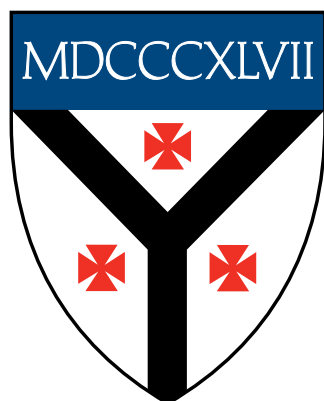


Graduate School of Arts and Sciences

Programs and Policies

2015–2016



BULLETIN OF YALE UNIVERSITY

Series 111 Number 5 July 15, 2015

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Contents

The President and Fellows of Yale University	7
The Officers of Yale University	8
The Administration of the Graduate School	9
Schedule of Academic Dates and Deadlines	10
A Message from the Dean	14
The Graduate School of Arts and Sciences	15
Mission Statement	15
Yale and the World	15
The Dean	17
Associate and Assistant Deans for Academic Affairs	17
Directors of Graduate Studies (DGS)	18
Graduate Student Development and Diversity	18
McDougal Graduate Student Center	19
Admissions	20
Business Operations	20
Financial Aid	20
Registrar's Office	21
Teaching Fellow Program	21
Affiliated Offices	21
Committees	24
Graduate Student Assembly (GSA)	24
Graduate-Professional Student Senate (GPSS)	25
Degree-Granting Departments and Programs	26
African American Studies	27
African Studies	33
American Studies	40
Anthropology	53
Applied Mathematics	67
Applied Physics	70
Archaeological Studies	75
Architecture	81
Astronomy	85
Biomedical Engineering	89
Cell Biology	90
Cellular and Molecular Physiology	95
Chemical & Environmental Engineering	100
Chemistry	101
Classics	106
Comparative Literature	118
Computational Biology and Bioinformatics	128
Computer Science	132
East Asian Languages and Literatures	139

East Asian Studies	144
Ecology and Evolutionary Biology	148
Economics	153
Electrical Engineering	163
Engineering & Applied Science	164
English Language and Literature	185
European and Russian Studies	193
Experimental Pathology	197
Film and Media Studies	202
Forestry & Environmental Studies	208
French	216
Genetics	220
Geology and Geophysics	226
Germanic Languages and Literatures	233
Global Affairs	238
History	248
History of Art	267
History of Science and Medicine	276
Immunobiology	281
International and Development Economics	288
Investigative Medicine	290
Italian Language and Literature	294
Law	298
Linguistics	300
Management	312
Mathematics	318
Mechanical Engineering & Materials Science	321
Medieval Studies	322
Microbiology	324
Molecular Biophysics and Biochemistry	328
Molecular, Cellular, and Developmental Biology	337
Music	345
Near Eastern Languages and Civilizations	349
Neurobiology	362
Neuroscience	372
Nursing	378
Pharmacology	384
Philosophy	389
Physics	397
Political Science	405
Psychology	419
Public Health	432
Religious Studies	446
Renaissance Studies	454

Slavic Languages and Literatures	463
Sociology	468
Spanish and Portuguese	476
Statistics	480
Non-Degree-Granting Programs, Councils, and Research Institutes	486
Atmospheric Science	486
Biological and Biomedical Sciences, Combined Program in the	487
The Cowles Foundation	490
The Economic Growth Center	491
Humanities: Mellon Program	492
Institution for Social and Policy Studies	494
International Security Studies	495
Jackson Institute for Global Affairs	496
Judaic Studies	497
The MacMillan Center	502
African Studies, Council on	507
East Asian Studies, Council on	509
European Studies Council	511
Latin American and Iberian Studies, Council on	514
Middle East Studies, Council on	517
South Asian Studies Council	519
Southeast Asia Studies, Council on	523
Physical and Engineering Biology, Integrated Graduate Program in	525
Women's, Gender, and Sexuality Studies	527
Yale Center for the Study of Globalization	532
Yale Climate and Energy Institute	533
Yale Initiative for the Study of Antiquity and the Premodern World	534
Policies and Regulations	537
Admissions	537
Programs of Study	538
Full-Time Degree Candidacy	
Part-Time Study	
Nondegree Study	
Interdisciplinary Study	
Combined and Joint-Degree Programs	
Exchange Scholar Program	
International Graduate Student Exchange Agreements	
Summer Study	
Degree Requirements	542
Requirements for the Degree of Doctor of Philosophy	
Requirements for the Degree of Master of Philosophy	
Requirements for the Degree of Master of Arts or Master of Science	
Requirements for Joint-Degree Programs	
Responsible Conduct in Research	

Petitioning for Degrees	
Commencement	
Academic Regulations	555
Registration	
Course Enrollment	
Grades	
Registration Status and Leaves of Absence	
Personal Conduct	
Grievance Procedures	
Freedom of Expression	
Financing Graduate School	572
Tuition and Fees, 2015–2016	572
Student Accounts and Bills	573
Transcripts	574
Financial Aid	574
University Fellowships	
Dissertation Fellowships	
Teaching Fellowships	
Traineeships and Assistantships in Research	
Research Appointments	
External Fellowships and Combined Award Policy	578
Eligibility for Fellowships	578
Other Means of Financing Graduate Education	579
Part-Time Employment	
Loans and Work-Study	
Two Federal Regulations Governing Title IV Financial Aid Programs	580
Satisfactory Academic Progress	
Department of Education Refund Policy	
Yale University Resources and Services	581
Living Accommodations	581
Graduate Housing – On Campus	
Off-Campus Listing Service	
University Properties	
Dining	
Health Services	582
Computing and Telecommunications	586
Office of International Students and Scholars	587
Resource Office on Disabilities	588
Resources on Sexual Misconduct	588
The Work of Yale University	591
Campus Map	594

The President and Fellows of Yale University

President

Peter Salovey, A.B., M.A., Ph.D.

Fellows

His Excellency the Governor of Connecticut, *ex officio*

Her Honor the Lieutenant Governor of Connecticut, *ex officio*

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Peter Brendan Dervan, B.S., Ph.D., San Marino, California

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Charles Waterhouse Goodyear IV, B.S., M.B.A., New Orleans, Louisiana

Catharine Bond Hill, B.A., B.A., M.A., Ph.D., Poughkeepsie, New York (*June 2019*)

Paul Lewis Joskow, B.A., Ph.D., New York, New York

William Earl Kennard, B.A., J.D., Charleston, South Carolina

Margaret Hilary Marshall, B.A., M.Ed., J.D., Cambridge, Massachusetts

Gina Marie Raimondo, A.B., D.Phil., J.D., Providence, Rhode Island (*June 2020*)

Emmett John Rice, Jr., B.A., M.B.A., Bethesda, Maryland (*June 2017*)

Eve Hart Rice, B.A., M.D., Bedford, New York (*June 2021*)

Kevin Patrick Ryan, B.A., M.B.A., New York, New York (*June 2018*)

Douglas Alexander Warner III, B.A., Hobe Sound, Florida

The Officers of Yale University

President

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Bruce Donald Alexander, B.A., J.D.

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Vice President for Alumni Affairs and Development

Joan Elizabeth O'Neill, B.A.

Vice President and General Counsel

Alexander Edward Dreier, A.B., M.A., J.D.

The Administration of the Graduate School

Office of the Dean

Lynn Cooley, Ph.D., Dean of the Graduate School

Susanne Olsen, Senior Executive Assistant to the Dean

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Allegra di Bonaventura, J.D., Ph.D., Associate Dean of the Graduate School

Michelle Nearon, Ph.D., Associate Dean for Graduate Student Development and Diversity; Director, Office for Graduate Student Development and Diversity

Richard G. Sleight, Ph.D., Associate Dean of the Graduate School

Robert Harper-Mangels, Ph.D., Assistant Dean of the Graduate School

Carl Hashimoto, Ph.D., Assistant Dean of the Graduate School

Elena D. Kallestinova, Ph.D., Assistant Dean of the Graduate School; Director of Graduate Writing, Yale Center for Teaching and Learning

Robin Ladouceur, Ph.D., Assistant Dean of the Graduate School

Graduate Student Life

Lisa Brandes, Ph.D., Assistant Dean for Student Affairs; Director, Graduate Student Life, McDougal Graduate Student Center

Jennifer Mendelsohn, M.S., Associate Director, Graduate Student Life, McDougal Graduate Student Center

Graduate Admissions

Robert Colonna, M.B.A., Director of Admissions

Lisa Furino, Assistant Director of Admissions

Financial Aid

Jennifer Brinley, B.S., Director of Financial Aid

Howard el-Yasin, M.A., Assistant Director, Teaching Fellow Program

Susan Wroszek, Assistant Director of Financial Aid

Administration

Mary Magri, M.B.A., Lead Administrator for the Dean's Administration

Other Academic Officers with Responsibilities in the Graduate School

Peter Salovey, Ph.D., President

Benjamin Polak, Ph.D. Provost

Tamar S. Gendler, Ph.D., Dean of the Faculty of Arts and Sciences

Schedule of Academic Dates and Deadlines

FALL TERM 2015

Aug. 24	M	New student orientation week begins
Aug. 26	W	Fall-term Online Course Selection (OCS) begins
Aug. 27	TH	Matriculation ceremony
Aug. 28	F	Oral Performance Assessment for international students in Ph.D. programs
Aug. 31	M	<i>Teaching @ Yale Day</i> : orientation for all new Teaching Fellows
Sept. 2	W	Fall-term classes begin, 8:20 a.m.
Sept. 4	F	Friday classes do not meet. Monday classes meet instead
Sept. 7	M	Labor Day. Classes do not meet
Sept. 11	F	Final day to apply for a fall-term personal leave of absence The entire fall-term tuition charge or continuous registration fee (CRF) will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a leave of absence effective on or before this date
Sept. 15	T	Final day to file petitions for M.A., M.S., and M.Phil. degrees to be awarded in December Due date to notify department of intention to submit dissertation for award of the Ph.D. in December
Sept. 16	W	Fall-term Online Course Selection (OCS) ends Final day for registration. <i>A fee of \$50 is assessed for course schedules accepted after this date</i>
Sept. 25	F	One-half of the fall-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. <i>The CRF is not prorated</i>
Oct. 1	TH	Due date for dissertations to be considered by the Degree Committees for award of the Ph.D. in December Final date for the faculty to submit grades to replace grades of Temporary Incomplete (TI) awarded during the previous academic year
Oct. 20	T	October recess begins, 5:20 p.m.

Oct. 26	M	Classes resume, 8:20 a.m.
Oct. 30	F	Midterm Readers' Reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in December Final day to change enrollment in a fall-term course from Credit to Audit or from Audit to Credit Final day to withdraw from a fall-term course One-quarter of the fall-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. <i>The CRF is not prorated</i> Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date
Nov. 5	TH	Departmental recommendations are due for candidates for December degrees Final day to withdraw a degree petition for degrees to be awarded in December
Nov. 12	TH	Oral Proficiency Assessment for international students in all GSAS degree programs
Nov. 20	F	November recess begins, 5:20 p.m.
Nov. 30	M	Classes resume, 8:20 a.m. Final day to submit petitions for extended registration and Dissertation Completion status for the spring term
Dec. 16	W	Classes end, 5:20 p.m.
Dec. 17	TH	Final examinations begin
Dec. 22	T	Examinations end. Winter recess begins

SPRING TERM 2016

Jan. 4	M	Final grades for fall-term courses due
Jan. 13	W	Spring-term Online Course Selection (OCS) begins
Jan. 19	T	Spring-term classes begin, 8:20 a.m. Registration begins <i>Teaching @ Yale Day:</i> orientation for all new Teaching Fellows

Jan. 28	TH	<p>Final day to apply for a spring-term personal leave of absence</p> <p>The entire spring-term tuition charge or CRF will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a leave of absence effective on or before this date</p>
Jan. 29	F	<p>Spring-term Online Course Selection (OCS) ends</p> <p>Final day for registration. <i>A fee of \$50 is assessed for course schedules accepted after this date</i></p>
Feb. 12	F	<p>One-half of the spring-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. <i>The CRF is not prorated</i></p>
Mar. 1	T	<p>Final day to file petitions for M.A., M.S., and M.Phil. degrees to be awarded in May</p> <p>Due date to notify department of intention to submit dissertation for award of the Ph.D. in May</p>
Mar. 11	F	<p>Midterm</p> <p>Spring recess begins, 5:20 p.m.</p> <p>One-quarter of the spring-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a medical leave of absence effective on or before this date. <i>The CRF is not prorated</i></p> <p>Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date</p>
Mar. 15	T	<p>Due date for dissertations to be considered by the Degree Committees for award of the Ph.D. in May</p>
Mar. 28	M	<p>Classes resume, 8:20 a.m.</p>
Apr. 8	F	<p>Final day to change enrollment in a spring-term course from Credit to Audit or from Audit to Credit</p> <p>Final day to withdraw from a spring-term course</p>
Apr. 15	F	<p>Readers' Reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in May</p> <p>Oral Proficiency Assessment for international students in all GSAS degree programs</p>

Apr. 21	TH	Departmental recommendations are due for candidates for May degrees Final day to withdraw a degree petition for degrees to be awarded in May
May 5	TH	Classes end, 5:20 p.m.
May 6	F	Final examinations begin Final day to submit Dissertation Progress Reports Final day to submit petitions for extended registration and Dissertation Completion status for the subsequent academic year
May 11	W	Final examinations end
May 13	F	Final grades for spring-term courses are due for candidates for terminal M.A. and M.S. degrees to be awarded at Commencement
May 22	SU	Graduate School Convocation
May 23	M	University Commencement
June 1	W	Final grades for spring-term courses and full-year courses are due

A Message from the Dean

Welcome to the Graduate School of Arts and Sciences at Yale University, the first of its kind in North America. The Graduate School stands at the very heart of Yale's mission as a university, and this publication, *Programs and Policies*, reveals the extraordinary breadth of opportunities for graduate study at Yale. As you peruse it, you likely will discover the intriguing ways in which graduate study differs from the undergraduate experience and the fulfillment brought by this intellectual progression. You have undertaken to explore a field in depth, master an area of inquiry, and learn to disseminate knowledge through classroom teaching. Graduate education culminates in a creative and original contribution in one's field of study representing the ability to participate in the advancement of human knowledge.

Yale's departments and programs constitute the center for most graduate student intellectual and social life at Yale. They comprise vital communities of scholars who share a common interest in advancing a particular discipline, and graduate students and faculty alike gain immeasurably from their intellectual and disciplinary collaborations. Yale's excellent laboratory facilities, unique museum collections, and tremendous library holdings all enrich the experience of a Yale University graduate education.

The Graduate School of Arts and Sciences has worked to extend and enrich the community life found within these disciplines. Interdisciplinary programs and institutes, as well as the events offered by the McDougal Graduate Student Center, the Office of Career Strategy, and the Center for Teaching and Learning, help graduate students prepare for their professional lives. The Graduate School enables students to connect with skilled experts with a shared commitment to careers in teaching, research, and an array of potential leadership opportunities.

Use *Programs and Policies* as a guide throughout your graduate study at Yale. It includes practical information about registration, financial aid, teaching experiences, University resources available to you, and the full range of assistance provided by the Graduate School. All of us in the Graduate School wish you good fortune as you pursue your advanced degree, and we want you to contact us if we can help you along the way. Graduate study is exhilarating and life-changing. For well over a century Yale has prepared women and men for truly extraordinary careers across many old, new, and evolving disciplines.

Lynn Cooley, Ph.D.
Dean, Graduate School of Arts and Sciences
C.N.H. Long Professor of Genetics and Professor
of Cell Biology and of Molecular, Cellular, and
Developmental Biology

The Graduate School of Arts and Sciences

The Yale Graduate School of Arts and Sciences is one of fourteen schools composing Yale University and the only one that awards the degrees of Doctor of Philosophy, Master of Philosophy, Master of Arts, and Master of Science. The work of the Graduate School is carried on in the divisions of the Humanities, Social Sciences, and Biological and Physical Sciences. Fifty-six departments and programs offer courses of study leading to the Ph.D. degree. There are nineteen programs that terminate with the master's degree.

Yale began to offer graduate education in 1847, and in 1861 it conferred the first Ph.D. degrees in North America. In 1876 Yale became the first American university to award the Ph.D. to an African American. The Graduate School of Arts and Sciences was formally established in 1892, when the first dean was appointed. It was in that same year that women were first admitted as candidates for the doctorate.

The Graduate School community has grown vigorously since the early twentieth century; today it comprises more than 2,800 graduate students and a faculty of 999 who are among the world's most distinguished teachers and scholars. Admission to the Graduate School is highly competitive; currently each entering class is made up of about 600 students.

The Graduate School's purpose is to educate students in research, scholarship, and teaching in the arts and sciences. Under the guidance of the faculty, graduate students engage in advanced study of a discipline and then proceed to generate new knowledge and ideas through research. They learn to disseminate this knowledge in scholarly publications and teaching. Yale's graduate students have built careers in colleges and universities, research laboratories, government, the nonprofit sector, and private industry. Their education equips them for leadership roles in all these callings.

Yale's standing as a great international research university is based on the strength and attractiveness of its graduate programs. The pursuit of advanced learning and new knowledge takes place in the departments and programs of the Graduate School. Thus it is the Graduate School that makes Yale a university. Furthermore, graduate students as scholars in training and apprentice teachers engage with undergraduates and the faculty. A shared sense of common purpose makes Yale a community of scholars, and a place for an unusually intimate exchange of ideas.

MISSION STATEMENT

The mission of the Graduate School of Arts and Sciences is to seek students of the highest intellectual promise and achievement of all backgrounds, from across the nation and around the world, and to educate them to be scholars, teachers, and leaders for many sectors of society. The larger aim of this enterprise is to prepare and stimulate each new generation to perpetuate and advance human knowledge and to contribute to the health and development of the human community.

YALE AND THE WORLD

The Yale Graduate School has always comprised an international community, but it recognizes as well that now, more than ever, advanced scholarship must occur on

transnational grounds. It is increasingly important that we prepare our students to participate in a global economy of research and knowledge and that we create institutional channels through which such participation can flourish. In addition to formal student exchanges that enable graduate students to perform research and fieldwork abroad, individual faculty members, departments, and the School participate in collaborative efforts with international partners.

Approximately one-third of full-time graduate students at Yale come from outside the United States. In addition, many international students come to the Graduate School as nondegree students in the Division of Special Registration (DSR). DSR students may undertake course work and/or research for periods of one term or one year. When appropriate the period may extend for a second year. These students are subject to the usual admissions procedure, are admitted to a department, and often work with a specific faculty member. See *International Student Life* for additional information regarding international student life at Yale.

A Global University

The University's engagement beyond the United States dates from its earliest years. Yale has drawn students from abroad for nearly two centuries, and international issues have been represented in its curriculum for the past hundred years and more. Yale continues to evolve as a global university, educating leaders and advancing the frontiers of knowledge not simply for the United States, but for the entire world.

Today, Yale welcomes the largest number of international students and scholars in its history. The current enrollment of approximately 2,500 international students from more than 115 countries comprises 20 percent of the student body. Yale is committed to attracting the best and brightest from around the world by offering generous international financial aid packages. The number of international scholars (visiting faculty, researchers, and postdoctoral fellows) has also grown to nearly 2,500 every year.

Yale's globalization is guided by three overarching goals: prepare students for leadership and service in an increasingly interdependent world, attract the most talented students and scholars to Yale from around the world, and position Yale as a global university of consequence. These efforts are coordinated by several University-wide organizations, in addition to the work being done within the individual schools and programs.

The Whitney and Betty MacMillan Center for International and Area Studies (www.yale.edu/macmillan) is the University's focal point for teaching and research on international affairs, societies, and cultures.

The Jackson Institute for Global Affairs (<http://jackson.yale.edu>) seeks to institutionalize the teaching of global affairs throughout the University and to inspire and prepare Yale students for global citizenship and leadership.

The Office of International Affairs (<http://world.yale.edu/oia>) supports the international activities of all schools, departments, offices, centers, and organizations at Yale; promotes Yale and its faculty to international audiences; and works to increase the visibility of Yale's international activities around the globe.

The Office of International Students and Scholars (www.yale.edu/oiss) is a resource on immigration matters and hosts orientation programs and social activities for the University's international community.

The Yale Center for the Study of Globalization (www.ycsg.yale.edu) draws on the intellectual resources of the Yale community, scholars from other universities, and experts from around the world to support teaching and research on the many facets of globalization, and to enrich debate through workshops, conferences, and public programs.

The Yale World Fellows Program (<http://worldfellows.yale.edu>) hosts fifteen emerging leaders from outside the United States each year for an intensive semester of individualized research, weekly seminars, leadership training, and regular interactions with the Yale community.

The Association of Yale Alumni (www.aya.yale.edu) provides a channel for communication between the alumni and the University and oversees the direction of alumni organizations and programs around the world.

Yale's online international toolkit (<http://world-toolkit.yale.edu>) provides a central point of access to resources and assistance for Yale faculty, students, postdocs, and staff conducting international activities abroad or on campus. Additional information may be found on the "Yale and the World" Web site (<http://world.yale.edu>), including links to international initiatives across the University.

THE DEAN

Lynn Cooley, grad.dean@yale.edu

The dean of the Graduate School is appointed by the president of the University and is responsible for the educational mission of the Graduate School, the quality of its programs, and the welfare of graduate students.

ASSOCIATE AND ASSISTANT DEANS FOR ACADEMIC AFFAIRS

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Carl Hashimoto, Assistant Dean, carl.hashimoto@yale.edu

Robin Ladouceur, Assistant Dean, robin.ladouceur@yale.edu

The academic deans of the Graduate School are responsible for the administration of graduate programs, normally in consultation with the directors of graduate studies, and for the academic and personal well-being of students. They participate in decisions regarding admissions, financial aid, academic performance, and the application of the regulations and policies of the Graduate School.

Dean Schirmeister, Dean di Bonaventura, and Dean Ladouceur oversee Ph.D. and terminal master's programs in African American Studies; African Studies; American

Studies; Archaeological Studies; Architecture; Classics; Comparative Literature; East Asian Languages and Literatures; East Asian Studies; Economics; English Language and Literature; European and Russian Studies; Film and Media Studies; French; Germanic Languages and Literatures; Global Affairs; History; History of Art; History of Science and Medicine; International and Development Economics; Italian Language and Literature; Law; Management; Medieval Studies; Music; Near Eastern Languages and Civilizations; Philosophy; Political Science; Religious Studies; Renaissance Studies; Slavic Languages and Literatures; Sociology; and Spanish and Portuguese.

Dean Sleight, Dean Harper-Mangels, and Dean Hashimoto oversee Ph.D. and terminal master's programs in Anthropology; Applied Mathematics; Applied Physics; Astronomy; Biological and Biomedical Sciences; Biomedical Engineering; Cell Biology; Cellular and Molecular Physiology; Chemical & Environmental Engineering; Chemistry; Computational Biology and Bioinformatics; Computer Science; Ecology and Evolutionary Biology; Electrical Engineering; Experimental Pathology; Forestry & Environmental Studies; Genetics; Geology and Geophysics; Immunobiology; Investigative Medicine; Linguistics; Mathematics; M.D./Ph.D. Program; Mechanical Engineering & Materials Science; Microbiology; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; Neurobiology; Neuroscience; Nursing; Pharmacology; Physics; Psychology; Public Health; and Statistics.

DIRECTORS OF GRADUATE STUDIES (DGS)

A senior faculty member, appointed by the dean, serves as director of graduate studies (DGS) for each department or program. The directors of graduate studies are responsible for the satisfactory administration of the programs of graduate study and function as advisers and guides to all graduate students in their respective departments and programs. They help graduate students to plan an appropriate course of study and research, and advise on and approve course schedules. The DGS acts as the liaison between each student in the department or program and the Office of the Dean.

GRADUATE STUDENT DEVELOPMENT AND DIVERSITY

Michelle Nearon, Associate Dean for Graduate Student Development and Diversity;

Director, OGSDD, 206 Warner House, 1 Hillhouse Ave., 203.436.1301
<http://gsas.yale.edu/diversity>

The Office for Graduate Student Development and Diversity's mission is to expand the diversity of the student body and to enhance the intellectual experience of the entire scholarly community. The office coordinates efforts to recruit and retain students of color, women, and other diverse groups at Yale Graduate School. The associate dean works collaboratively with departments and programs to support the needs of these students as they pursue graduate study. The associate dean advises prospective and current minority graduate students, directs the Summer Undergraduate Research Fellowship (SURF) Program, co-directs the Postbaccalaureate Research Education Program, oversees Diversity Recruitment Days, coordinates the Annual Yale Bouchet Conference on Diversity and Graduate Education, writes and administers grants, and provides reports on the Graduate

School's progress in recruiting and retaining diverse students. Graduate Diversity Fellows within the office are also appointed annually to assist the office in the development and implementation of a wide array of programs, such as application seminars, mentoring programs, discussions and lectures presented by diverse scholars, and social and cultural events. An Advisory Committee, appointed by the dean, meets regularly to discuss and review the office's programmatic efforts.

MCDUGAL GRADUATE STUDENT CENTER

Hall of Graduate Studies, 203.432.BLUE (2583)

<http://gsas.yale.edu/life-yale/mcdougal-graduate-student-center>

A generous gift from Mr. Alfred McDougal '53, a Yale alumnus, and his wife, Ms. Nancy Lauter, enabled Yale to create the McDougal Graduate Student Center in 1997. The McDougal Center provides space and programs for building intellectual, cultural, and social community, as well as facilitating professional development activities across the departments of the Graduate School. The McDougal Center endowment supports the facilities of the center and the appointment of more than fifty McDougal Fellows in five offices who create programs and services for the graduate community.

Graduate Student Life

Lisa Brandes, Assistant Dean for Student Affairs and Director, 126 HGS, 203.432.2583,
mcdougal.center@yale.edu

Jennifer Mendelsohn, Associate Director, 125 HGS, 203.432.2583,
mcdougal.center@yale.edu

<http://gsas.yale.edu/life-yale/graduate-student-life-office>

The Office of Graduate Student Life is responsible for student life programs in the McDougal Center and student services in the Graduate School. McDougal Graduate Fellows and staff produce a wide array of student life programs, including concerts; arts, literary, music, sports, and cultural events; health and wellness programs; outings; family activities and resources; international student events; religious and spiritual events; public service opportunities; and monthly happy hours, dances, and events for various student groups. Graduate Student Life provides advice and support to graduate student organizations, which may sponsor events at the center. Activities are announced in the weekly e-mail McDougal Life Notes, through specialized e-mail lists, and on the McDougal Center Student Life Web calendar at the site listed above. This office also oversees the facilities and general services of the McDougal Center, including meeting rooms and room requests, online ticket sales, and lockers.

In collaboration with the Office of the Vice President for Student Life, the assistant dean for student affairs coordinates general campus services for graduate students, serving as a graduate student advocate and departmental liaison for graduate housing, dining services, health services, athletics, security, chaplains, child care, and parking and transit. The assistant dean and staff are available to answer questions or help with any problems that students may have, including speaking individually about issues concerning their life at Yale and other personal matters and concerns. The Graduate Student Life office

also assists departmental recruitment activities and organizes new student orientation, GS Dean's social events, and other events for the Graduate School community, including the Graduate School's participation in the University's Commencement exercises.

ADMISSIONS

Robert Colonna, Director, 307 Warner House, 1 Hillhouse Ave., 203.432.2771,
graduate.admissions@yale.edu

Lisa Furino, Assistant Director, 302 Warner House, 1 Hillhouse Ave., 203.432.2771,
graduate.admissions@yale.edu

<http://gsas.yale.edu/admission-graduate-school>

The Office of Graduate Admissions coordinates and oversees all aspects of application to the Graduate School for individuals seeking master's and doctoral degrees, as well as for nondegree study. The office also works with the associate deans and academic departments to provide relevant information and decisions to applicants.

BUSINESS OPERATIONS

Mary Magri, Lead Administrator for the Dean's Administration, Warner House,
1 Hillhouse Ave., 203.432.7980, mary.magri@yale.edu

The Office of Business Operations is responsible for all financial transactions in the Graduate School, overseeing both financial aid and operating activities. Working with the dean and others, the office develops and monitors all Graduate School budgets and expenditures, maintaining compliance with internal and external policies and regulations. The office provides support to the dean and Graduate School supervisory staff in hiring, training, and related human resources activities of the School. The office is a resource to Graduate School, University, and external organizations seeking interpretation of policies and regulations, providing guidance about procedures, reporting, and interactive systems.

FINANCIAL AID

Jennifer Brinley, Director, 106 Warner House, 1 Hillhouse Ave., 203.432.7980,
gradfinaid@yale.edu

<http://gsas.yale.edu/office-financial-aid>

The Office of Financial Aid is a resource to graduate students, departments, and non-Yale organizations needing guidance or assistance regarding financial aid policies and the administration of fellowships and student loan programs. The office oversees and maintains financial and data management systems and disburses all graduate student financial aid.

REGISTRAR'S OFFICE

Shonna Marshall, Associate University Registrar for Student Support, 246 Church Street, 203.436.8036, registrar@yale.edu

Claudia Schiavone, Assistant University Registrar, 246 Church Street, 203.432.2743, registrar@yale.edu

The Office of the Registrar maintains the academic records of all students in the Graduate School. In addition, the office develops course and classroom schedules and oversees registration, tuition charges, academic holds, dissertation submission, final clearance at graduation, and release of diplomas for Commencement. Students should consult this office to report changes in name or Social Security number, to request transcripts, or to certify their enrollment in the Graduate School. Students can change their address listing at www.yale.edu/sis.

TEACHING FELLOW PROGRAM

teaching.fellows@yale.edu

<http://gsas.yale.edu/academic-professional-development/teaching-fellow-program>

The Teaching Fellow Program is the principal framework at Yale in which graduate students learn to become effective teachers. Learning to teach and to evaluate student work is fundamental to the education of graduate students. The Teaching Fellow Program provides opportunities for graduate students to develop teaching skills, under faculty guidance, through active participation in the teaching of Yale undergraduates. Teaching fellows who encounter problems or difficulties related to their teaching roles are encouraged to meet with the director of the Teaching Fellow Program or their associate dean.

AFFILIATED OFFICES

Office of Career Strategy

Jeanine Dames, Director; Assistant Dean, Yale College; careerstrategy@yale.edu
55 Whitney Ave., 3rd Floor
<http://ocs.yale.edu>

The Office of Career Strategy assists currently enrolled degree students in the Graduate School of Arts and Sciences and recent alumni with career advising, nonacademic employment opportunities, and career development resources. Offerings include individual advising appointments and daily walk-in hours; workshops, programs, and online webinars; employer recruiting events, information sessions, and an on-campus interview program; alumni networking events; an employer database with more than 10,000 registered employers and an online job posting resource with current opportunities; an interactive mock interview system; partnerships with external career partners such as New York Academy of Sciences as well as Versatile PhD; and the Office of Career Strategy McDougal Fellows, who plan programming unique to graduate students and offer peer advising. All degree students in the Graduate School of Arts and Sciences receive regular communication and program updates from the Office of Career Strategy

via its weekly e-newsletter. In addition, degree students can view its calendar of events and make appointments with a career adviser via Symplicity, the office's career services management system.

Yale Center for Teaching and Learning

Jennifer Frederick, Executive Director, jennifer.frederick@yale.edu

113 HGS

<http://ctl.yale.edu>

The Yale Center for Teaching and Learning (CTL) supports teaching excellence and innovation campuswide and unites Yale's work in online education with the University's other pedagogical initiatives. Several units within the CTL are focused exclusively on professional development and skill-based training for graduate and professional school students.

The CTL's McDougal Program for Graduate Teaching offers a full range of training, consultation, and teacher development services to teaching fellows and postdoctoral fellows at Yale. The professional staff and graduate teaching consultants are available throughout the year and in a variety of capacities to provide assistance and training in a wide array of topics and issues. For first-time teaching fellows, the center organizes Fundamentals of Teaching courses for specific departments, such as Chemistry, Engineering & Applied Science, History, Music, Political Science, and Physics. (Departments and programs seeking their own discipline-centered program should contact the CTL.) In addition, the center offers Fundamentals of Teaching courses in the humanities, social sciences, sciences, and foreign languages. For more advanced graduate teachers, the CTL offers workshops on topics such as classroom management, course design, grading, instructional technology, and leading discussions. It also offers upper-level programs to help graduate students prepare for the academic job market, including sessions on interview preparation, syllabus design, and developing a teaching portfolio, including writing a teaching statement. The CTL also offers an extensive program of individual consultations and coaching, which may include classroom visits and videotaping. All of the CTL's programs and consultations are strictly confidential. Graduate students who avail themselves of these and other on-campus teaching programs can obtain a Certificate of College Teaching Preparation (CCTP). Through its Spring Teaching Forum, the CTL provides a venue for members of the Yale community to discuss issues in education and pedagogy. Its Associates in Teaching program allows graduate students to co-design and co-teach a course with a faculty mentor.

On the CTL Web site, graduate students will find a variety of online teaching resources, including a calendar of events, descriptions of the CTL programs, a "Teaching How-To" for new and returning teachers, and modules on important teaching topics. The CTL connects with graduate students through its blog, Facebook page, and Twitter account, all of which are accessible at <http://teaching.yale.edu>. All graduate students also receive its occasional e-newsletter about upcoming and new programs and events.

GRADUATE WRITING CENTER

Elena D. Kallestinova, Assistant Dean and Director, 35 Broadway, Rm. 210,
203.432.7725, elena.kallestinova@yale.edu, grad.writing@yale.edu
[http://gsas.yale.edu/academic-professional-development/
yale-center-teaching-learning/graduate-writing-center](http://gsas.yale.edu/academic-professional-development/yale-center-teaching-learning/graduate-writing-center)

The Graduate Writing Center (GWC), a unit of the CTL, offers resources to all currently enrolled GSAS students who want to grow as successful academic writers. The center offers support through individual advising, academic writing workshops, writing groups, and online resources. Graduate students are encouraged to schedule individual writing consultations with Graduate Writing Advisers, available throughout the academic year and meeting in the GWC, the Center for Science and Social Science Information (CSSSI), and the Cushing/Whitney Medical Library. During these consultations, the students can receive feedback on their written course work, grant proposals, fellowship applications, conference presentations, research papers, prospectuses, and dissertation chapters. In addition, the center offers a comprehensive program of workshops, seminars, and discussion panels led by the director, Graduate Writing Fellows, and invited speakers. These workshops relate to topics of academic research, writing, and publishing and take place at different locations convenient for the graduate students. The center also organizes regular writing groups including peer-review groups, dissertation boot camps, and study halls. These groups help students with the process of writing and provide accountability and peer support. A complete list of programs, together with a variety of handouts and online resources, is available through the GWC Web site and the e-newsletter circulated among graduate students.

CENTER FOR LANGUAGE STUDY

Nelleke Van Deusen-Scholl, Director; Associate Dean, Yale College; 203.432.6456,
nelleke.vandeusen-scholl@yale.edu
Suzanne Young, Associate Director, 203.432.0168, suzanne.young@yale.edu
Dow Hall, 370 Temple St.
<http://cls.yale.edu>

The Center for Language Study (CLS), a unit of the CTL, supports language teaching and learning across the university. For graduate students in language and literature programs, it offers a Certificate in Second Language Acquisition that includes pedagogy workshops, a capstone course in SLA, and a series of professional development workshops that, taken together, give graduate students grounding in the theory and practice of language teaching. Graduate students have found the SLA Certificate helpful in preparing for the job market, in part because the teaching ePortfolio they prepare as they exit the program is attractive to hiring committees. For international graduate students, the CLS offers the English Language Program (ELP), which includes a Summer Program for incoming students, a series of courses that focus on academic English and teaching in the American classroom, workshops on a range of topics such as pronunciation and public speaking, and a final assessment that certifies graduate students for teaching at Yale. The goal of ELP is to prepare international graduate students for success in their academic and professional lives here at Yale and beyond. For more information, contact

James Tierney at james.tierney@yale.edu. Finally, the CLS offers two programs for independent language learning, Directed Independent Language Study (DILS) and Fields, both of which are available to graduate students. DILS matches students who want to study languages not taught at Yale with an educated native speaker of that language. Fields matches advanced students of any language (including those taught at Yale) with a language partner to study a language and a field together (e.g., Chinese and Economics). Although neither DILS nor Fields carries course credit, graduate students often use these programs to prepare for field study and research, and for fellowship applications. For more information, contact Angela Gleason at angela.gleason@yale.edu.

COMMITTEES

Currently four standing committees are concerned with the policies and procedures of the Graduate School; as with all standing committees, their deliberations are confidential. Student members of these committees are selected by the Graduate Student Assembly.

The Executive Committee A committee of faculty members and graduate students, chaired by the dean, advises the dean on broad matters of policy and procedure and makes recommendations to the faculty of the Graduate School.

The Degree Committees There are three degree committees, serving the divisions of Humanities, Social Sciences, and Biological and Physical Sciences. The degree committees, composed of members of the division's faculty and chaired by the dean, meet twice a year and are responsible to the faculty of the Graduate School for maintaining standards of graduate education in the School and for recommending candidates for degrees. They review special academic problems of individual students and, when appropriate, the educational programs of the departments.

Dean's Advisory Committee on Student Grievances Composed of three graduate students, three faculty members, normally one from each division, and one administrator of the Graduate School, the committee reviews complaints brought by graduate students against a member of the faculty or administration of the Graduate School (see Grievance Procedures, under Policies and Regulations).

The Committee on Regulations and Discipline Composed of three graduate students, three faculty members, normally one from each division, and an associate dean, the committee reviews violations of the regulations governing academic and personal conduct (see Personal Conduct, under Policies and Regulations).

GRADUATE STUDENT ASSEMBLY (GSA)

B43 HGS, 203.432.8893, gsa@yale.edu
<http://gsa.yale.edu>

Students in the Graduate School are represented collectively by the Graduate Student Assembly, which provides a forum for students to address issues across the Graduate School and University. It consults with the dean and other administrators on proposed changes in Graduate School policy, raises concerns expressed by the student body,

nominates the student members of all Graduate School standing committees, and administers a conference travel fund for graduate students. Representatives to the assembly are elected by students in individual departments and degree programs. Each department or program has at least one student representative, with additional representatives allotted proportionally by size of the student population.

GRADUATE-PROFESSIONAL STUDENT SENATE (GPSS)

gpss@yale.edu

<http://gpss.yale.edu>

The Graduate and Professional Student Senate (GPSS or “Yale Senate”) is composed of elected representatives from each of the thirteen graduate and professional schools at Yale. Any student in these schools is eligible to run for a senate seat during fall elections. As a governing body, the GPSS advocates for student concerns and advancement within Yale, represents all graduate and professional students to the outside world, and facilitates interaction and collaboration among the schools through social gatherings, academic or professional events, and community service. GPSS meetings occur on alternating Thursdays and are open to the entire graduate and professional school community, as well as representatives from the Yale administration. GPSS also oversees the management of the Graduate and Professional Student Center at Yale (GPSCY), located at 204 York Street. GPSCY provides office and event space for GPSS and other student organizations and houses Gryphon’s Pub.

Degree-Granting Departments and Programs

This section provides information on all degree-granting departments and programs of the Graduate School of Arts and Sciences. Each listing provides a roster of faculty, special admissions and degree requirements, and course offerings for that department or program. The requirements appearing in the *Graduate School of Arts and Sciences Programs and Policies* take precedence over any statements published separately by individual departments and programs.

The degree requirements of the Graduate School itself appear later in this publication, under Policies and Regulations. These apply to all students in the Graduate School, although there are variations in the pattern of their fulfillment in individual departments and programs. The requirements of the Graduate School may change from time to time. If a requirement changes within the period normally required for completion of a student's course of study, the student will normally be given the choice of completing either the new or the old requirement.

The requirements of individual departments also may change from time to time, with the approval of the Graduate School. After such approval has officially been given, students in that department or program will receive written notification. All changes in departmental degree requirements occurring after the publication closing date of the *Graduate School of Arts and Sciences Programs and Policies* bulletin are posted on the departments' Web sites. General changes to degree requirements will be posted on the Graduate School's Web site.

The course listings and instructors that follow reflect information received by the registrar as of the publication date and are subject to change without notice. Students are advised to consult www.yale.edu/oci for the most recent information.

Fall-term courses are indicated by the letter "a," spring-term courses by the letter "b"; summer courses are indicated by the letter "c." Yearlong courses have no letter designation or list both "a" and "b." A superscript "u" after a course number indicates that the course also has a Yale College course number. Courses in brackets are not offered during the current academic year.

AFRICAN AMERICAN STUDIES

81 Wall Street, 203.432.1170
<http://afamstudies.yale.edu>
 M.A., M.Phil., Ph.D.

Chair

Jacqueline Goldsby (81 Wall St., jacqueline.goldsby@yale.edu)

Director of Graduate Studies

Gerald Jaynes (81 Wall St., gerald.jaynes@yale.edu)

Professors Elizabeth Alexander, Elijah Anderson, David Blight, Daphne Brooks (*on leave*), Hazel Carby, Glenda Gilmore, Jacqueline Goldsby, Emily Greenwood, Jonathan Holloway, Matthew Jacobson, Gerald Jaynes, Kobena Mercer, Christopher L. Miller, Joseph Roach, Robert Stepto (*on leave* [F]), Michael Veal

Associate Professors Jafari Allen, Crystal Feimster (*on leave*), Anthony Reed (*on leave*), Edward Rugemer (*on leave* [F]), Vesla Weaver (*on leave*)

Assistant Professors Vanessa Agard-Jones, Erica James, Christopher Lebron (*on leave*)

Fields of Study

The Department of African American Studies offers a combined Ph.D. in conjunction with several other departments and programs. Departments and programs that currently offer a combined Ph.D. with African American Studies are: American Studies, Anthropology, English, Film and Media Studies, French, History, History of Art, Political Science, Psychology, Religious Studies, Sociology, and Spanish and Portuguese. Within the field of study, the student will select an area of concentration in consultation with the directors of graduate studies of African American Studies and the joint department or program. An area of concentration in African American Studies may take the form of a single area study or a comparative area study: e.g., Caribbean or African American literature, a comparison of African American literature in a combined degree with the Department of English; an investigation of the significance of the presence of African cultures in the New World, either in the Caribbean or in Latin and/or South America in a combined degree with the Spanish and Portuguese department. An area of concentration may also follow the fields of study already established within a single discipline: e.g., race/minority/ethnic studies in a combined degree with Sociology. An area of concentration must either be a field of study offered by a department or fall within the rubric of such a field. Please refer to the description of fields of study of the prospective joint department or program.

Special Admissions Requirements

Strong undergraduate preparation in a discipline related to African American studies; writing sample; description of the fields of interest to be pursued in a combined degree. This is a combined degree program. To be considered for admission to this program you must indicate both African American Studies and one of the participating departments/programs listed above. Additionally, please indicate both departments on all supporting documents (personal statement, letters of recommendation, transcripts, etc.).

Special Requirements for the Ph.D. Degree

Students will be subject to the combined Ph.D. supervision of the African American Studies department and the relevant participating department or program. The student's academic program will be decided in consultation with an adviser, the director of graduate studies of African American Studies, and the director of graduate studies of the participating department or program and must be approved by all three. Students are required to take five courses in African American Studies, generally at least one course each term. Any variance in scheduling requires DGS approval. Core courses are (1) Theorizing Racial Formations (AFAM 505a/AMST 643a), which is a required course for all first-year graduate students in the combined program, and (2) Dissertation Prospectus Workshop (AFAM 895), a two-term course, which graduate students in their third year of study must satisfactorily complete. This workshop is intended to support preparation of the dissertation proposal; each student will be required to present his or her dissertation prospectus orally to the faculty and to turn in a written prospectus draft by the end of spring term. Three other graduate-level African American Studies courses are required: (1) a history course, (2) a social science course, and (3) a course in literature or culture.

Qualifying examinations and the dissertation proposal will be administered jointly by the program and participating department and must be passed within the time required by the participating department. A current tenured or ladder faculty member in African American Studies must serve on the dissertation committee, and the dissertation must have an African American Studies component. The total number of courses required will adhere to the requirements of the participating department or program. Each student must complete the minimum number of courses required by the participating department or program; African American Studies courses (excepting the dissertation prospectus workshop) count toward the participating department's or program's total. For details of these requirements, see the special requirements of the combined Ph.D. for the particular department printed in this bulletin. Students will be required to meet the foreign language requirements of the participating department (see Degree Requirements under Policies and Regulations). Students will not be admitted to candidacy until all requirements, including the dissertation prospectus, have been met and approved by the Graduate Studies Executive Committee of the African American Studies department and the participating department. If a student intends to apply for this combined Ph.D. in African American Studies and another department, he or she should consult the other department's Ph.D. requirements and courses.

The faculty in African American Studies consider teaching to be an essential component of graduate education, and students therefore will teach, under the supervision of departmental professors, in their third and fourth years.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. (en route to the combined Ph.D.) Students will be awarded a combined M.A. degree in African American Studies and the relevant participating department or program upon successful completion of all course work except the Dissertation Prospectus

Workshop, which is taken in the student's third year of study. See also Degree Requirements under Policies and Regulations.

More information is available on the department's Web site, <http://afamstudies.yale.edu>.

Courses

AFAM 505a/AMST 643a, Theorizing Racial Formations Jacqueline Goldsby

A required course for all first-year students in the combined Ph.D. program in African American Studies; also open to students in American Studies. This interdisciplinary reading seminar focuses on new work that is challenging the temporal, theoretical, and spatial boundaries of the field. T 2:30–4:30

AFAM 563b^U/AMST 651b^U/ENGL 951b^U, Ralph Ellison in Context Robert Stepto

This seminar pursues close readings of Ralph Ellison's essays, short fiction, and novels. The "in context" component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African America Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. Texts include Ellison's *Collected Essays*, *Flying Home and Other Stories*, *Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison's Invisible Man*; and A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. M 1:30–3:20

AFAM 580a/HSAR 785a, Cross-Cultural Aesthetics: From Hybridity to

Transculturation Kobena Mercer

Examines theories and methods in the reception of early-twentieth-century African American modernism, mid-twentieth-century studies of Caribbean art and culture, and black Atlantic art from the 1980s onward, addressing concepts of hybridity, creolization, syncretism, translation, and transculturation in the analysis of visual arts. W 3:30–5:20

AFAM 610a/AMST 725a/ENGL 939a, Making the African American Literary

Anthology Elizabeth Alexander

In this research seminar, students work on the compilation of the Library of America's historical anthology of African American poetry from the eighteenth century to the present. Debates about the canon inside and outside the academy have sharpened awareness of writers and works excluded from standard literary histories, and new archival discoveries have broadened our knowledge of material on black poetry at research centers such as the Schomburg Center, Boston University's Gotlieb Archival Research Center, Yale's Beinecke Library, and Emory University (Lucille Clifton papers), and also in privately held collections. Each student is responsible for extensive research on particular poets, periods, and/or eras in a series of short projects, and we work together on assembling the three-hundred-year anthology. Each student then designs an integrative archival project; because the anthology will have a visual component, students may also work with rare photographs, broadsides, recordings, and other ephemera. W 9:25–11:15

AFAM 613b/AMST 733b/ENGL 945b, Black Literature and U.S. Liberalism

Jacqueline Goldsby

An examination of mid-twentieth-century African American literature and the rise of anti-Communist liberalism in American politics and life. We consider how black-authored

fiction, drama, and poetry retheorized liberalism's tenets of agency, subjectivity, property, autonomy, sociality, and governmentality. Rather than accept the persuasive and oft-argued position that black literature published during these decades was "integrationist" and therefore politically suspect, this course interrogates the aesthetic and political ends that the "black liberal imagination" served during these critical decades and into our present-day cultural moment. W 9:25–11:15

AFAM 709b/AMST 709b/HIST 736b/WGSS 736b, Research in Twentieth-Century U.S. Political and Social History Glenda Gilmore

Projects chosen from the post-Civil War period, with an emphasis on twentieth-century social and political history, broadly defined. TH 9:25–11:15

AFAM 712a/FREN 935a, Aimé Césaire: One Hundred Years Christopher L. Miller
Observing the recent centenary of Aimé Césaire's birth, this seminar examines the totality of the poet-statesman's work. Each student takes responsibility for a work or topic and leads the class for one session. Conducted in English; reading knowledge of French required. TH 1:30–3:20

AFAM 736b/HSAR 790b/WGSS 788b, Bodies and Borders: Psychoanalysis, Race, and Representation Kobena Mercer

Introducing methods from cultural studies, postcolonial studies, and psychoanalysis, this seminar examines representations of black bodies in modern art and visual culture. Abolitionist, Orientalist, and primitivist painting and sculpture are investigated through concepts of fetishism, fantasy, and the gaze, and in light of post-1960s artistic practices addressing interracial border zones as sites of cross-cultural hybridity. Artists include Carl Van Vechten, Wifredo Lam, Adrian Piper, Robert Mapplethorpe, Kara Walker, and Renée Cox; texts include Mikhail Bakhtin, Homi Bhabha, Frantz Fanon, and Griselda Pollock. W 3:30–5:20

AFAM 737a/HSAR 698a, The Global Caribbean Erica James

The Caribbean is a hyper-diaspora, both a site of dispersal and a point of departure for people of African, Indian, Chinese, European, and native heritages. Though it is often reduced to signs of sun, sand, sea, and sex, a closer engagement of the lived realities of the Caribbean complicates singular or essential readings of race, culture, identity, and aesthetics and poses a fundamental challenge to the writing of art histories of the region. This course offers a close examination of the written record of the art history and visual and performance cultures of the Caribbean. In process it attempts to critically engage fundamental aspects of art historical scholarship, theory, methodology, historiography, aesthetics, exhibition practices, and the uses and limits of the term "Caribbean" in an effort to consider methods of art historical scholarship beyond the moorings of postcolonial, postrevolutionary, postindependence, and postnational discourses. W 2:30–4:20

AFAM 743b^U/AMST 654b^U/ENGL 952^U, American Artists and the African American Book Robert Stepto

Visual art in African American books since 1900. Artists include Winold Reiss, Aaron Douglas, E.S. Campbell, Tom Feelings, and the FSA photographers of the 1930s and '40s. Topics include Harlem Renaissance book art, photography and literature, and children's

books. Research in collections of the Beinecke Library and the Yale Art Gallery is encouraged. W 1:30–3:20

AFAM 763b/AMST 731b/HIST 747b, Methods and Practices in U.S. Cultural History

Matthew Jacobson

This sampling of U.S. cultural history from the early national period to the present is designed to unfold on two distinct planes. The first is a rendering of U.S. culture itself—a survey, however imperfect, of the major currents, themes, and textures of U.S. culture over time, including its contested ideologies of race and gender, its organization of productivity and pleasure, its media and culture industries, its modes of creating and disseminating “information” and “knowledge,” its resilient subcultures, and its reigning nationalist iconographies and narratives. The second is a sampling of scholarly methods and approaches, a meta-history of “the culture concept” as it has informed historical scholarship in the past few decades. The cultural turn in historiography since the 1980s has resulted in a dramatic reordering of “legitimate” scholarly topics, and hence a markedly different scholarly landscape, including some works that seek to narrate the history of the culture in its own right (Kasson’s history of the amusement park, for instance), and others that resort to cultural forms and artifacts to answer questions regarding politics, nationalism, and power relations (Melani McAlister’s *Epic Encounters*). In addition to providing a background in U.S. culture, then, this seminar seeks to trace these developments within the discipline, to understand their basis, to sample the means and methods of “the cultural turn,” and to assess the strengths and shortcomings of culture-based historiography as it is now constituted. T 1:30–3:20

AFAM 773a,b/SOCY 630a,b, Workshop in Urban Ethnography

Elijah Anderson

The ethnographic interpretation of urban life and culture. Conceptual and methodological issues are discussed. Ongoing projects of participants are presented in a workshop format, thus providing participants with critical feedback as well as the opportunity to learn from and contribute to ethnographic work in progress. Selected ethnographic works are read and assessed. M 11:30–1:20

AFAM 795b, Inequality and Urban Education Gerald Jaynes

The course provides students with basic tools and methods with which to deepen their understanding of and ability to analyze contemporary problems related to academic under-performance in lower income urban schools and the concomitant achievement gaps among various racial/ethnic groups in U.S. K–12 education. The primary objectives entail addressing various social inequalities to focus on causal explanations and proposed policy solutions frequently offered to ameliorate racial and ethnic differences in achievement and job readiness. The course draws on interdisciplinary methods. W 3:30–5:20

AFAM 802a/AMST 804a/HIST 750a, Readings in African American History since 1865 Glenda Gilmore

Students read major secondary works alongside key primary sources on African American history from 1865 to the present. The course covers Reconstruction; the Jim Crow era; the Long Civil Rights Movement, including its classical phase; African American transnationalism; and urban, political, and labor history from the African American

perspective. The course emphasizes gender and racial formation. Students read thematically within the course, make class presentations, and write a historiographical paper. W 1:30–3:20

AFAM 834b/AMST 658b/WGSS 834b, The Politics of Representation: Visual and Literary Culture and the Black Female Body Hazel Carby

Utilizing collections held in the Yale Art Gallery, the Center for British Art, and the Beinecke Library, this course juxtaposes literary texts and visual culture to create interdisciplinary conversations about the representation of the black female body with particular emphasis on issues of sexuality, gender, and racial formation. F 1:30–3:20

AFAM 850b/ENGL 937b, African Urban Cultures: Mediations of the City

Stephanie Newell

This course approaches the study of African cities and urbanization through the medium of diverse texts, including fiction, nonfiction, popular culture, film, and the arts, as well as scholarly work on African cities. Through these cultural “texts,” attention is given to everyday conceptualizations of the body and the environment, as well as to theoretical engagements with the African city. We study urban relationships as depicted in literature and popular media in relation to Africa’s long history of intercultural encounters, including materials dating back to the 1880s and the 1930s. T 9:25–11:15

AFAM 880a or b, Directed Reading

By arrangement with faculty.

AFAM 895a and b, Dissertation Prospectus Workshop Gerald Jaynes

A noncredit, two-term course, which graduate students in their third year of study must satisfactorily complete. This workshop is intended to support preparation of the dissertation proposal. W 1–2:15

For course offerings in African languages, see African Studies.

AFRICAN STUDIES

Council on African Studies
The MacMillan Center
309 Luce Hall, 203.432.9903
www.yale.edu/macmillan/african
M.A.

Chair

Michael Cappello (*Pediatrics; Public Health*)

Director of Graduate Studies

David Simon (203.432.5243, david.simon@yale.edu)

Director of Program in African Languages

Kiarie Wa’Njogu (203.432.0110, john.wanjogu@yale.edu)

Professors Serap Aksoy (*Public Health; on leave [F]*), Lea Brilmayer (*Law*), John Darnell (*Near Eastern Languages & Civilizations*), Owen Fiss (*Law*), Robert Harms (*History*), Andrew Hill (*Anthropology*), Roderick McIntosh (*Anthropology; on leave [F]*), Christopher L. Miller (*French; African American Studies*), Catherine Panter-Brick (*Anthropology; on leave [F]*), Lamin Sanneh (*History; Divinity*), Ian Shapiro (*Political Science*), Robert Thompson (*History of Art*), Christopher Udry (*Economics*), Michael Veal (*Music*), David Watts (*Anthropology*), Elisabeth Wood (*Political Science*)

Assistant Professors Katharine Baldwin (*Political Science*), Adria Lawrence (*Political Science*), Louisa Lombard (*Anthropology*), Daniel Magaziner (*History*), Sunil Parikh (*Public Health; Medicine*), Brian Wood (*Anthropology*), Jonathan Wyrzten (*Sociology*)

Senior Lecturer Cheryl Doss (*Economics*)

Lecturers Anne-Marie Foltz (*Public Health*), David Simon (*Political Science*), Veronica Waweru (*African Languages*)

Senior Lectors II Sandra Sanneh (*African Languages*), Kiarie Wa’Njogu (*African Languages*)

Senior Lectors Oluseye Adesola (*African Languages*), Matuku Ngame (*French*)

Fields of Study

African Studies considers the arts, history, cultures, languages, literatures, politics, religions, and societies of Africa as well as issues concerning development, health, and the environment. Considerable flexibility and choice of areas of concentration are offered because students entering the program may have differing academic backgrounds and career plans. Enrollment in the M.A. program in African Studies provides students with the opportunity to register for the many African studies courses offered in the various departments of the Graduate School of Arts and Sciences and the professional schools.

The Program in African Studies also offers two interdisciplinary seminars to create dialogue and to integrate approaches across disciplines. In addition to the M.A. degree program, the Council on African Studies offers students in the University’s doctoral and

other professional degree programs the chance to obtain a Graduate Certificate of Concentration in African Studies by fulfilling a supplementary curriculum (see the section on the African Studies Council, under Non-Degree Granting Programs, Councils, and Research Institutes). Joint degrees are possible with the approval of the director of graduate studies (DGS) and the relevant officials in the schools of Forestry & Environmental Studies, Law, Management, and Public Health.

The African collections of the Yale libraries together represent one of the largest holdings on Africa found in North America. The University now possesses more than 220,000 volumes including, but not limited to, government documents, art catalogues, photographs, manuscripts, correspondence, and theses, many published in Africa.

Special Admissions Requirement

The GRE General Test is required.

Special Requirements for the M.A. Degree

The Yale University Master of Arts degree program in African Studies was instituted in 1986. The two-year interdisciplinary, graduate-level curriculum is intended for students who will later continue in a Ph.D. program or a professional school, or for those who will enter business, government service, or another career in which a sound knowledge of Africa is essential or valuable. A student may choose one of the following areas of concentration: history; anthropology; political science; sociology; arts and literatures; languages and linguistics; religion; environmental and development studies.

The program requires sixteen courses: two compulsory introductory interdisciplinary seminars, Research Methods in African Studies (AFST 501a) and Topics in African Studies (AFST 764b) or an alternate course, as specifically designated by the DGS; four courses of instruction in an African language; four courses in one of the foregoing areas of concentration; four other approved courses offered in the Graduate School or professional schools; and two terms of directed reading and research (AFST 590a and 900b) during which students will complete the required thesis. A student who is able to demonstrate advanced proficiency in an African language may have the language requirement waived and substitute four other approved courses. The choice of courses must be approved by the DGS, with whom students should consult as soon as possible in the first term.

The Master's Thesis

The master's thesis is based on research on a topic approved by the DGS and advised by a faculty member with expertise or specialized competence in the chosen topic. Students must submit their thesis for joint evaluation by the adviser and a second reader, who is chosen by the student in consultation with the DGS.

Program in African Languages

The language program offers instruction in four major languages from sub-Saharan Africa: Kiswahili (eastern and central Africa), Wolof (west Africa), Yorùbá (west Africa), and isiZulu (southern Africa). Language-related courses and language courses for

professionals are also offered. African language courses emphasize communicative competence, and instructors use multimedia materials that focus on the contemporary African context. Course sequences are designed to enable students to achieve advanced competence in all skill areas by the end of the third year, and the African Languages program encourages students to spend one summer or term in Africa during their language study.

Noncredited instruction in other African languages is available by application through the Directed Independent Language Study program at the Center for Language Study. Contact the director of the Program in African Languages.

Program materials are available upon request from the Director of Graduate Studies, Council on African Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail, africanstudies@yale.edu.

Courses

AFST 501a^U, Research Methods in African Studies Cheryl Doss

Disciplinary and interdisciplinary research methodologies in African studies. The focus of the course is on field methods and archival research in the social sciences and humanities. Topics include use of African studies and disciplinary sources (including bibliographical databases and African studies archives), research design, interviewing, survey methods, analysis of sources, and the development of databases and research collections.

M 1:30–3:20

[AFST 541b^U, Comparative Perspectives on African Literatures]

AFST 548b^U/SOCY 548b^U, Islamic Social Movements Jonathan Wyrzten

Social movement and network theory used to analyze the emergence and evolution of Islamic movements from the early twentieth century to the present. Organization, mobilization, and framing of political, nonpolitical, militant, and nonmilitant movements; transnational dimensions of Islamic activism. Case studies include the Muslim Brotherhood, Hamas, Hizbollah, Al-Qaeda, Al-Adl wa-Ihsann, and Tablighi Jama'at.

T 1:30–3:20

AFST 573b^U/SOCY 563b^U, Imperialism, Insurgency, and State Building in the Middle East and North Africa Jonathan Wyrzten

The historical evolution of political order from Morocco to Central Asia in the past two centuries. Focus on relationships among imperialism, insurgency, and state building. Ottoman, European, and nationalist strategies for state building; modes of local resistance; recent transnational developments; American counterinsurgency and nation-building initiatives in the region. T 9:25–11:15

[AFST 582a^U/SOCY 559a^U, Comparative Nationalism in North Africa and the Middle East]

AFST 590a^U, African Studies Colloquium

AFST 630b^U, Language Planning in Sub-Saharan Africa Kiarie Wa'Njogu

Examination of language policies in selected sub-Saharan African countries. Analysis of language use in different contexts; assessment of the impact of globalization on African languages. W 1:30–3:20

AFST 639a^U/ANTH 639a^U, Political Anthropology and Africa Louisa Lombard

A historical-anthropological study of politics in Africa. How have anthropologists made sense of the workings of African politics, both those of state and nonstate actors? This course charts how African states came into being, how they operate, and how state agents and the people they govern negotiate legitimacy, authority, and belonging. W 3:30–5:20

AFST 647a^U, The Rwandan Genocide in Comparative Context David Simon

An examination of the 1994 Rwandan genocide: historical sources of the conflict, the motivations of the killers, actions and reactions of outside actors, efforts to reconstruct a post-genocide society, and continuation of the genocidal dynamic within the Great Lakes region. Consideration of other countries in similar situations, as well as other genocides in recent decades. T 3:30–5:20

AFST 680b^U, Nigeria and Its Diaspora Oluseye Adesola

Nigerians in the modern diaspora, both those who endured forced migration and those who migrated voluntarily. Specific reference to the Igbos and the Yorùbás. The preservation and maintenance of Nigerian culture, history, dance, literature, traditional education, theater, politics, art, music, film, religion, and folklore, especially in African American and Nigerian American contexts.

AFST 814a/REL 914a, Christian-Muslim Encounter: Historical and Theological Dimensions Lamin Sanneh

This course is an introduction to Islamic theology through the framework of the Five Pillars, with special emphasis on the development of religious structures and institutions in the early centuries. In time the pillars of religion grew independently of Islam's political culture. Civil society offered a stable environment for religious life amidst political changes. This situation has similarities with New World ideas about society rather than the state as the proper locus of religion.

AFST 833b/HIST 833b, Agrarian History of Africa Robert Harms

This course examines changes in African rural life from precolonial times to the present. Issues to be examined include land use systems, rural modes of production, gender roles, markets and trade, the impact of colonialism, cash cropping, rural-urban migration, and development schemes. W 9:25–11:15

AFST 837a/HIST 837a, Decolonization and Independence in Africa Robert Harms

This seminar looks at the process of decolonization in twentieth-century Africa and explores some of the major political, economic, and cultural forces that influenced the trajectories of independent African countries. W 9:25–11:15

AFST 838a/HIST 838a, Ideology in African History Daniel Magaziner

This course in African intellectual history considers how various African peoples have made sense of their world, in ways both conscious and unconscious, ascribed and articulated, successful and failed, and how historians have developed interpretations of the continent's intellectual history. Topics to be considered include political theory, health and healing regimes, rainmaking, nationalism, Marxism, Christianity, Islam, and prophetic movements. Students work on a historiographical essay and facilitate discussion. Readings include monographs, novels, and other media. TH 3:30–5:20

AFST 900b, Master's Thesis David Simon and faculty

Directed reading and research on a topic approved by the DGS and advised by a faculty member (by arrangement) with expertise or specialized competence in the chosen field. Readings and research are done in preparation for the required master's thesis.

AFST 951a or b, Directed Reading and Research David Simon and faculty

By arrangement with faculty.

SWAH 610a^U, Beginning Kiswahili I Kiarie Wa'Njogu

A beginning course with intensive training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken language and conversation. Credit only on completion of SWAH 620b. MTWTHF 9:25–10:15

SWAH 620b^U, Beginning Kiswahili II Kiarie Wa'Njogu

Continuation of SWAH 610a. Texts provide an introduction to the basic structure of Kiswahili and to the culture of the speakers of the language. Prerequisite: SWAH 610a. MTWTHF 9:25–10:15

SWAH 630a^U, Intermediate Kiswahili I Veronica Waweru

Further development of speaking, listening, reading, and writing skills. Prepares students for further work in literary, language, and cultural studies as well as for a functional use of Kiswahili. Study of structure and vocabulary is based on a variety of texts from traditional and popular culture. Emphasis on command of idiomatic usage and stylistic nuance. Prerequisite: SWAH 620b. MTWTHF 11:35–12:25

SWAH 640b^U, Intermediate Kiswahili II

Continuation of SWAH 630a. MTWTHF 11:35–12:25

SWAH 650a^U, Advanced Kiswahili I Kiarie Wa'Njogu

Development of fluency through readings and discussions on contemporary issues in Kiswahili. Introduction to literary criticism in Kiswahili. Materials include Kiswahili oral literature, prose, poetry, and plays, as well as texts drawn from popular and political culture. Prerequisite: SWAH 640b. TTH 1–2:15

SWAH 660b^U, Advanced Kiswahili II Kiarie Wa'Njogu

Continuation of SWAH 650a. TTH 1–2:15

SWAH 670a^U, Topics in Kiswahili Literature Kiarie Wa'Njogu

Advanced readings and discussion with emphasis on literary and historical texts. Reading assignments include materials on Kiswahili prose, plays, poetry, Kiswahili dialects, and the history of the language. TTH 10:30–11:20, F 8:20–9:10

SWAH 671b^U, Topics in Kiswahili Literature Kiarie Wa'Njogu

Advanced readings and discussion with emphasis on literary and historical texts. Reading assignments include materials on Kiswahili prose, plays, poetry, Kiswahili dialects, and the history of the language. TTH 11:35–12:50

YORU 610a^U, Beginning Yorùbá I Oluseye Adesola

Training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken aspect, with special attention to unfamiliar consonantal sounds, nasal

vowels, and tone, using isolated phrases, set conversational pieces, and simple dialogues. Multimedia materials provide audio practice and cultural information. Credit only on completion of YORU 620b. MTWTHF 10:30–11:20

YORU 620b^U, Beginning Yorùbá II Oluseye Adesola

Continuing practice in using and recognizing tone through dialogues. More emphasis is placed on simple cultural texts and role playing. Prerequisite: YORU 610a. MTWTHF 10:30–11:20

YORU 630a^U, Intermediate Yorùbá I Oluseye Adesola

Refinement of speaking, listening, reading, and writing skills. More natural texts are provided to prepare students for work in literary, language, and cultural studies as well as for a functional use of Yorùbá. Prerequisite: YORU 620b. MTWTHF 11:35–12:25

YORU 640b^U, Intermediate Yorùbá II Oluseye Adesola

Students are exposed to more idiomatic use of the language in a variety of interactions, including occupational, social, religious, and educational. Cultural documents include literary and nonliterary texts. Prerequisite: YORU 630a. MTWTHF 11:35–12:25

YORU 650a^U, Advanced Yorùbá I Oluseye Adesola

An advanced course intended to improve aural and reading comprehension as well as speaking and writing skills. Emphasis is on acquiring a command of idiomatic usage and stylistic nuance. Study materials include literary and nonliterary texts; social, political, and popular entertainment media such as video movies and recorded poems (*ewi*); and music. Prerequisite: YORU 640b. 3 HTBA

YORU 660b^U, Advanced Yorùbá II Oluseye Adesola

Continuing development of aural and reading comprehension, and speaking and writing skills, with emphasis on idiomatic usage and stylistic nuance. Study materials are selected to reflect research interests of the students. Prerequisite: YORU 650a. 3 HTBA

YORU 670a^U or b^U, Topics in Yorùbá Literature and Culture Oluseye Adesola

The course provides students with the opportunity to acquire Yorùbá up to the superior level. It is designed to give an in-depth discussion on advanced readings on Yorùbá literature and culture. It focuses on Yorùbá history, poetry, novels, dramas, and oral folklore. It also seeks to uncover the basics of the Yorùbá culture in communities where Yorùbá is spoken across the globe, with particular emphasis on Nigeria. It examines movies, texts, and written literature to gain insight into the Yorùbá philosophy and ways of life. TTH 4–5:15

YORU 680a^U, Advanced Topics in Yorùbá Literature and Culture Oluseye Adesola

A course for students with advanced proficiency in Yorùbá who are interested in discussion and research in Yorùbá at a level not covered by existing courses. A term paper or its equivalent is required. TTH 1–2:15

YORU 682b^U, Advanced Topics in Yorùbá Literature and Culture II

Oluseye Adesola

Continuation of YORU 680a. TTH 1–2:15

ZULU 610a^u, Beginning isiZulu I Sandra Sanneh

A beginning course in conversational isiZulu, using Web-based materials filmed in South Africa. Emphasis on the sounds of the language, including clicks and tonal variation, and on the words and structures needed for initial social interaction. Brief dialogues concern everyday activities; aspects of contemporary Zulu culture are introduced through readings and documentaries in English. Credit only on completion of ZULU 620b.

MTWTHF 11:35–12:25

ZULU 620b^u, Beginning isiZulu II Sandra Sanneh

Development of communication skills through dialogues and role play. Texts and songs are drawn from traditional and popular literature and songs. Students research daily life in selected areas of South Africa. Prerequisite: ZULU 610a. MTWTHF 11:35–12:25

ZULU 630a^u, Intermediate isiZulu I Sandra Sanneh

Development of basic fluency in speaking, listening, reading, and writing isiZulu, using Web-based materials filmed in South Africa. Students describe and narrate spoken and written paragraphs. Review of morphology; concentration on tense and aspect. Materials are drawn from contemporary popular culture, folklore, and mass media. Prerequisite: ZULU 620b. MTWTHF 9:25–10:15

ZULU 640b^u, Intermediate isiZulu II Sandra Sanneh

Students read longer texts from popular media as well as myths and folktales. Students are prepared for initial research involving interaction with speakers of isiZulu in South Africa, and for the study of oral and literary genres. Prerequisite: ZULU 630a. MTWTHF 9:25–10:15

ZULU 650a^u, Advanced isiZulu I Sandra Sanneh

Development of fluency in using idioms, speaking about abstract concepts, and voicing preferences and opinions. Excerpts are drawn from oral genres, short stories, and dramas made for television. Introduction to other South African languages and to issues of standardization, dialect, and language attitude. Prerequisite: ZULU 640b. 3 HTBA

ZULU 660b^u, Advanced isiZulu II Sandra Sanneh

Readings may include short stories, a novel, praise poetry, historical texts, or contemporary political speeches, depending on student interests. Study of issues of language policy and use in contemporary South Africa; introduction to the Soweto dialect of isiZulu. Students are prepared for extended research in South Africa involving interviews with isiZulu speakers. Prerequisite: ZULU 650a.

AMERICAN STUDIES

230 Hall of Graduate Studies, 203.432.1186

<http://americanstudies.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Kathryn Dudley (230 HGS, 203.432.1186)

Director of Graduate Studies

George Chauncey (230 HGS, 203.432.1186)

Professors Jean-Christophe Agnew, Elizabeth Alexander, Ned Blackhawk, David Blight, Daphne Brooks (*on leave*), Hazel Carby, George Chauncey, Edward Cooke, Jr., Michael Denning, Wai Chee Dimock (*on leave* [F]), Kathryn Dudley, John Mack Faragher, Glenda Gilmore, Inderpal Grewal, Dolores Hayden (*on leave* [Sp]), Jonathan Holloway, Amy Hungerford, Matthew Jacobson, Kathryn Lofton, Mary Lui, Joanne Meyerowitz (*on leave*), Charles Musser (*on leave* [Sp]), Stephen Pitti (*on leave*), Sally Promey, Joseph Roach, Marc Robinson (*on leave* [Sp]), Michael Roemer (*Adjunct*), Alicia Schmidt Camacho, Caleb Smith, Robert Stepto (*on leave* [F]), Harry Stout, Michael Veal, John Harley Warner (*on leave* [Sp]), Michael Warner, Laura Wexler

Associate Professors Jafari Allen, Crystal Feimster (*on leave*), Zareena Grewal (*on leave* [F]), Paul Sabin, Tisa Wenger

Assistant Professors Laura Barraclough (*on leave*), Birgit Brander Rasmussen, Greta LaFleur (*on leave*), Albert Laguna, Dixia Ramirez (*on leave*), Elihu Rubin, Jenifer Van Vleck

Lecturers James Berger, Ronald Gregg

Fields of Study

Fields include American literature, history, the arts and material culture, philosophy, cultural theory, and the social sciences.

Special Admissions Requirement

A twenty-page writing sample is required with the application.

Special Requirements for the Ph.D. Degree

During the first two years of study students are required to take twelve term courses; at least half of these courses must be in American Studies. First-year students are also required to take AMST 600a, American Scholars (graded Satisfactory/Unsatisfactory). The student's program will be decided in consultation with the adviser and the director of graduate studies (DGS). In each of the two years, the student should take at least one seminar devoted to research or requiring a substantial original paper, and must achieve two grades of Honors, with an average overall of High Pass.

Students are required to show proficiency in a language other than English; they may fulfill this requirement by (1) conducting substantial research in the chosen language as

part of the course requirements for one of the twelve required seminars, (2) passing a translation test, offered each term by various language departments, or (3) receiving a grade of B or higher in a Yale College intermediate- or advanced-level language course or in a Yale language-for-reading course, such as French for Reading or German for Reading.

Upon completion of course work, students in their third year of study are required to participate in at least one term of a monthly prospectus workshop (AMST 902a and b). Intended to complement the work of the prospectus committee, the workshop is designed as a professionalization experience that culminates in students' presentation of the dissertation prospectus at their prospectus colloquium.

Students should schedule the oral qualifying examinations in four fields, in the fifth term of study. Preparation, submission, and approval of the dissertation prospectus should be completed by the end of the sixth term, with a final deadline at the end of the seventh term with permission from the DGS. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation requirements, including the prospectus. The faculty in American Studies considers training in teaching to be an important part of the program. Students in American Studies normally teach in years three and four.

Combined Ph.D. Programs

AMERICAN STUDIES AND AFRICAN AMERICAN STUDIES

The American Studies Program also offers, in conjunction with the Department of African American Studies, a combined Ph.D. in American Studies and African American Studies. This combined degree is most appropriate for students who intend to concentrate in and write a dissertation on any aspect of African American history, literature, or culture in the United States and other parts of the Americas. Applicants to the combined program must indicate on their application that they are applying both to American Studies and to African American Studies. All documentation within the application should include this information.

AMERICAN STUDIES AND FILM AND MEDIA STUDIES

The American Studies Program also offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. in American Studies and Film and Media Studies. For further details, see Film and Media Studies. Applicants to the combined program must indicate on their application that they are applying both to American Studies and to Film and Media Studies. All documentation within the application should include this information.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. (en route to the Ph.D.) The M.A. is granted upon the completion of seven term courses (two grades must be Honors and the other five grades must average High Pass), and the successful completion of the language requirement. It can be petitioned for in the term following completion of the requirements. Candidates in combined programs will be awarded the master's degree only when the master's requirements for both programs have been met.

Public Humanities Concentration The M.A. with a concentration in Public Humanities is granted upon the completion of all requirements for the en route M.A. Of the seven term courses required, students must take four Public Humanities courses, including AMST 903, 904, 905.

Terminal Master's Degree Program The basic requirements for this terminal degree are seven term courses, including a special writing project, and the successful completion of the language examination. The project involves the submission of substantial written work either in conjunction with one course or as a tutorial that substitutes for one course. Students must earn a grade of Honors in two of their courses and an average grade of High Pass in the others.

More information is available on the department's Web site, <http://americanstudies.yale.edu>.

Courses

AMST 600a, American Scholars Hazel Carby

"What would we really know the meaning of? The meal in the firkin; the milk in the pan; the ballad in the street; the news of the boat; the glance of the eye; the form and the gait of the body. The literature of the poor, the feelings of the child, the philosophy of the street, the meaning of household life, are the topics of the time."

—Ralph Waldo Emerson, *The American Scholar*, 1837

A half-century ago American studies was a movement; now it is an institution. But it remains an anomaly in the academy, with neither method nor discipline: a modest program, not a department that immodestly claims the space between disciplines, beyond disciplines, and perhaps encompassing disciplines.

In the early days, American studies was imagined as a home for Emerson's American scholar; these days Emerson's scholar is apt to be eyed more skeptically. Nevertheless the philosophy of the street and the meaning of household life continue to be the topics of the time, and American studies remains an oddly Emersonian place for nurturing intellectuals.

To explore the various kinds of American scholars and American studies, the American Scholars colloquium meets weekly. Each week, we ask a member of the American Studies faculty: What are the key works that shape your intellectual project? What works pose the crucial issues? What works engage what you would really know the meaning of? Each speaks briefly and leads a discussion of the works chosen. There is no writing assignment, and students receive a credit for participating. This course is mandatory for first-year American Studies graduate students. W 9:25–11:15

AMST 622a/623b/CPLT 622a,b, Working Group on Globalization and Culture

Michael Denning

A continuing collective research project, a cultural studies "laboratory," that has been running since the fall of 2003. The group, made up of graduate students and faculty from several disciplines, meets regularly to discuss common readings, to develop collective and individual research projects, and to present that research publicly. The general theme for the working group is globalization and culture, with three principal aspects: (1) the

globalization of cultural industries and goods, and its consequences for patterns of everyday life as well as for forms of fiction, film, broadcasting, and music; (2) the trajectories of social movements and their relation to patterns of migration, the rise of global cities, the transformation of labor processes, and forms of ethnic, class, and gender conflict; (3) the emergence of and debates within transnational social and cultural theory. The specific focus, projects, and directions of the working group are determined by the interests, expertise, and ambitions of the members of the group, and change as its members change. There are a small number of openings for second-year graduate students. Students interested in participating should contact michael.denning@yale.edu. M 1:30–3:20

AMST 643a/AFAM 505a, Theorizing Racial Formations Jacqueline Goldsby

A required course for all first-year students in the combined Ph.D. program in African American Studies; also open to students in American Studies. This interdisciplinary reading seminar focuses on new work that is challenging the temporal, theoretical, and spatial boundaries of the field. T 2:30–4:30

AMST 650a/HIST 807a, Resistance, Rebellion, and Survival Strategies in Modern Latin America Gilbert Joseph

An interdisciplinary examination of new conceptual and methodological approaches to such phenomena as peasants in revolution, millenarianism, “banditry,” refugee movements, and transnational migration. F 1:30–3:20

AMST 651b^U/AFAM 563b^U/ENGL 951b^U, Ralph Ellison in Context Robert Stepto

This seminar pursues close readings of Ralph Ellison’s essays, short fiction, and novels. The “in context” component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African American Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. Texts include Ellison’s *Collected Essays*, *Flying Home and Other Stories*, *Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison’s Invisible Man*; and A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. M 1:30–3:20

AMST 654b^U/AFAM 743b^U/ENGL 952b^U, American Artists and the African American Book Robert Stepto

Visual art in African American books since 1900. Artists include Winold Reiss, Aaron Douglas, E.S. Campbell, Tom Feelings, and the FSA photographers of the 1930s and ’40s. Topics include Harlem Renaissance book art, photography and literature, and children’s books. Research in collections of the Beinecke Library and the Yale Art Gallery is encouraged. W 1:30–3:20

AMST 658b/AFAM 834b/WGSS 834b, The Politics of Representation: Visual and Literary Culture and the Black Female Body Hazel Carby

Utilizing collections held in the Yale Art Gallery, the Center for British Art, and the Beinecke Library, this course juxtaposes literary texts and visual culture to create interdisciplinary conversations about the representation of the black female body with particular emphasis on issues of sexuality, gender, and racial formation. F 1:30–3:20

AMST 662b/ENGL 927b, Prison Studies and Prison Literature Caleb Smith

Since the late 1960s, the U.S. prison system has expanded with unprecedented speed to become the largest in the world. Prisons, once seen as marginal zones of resocialization or containment for an unassimilable few, now appear central to the American political and social orders; we find ourselves in the presence of what critics have called “mass incarceration,” the “penal state,” and a “prison society” organized around a “new Jim Crow.” This seminar considers two intellectual traditions that have emerged in opposition to the new system—an interdisciplinary field of critical prison studies and a canon of prison literature. Approaching the prison from multiple perspectives, we read works in history (Foucault, Rothman); law (Feeley and Simon, Alexander); social science (Gilmore, Wacquant); and cultural studies (Rodriguez, Davis); as well as literary works by incarcerated and formerly incarcerated writers (Reed, Jackson, Baca). Key problems for discussion include disciplinary subject-formation and dehumanization, unfree labor and racialization, biopolitics and neoliberal governmentality, and the politics and poetics of literary testimony. T 1:30–3:20

AMST 677a/CPLT 914a/ENGL 962a, Modern Drama and Mass Culture

Joseph Roach

Taking account of the genealogy of modern drama in eighteenth-century performance, this seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events from *Oroonoko* (1695) to *Oroonoko*, a new adaptation by Biyi Bandele (1999), and from *The Beggar's Opera* (1728) to *The Threepenny Opera* (1928). Topics include the transformation of classical genres into the *drame*, the commercialization of leisure through the mass-marketing of vicarious experience, and the emerging culture of celebrity. Critical readings include selections from the Frankfurt School, Walter Benjamin, Bertolt Brecht, Raymond Williams, Roland Barthes, and Jean Baudrillard. Plays are drawn from popular comedies, Sheridan to Shaw (*Pygmalion* and *My Fair Lady*), and long-running bourgeois dramas, beginning with Lillo's *The London Merchant*. Readings are supplemented by selected materials on theatrical production, acting, and management. W 9:25–11:15

AMST 685a/ENGL 930a, Disability: Representation, History, Ethics James Berger

This course provides an introduction to some key topics in contemporary disability studies. Students read sources on the history of the disability rights movement in the United States, and texts on modes of theorizing disability and how these theorizations intersect with and sometimes contest the movement's political assertions. Encounters with artistic and other cultural representations of disability have been central to disability studies, so students read or view significant literary and cinematic accounts of disability. Finally, the class contends with important recent ethical issues pertaining to disability: questions of eugenics, genetic screening, euthanasia, the ethics of care, and disability in a global perspective. T 1:30–3:20

AMST 686a^U/HIST 769a^U, Introduction to Documentary Studies

Matthew Jacobson

This mixed graduate/undergraduate seminar surveys documentary work in three media—film, photography, and sound—since the 1930s, focusing on the documentary both as a cultural form with a history of its own and as a parcel of skill sets and

storytelling and production practices to be studied and mastered. Readings and discussions cover important scholarly approaches to documentary as a genre, as well as close readings of documentaries themselves and practitioners' guides to various aspects of documentary work. Topics include major trends in documentary practice across the three media, documentary ethics, aesthetics and truth-claims, documentary's relationship to the scholarly disciplines and to journalism, and documentary work as political activism. Class meetings include screenings/viewings/soundings of documentary works, and practitioners' panels and workshops with Yale documentarians (including Charles Musser, Zareena Grewal, Elihu Rubin, Gretchen Berland, and Laura Wexler) and local New Haven documentarians such as Jake Halpern (Yale '97, *This American Life*). Students' final projects may take the form of a traditional scholarly paper on some aspect of documentary history or a particular documentary producer, or an actual piece of documentary work—a film treatment, a brief video, a set of photographs, a sound documentary, or script. MW 2:30–3:45

AMST 705a/HIST 582a/RLST 705a, Readings in Religion in American Society, 1600–2001 Kathryn Lofton, Harry Stout

This seminar explores intersections of religion and society in American history from the colonial period to the present as well as methodological problems important to their study. T 3:30–5:20

AMST 709b/AFAM 709b/HIST 736b/WGSS 736b, Research in Twentieth-Century U.S. Political and Social History Glenda Gilmore

Projects chosen from the post-Civil War period, with an emphasis on twentieth-century social and political history, broadly defined. TH 9:25–11:15

AMST 710a/ENGL 847a, Colonial and National: American Literature to 1830 Michael Warner

An introduction to both the primary texts and the current scholarship in the field, including transatlantic and hemispheric perspectives; the public sphere; evangelicalism and the secular; the rise of African American public intellectuals; varieties of pastoral in contexts of settler colonialism; cultural geographies of literary capitals and the backcountry; nationalism; polite letters and popular genres; Native American literacies; the early American novel; and the modern social imaginary. Writers and preachers studied include Cotton Mather, Jonathan Edwards, Benjamin Franklin, Samson Occom, Ukawsaw Gronniosaw, Phillis Wheatley, John Marrant, Thomas Jefferson, Thomas Paine, Judith Sargent Murray, Timothy Dwight, and Charles Brown. The course ends with the generation of Washington Irving, William Cullen Bryant, James Fenimore Cooper, and Catharine Sedgwick. TH 9:25–11:15

AMST 711a/HIST 707a, Introduction to the Literature of American History Alejandra Dubcovsky-Joseph

This course is designed as an introduction to the historiography of early America from about 1500 to the American Revolution. It provides an overview of critical debates within the field and acquaints students with some of the most influential works of both recent and “classic” historians. T 1:30–3:20

AMST 716a/ANTH 769a/ARCG 769a/HSAR 716a, Landscapes of Meaning:**Museums and Their Objects** Anne Underhill, Cyra Levenson

This seminar explores how museums convey various meanings about ethnographic, art, and archaeological objects through the processes of collecting, preparing exhibitions, and conducting research. Participants also discuss broader theoretical and methodological issues such as the roles of museums in society, relationships with source communities, management of cultural heritage, and various specializations valuable for careers in art, natural history, anthropology, history, and other museums. T 9:25–11:15

AMST 719b/RLST 703b, Interrogating the Crisis of Islam Zareena Grewal

In official and unofficial discourses in the United States, diagnoses of Islam's various "crises" are ubiquitous, and Muslim "hearts and minds" are viewed as the "other" front in the War on Terror. Since 9/11, the U.S. State Department has made the reform of Islam an explicit national interest, pouring billions of dollars into USAID projects in Muslim-majority countries, initiating curriculum development programs for madrasas in South Asia, and establishing the Arabic Radio Sawa and the satellite TV station Al-Hurra to propagate the U.S. administration's political views as well as what it terms a "liberal" strain of Islam. Muslim Americans are also consumed by debates about the "crisis" of Islam, a crisis of religious authority in which the nature and rapidity of change in the measures of authority are felt to be too difficult to assimilate. This course maps out the various and deeply politically charged contemporary debates about the "crisis of Islam" and the question of Islamic reform through an examination of official U.S. policy, transnational pulp Islamic literature, fatwas and essays authored by internationally renowned Muslim jurists and scholars, and historical and ethnographic works that take up the category of crisis as an interpretive device. T 1:30–3:20

AMST 723b^U/ENGL 833b^U, The Nonhuman in Literature and Culture since 1800

Wai Chee Dimock

Nonhuman life forms in fiction and poetry from the nineteenth century to the twenty-first, including plants and animals, "legal persons" such as corporations, large-scale phenomena such as the market and the Internet, war and environmental catastrophes, as well as intelligent machines and extraterrestrial aliens. Authors include Herman Melville, Emily Dickinson, Upton Sinclair, Elizabeth Bishop, Louise Erdrich, Richard Powers, Don DeLillo, Cormac McCarthy, Philip K. Dick, Ursula Le Guin, Octavia Butler, Dave Eggers. Theorists include Giorgio Agamben, Jane Bennett, Jacques Derrida, Donna Haraway, N. Katherine Hayles, Fredric Jameson, Brian Massumi, Timothy Morton. W 1:30–3:20

AMST 725a/AFAM 610a/ENGL 939a, Making the African American Literary**Anthology** Elizabeth Alexander

In this research seminar, students work on the compilation of the Library of America's historical anthology of African American poetry from the eighteenth century to the present. Debates about the canon inside and outside the academy have sharpened awareness of writers and works excluded from standard literary histories, and new archival discoveries have broadened our knowledge of material on black poetry at research centers such as the Schomburg Center, Boston University's Gotlieb Archival Research Center, Yale's Beinecke Library, and Emory University (Lucille Clifton papers), and also in privately

held collections. Each student is responsible for extensive research on particular poets, periods, and/or eras in a series of short projects, and we work together on assembling the three-hundred-year anthology. Each student then designs an integrative archival project; because the anthology will have a visual component, students may also work with rare photographs, broadsides, recordings, and other ephemera. W 9:25–11:15

AMST 731b/AFAM 763b/HIST 747b, Methods and Practices in U.S. Cultural History

Matthew Jacobson

This sampling of U.S. cultural history from the early national period to the present is designed to unfold on two distinct planes. The first is a rendering of U.S. culture itself—a survey, however imperfect, of the major currents, themes, and textures of U.S. culture over time, including its contested ideologies of race and gender, its organization of productivity and pleasure, its media and culture industries, its modes of creating and disseminating “information” and “knowledge,” its resilient subcultures, and its reigning nationalist iconographies and narratives. The second is a sampling of scholarly methods and approaches, a meta-history of “the culture concept” as it has informed historical scholarship in the past few decades. The cultural turn in historiography since the 1980s has resulted in a dramatic reordering of “legitimate” scholarly topics, and hence a markedly different scholarly landscape, including some works that seek to narrate the history of the culture in its own right (Kasson’s history of the amusement park, for instance), and others that resort to cultural forms and artifacts to answer questions regarding politics, nationalism, and power relations (Melani McAlister’s *Epic Encounters*). In addition to providing a background in U.S. culture, then, this seminar seeks to trace these developments within the discipline, to understand their basis, to sample the means and methods of “the cultural turn,” and to assess the strengths and shortcomings of culture-based historiography as it is now constituted. T 1:30–3:20

AMST 733b/AFAM 613b/ENGL 945b, Black Literature and U.S. Liberalism

Jacqueline Goldsby

An examination of mid-twentieth-century African American literature and the rise of anti-Communist liberalism in American politics and life. We consider how black-authored fiction, drama, and poetry retheorized liberalism’s tenets of agency, subjectivity, property, autonomy, sociality, and governmentality. Rather than accept the persuasive and oft-argued position that black literature published during these decades was “integrationist” and therefore politically suspect, this course interrogates the aesthetic and political ends that the “black liberal imagination” served during these critical decades and into our present-day cultural moment. W 9:25–11:15

AMST 746a/ANTH 503a, Research in Sociocultural Anthropology: Ethnographic

Writing and Representation Jafari Allen

The course examines the representational practices that inform the doing and making of ethnography, broadly construed as the depiction of social life in the past and present. We consider classic and contemporary approaches to ethnography as a literary form as well as explore precedents and possibilities in the visual and performing arts. This is a core Anthropology graduate program course; others admitted only by permission of the instructor.

AMST 747b/ANTH 594b/WGSS 633b, Affect and Materiality Kathryn Dudley

Recent scholarship in the fields of affect studies and the new materialisms raises important questions about the ethnographic encounter and the kind of knowledge it produces. Refusing to grant ontological status to classic oppositions between nature/culture, self/other, subject/object, and human/nonhuman, this work encourages anthropologically inclined ethnographers to rethink longstanding assumptions about the composition of the “social” and the “political” in an anthropocentric world that ignores the vulnerabilities and agential capacities of global ecosystems at its peril. Reading across ossifying disciplinary divides, this seminar examines the intellectual projects of writers such as Jane Bennett, Bruno Latour, Lauren Berlant, and Kathleen Stewart, among others. Our objective is to theorize the intersection between public and private feelings and human and nonhuman materiality in ways that bring the political and aesthetic implications of ethnographic research and writing to the fore. TH 1:30–3:20

AMST 767b/HIST 724b, Research Seminar in U.S. Urban History Mary Lui

Students conduct archival research to write an original, article-length essay on any aspect of U.S. urban history in any century. The first half of the seminar consists of weekly readings and discussions while the latter half consists of article workshop meetings focused on student writing. T 9:25–11:15

AMST 777a/HIST 755a, Research on the United States and the World

Jenifer Van Vleck

This research seminar is designed to enable students to produce an original, article-length paper based on primary research. Questions considered include: What does it mean to work across geographical borders (or, indeed, disciplinary borders), conceptually and methodologically? Why might an international/transnational perspective enrich our understanding of U.S. history? How can we historicize the relationship between “domestic” U.S. history and the history of U.S. foreign relations? During the first four weeks of class, we read recent historiography on the United States’ role in the world. Remaining weeks are devoted to a series of writing workshops, in which students share and discuss their work at various stages of the research and writing process. We also discuss practical strategies for publishing articles in academic journals, using seminar papers to advance work on the dissertation, and finding archival collections and sources at Yale that are relevant to the United States’ international history. W 3:30–5:20

AMST 780b/HIST 734b, Class and Capitalism in Twentieth-Century United States

Jennifer Klein

Reading course on class formation, labor, and political economy in the twentieth-century United States; how regionalism, race, and class power shaped development of American capitalism. The course reconsiders the relationships between economic structure and American politics and political ideologies, and between global and domestic political economy. Readings include primary texts and secondary literature (social, intellectual, and political history; geography). TH 1:30–3:20

AMST 782a/E&RS 648a/GLBL 811a/HIST 788a, 1968: Social Movements in

Comparative Perspective and Their Legacies Becky Conekin

In this seminar we explore post-WWII social movements and their legacies primarily across Western and Eastern Europe, North America, and Mexico. Analysis of other

countries or regions in class discussions and final research papers is encouraged, based on student interest. Examining both the actuality and symbolic character of these movements in contemporary history, we analyze the political, social, and cultural meanings of protest and its impact on class, generational, gender, and racial relations. In addition, we discuss different national histories and discourses about identity, while exploring the varied geographies of the Cold War. We then move to a more thematic approach focusing on, for example, civil rights, antiwar and student protests, and countercultural politics. We conclude with a look at the social movements that developed out of the 1960s, such as second-wave feminism and gay and lesbian rights. This course offers students historical insights into the civil rights and student movements of the turbulent sixties that will shed light on current youth organizing and protest around the world. W 1:30–3:20

AMST 790b/HIST 962b, Writing History John Demos

The focus of the seminar is prose writing about history. We proceed through reading and discussion of exemplary texts, with an emphasis on their literary aspects (including thematic and narrative structure, author-to-subject connections, the fact/fiction boundary, and the moral dimension of historical work). There is also a monthlong practicum, set in the middle of the term and devoted entirely to the students' own writing. The goal throughout is to raise consciousness about this oft-neglected part of the historian's task—and to improve performance within it. T 3:30–5:20

AMST 796a/HIST 727a, Approaches to the History of Capitalism and Culture

Jean-Christophe Agnew

A research seminar oriented around themes and issues in U.S. political economy from the late nineteenth century through the end of the twentieth. Readings in the first part of the term look at various approaches to writing about political economy: for example, business history, intellectual history, labor history, biography, local monograph, or transnational history. Research projects explore new possibilities for writing about labor, business, the state, and capitalism. W 3:30–5:20

AMST 803a/HIST 703a, Research in Early National America Joanne Freeman

A research seminar focused on the early national period of American history, broadly defined. Early weeks familiarize students with sources from the period and discuss research and writing strategies. Students produce a publishable article grounded on primary materials. W 9:25–11:15

AMST 804a/AFAM 802a/HIST 750a, Readings in African American History since 1865 Glenda Gilmore

Students read major secondary works alongside key primary sources on African American history from 1865 to the present. The course covers Reconstruction; the Jim Crow era; the Long Civil Rights Movement, including its classical phase; African American transnationalism; and urban, political, and labor history from the African American perspective. The course emphasizes gender and racial formation. Students read thematically within the course, make class presentations, and write a historiographical paper. W 1:30–3:20

AMST 806b/HSAR 723b/RLST 701b/WGSS 768b, Studies in “New” Materialities:**Agency, Ontology, Embodiment, Cognition** Sally Promey

This advanced research course invites students to engage and interrogate a set of “new” ideas about objects and materiality emerging in disciplines as far-ranging as political science, cultural anthropology, ethics, history of art, cognitive science, religious studies, and gender and sexuality studies. One concern is to explore how these ideas, far from being “new,” have a deep, and deeply political, history in relation to Western efforts to make sense of and order the material (and spiritual) world and to mark and distinguish Western modernity and “civilization.” In the second half of the term, research projects take the shape of applying some of these theoretical models to case studies concerning specific objects, bodies, and materials. Note that a course on the same subject is being offered simultaneously at another institution, with students and professors in both courses entering into various sorts of conversation during the term. TH 1:30–3:20

AMST 819a/HSAR 722a/REL 981a/RLST 695a, Visual Controversies: Religion and the Politics of Vision Sally Promey, Vasileios Marinis

This interdisciplinary seminar explores the destruction, censorship, and suppression of pictures and objects, as these acts have been motivated by religious convictions and practices, in medieval Europe and then in the United States from colonization to the present. In such episodes, religion does not operate in a vacuum but draws attention to other cultural pressure points concerning, for example, race, ethnicity, gender, and sexuality. Already in the third century in Europe, and as early as the seventeenth century in the geographic area that is now the United States, individuals and groups practiced a range of behaviors we might meaningfully, though often figuratively, label iconoclastic. This course focuses most specifically on the emergence of Christian art and architecture in dialogue (or competition) with Greco-Roman religions and Islam; and on variations of Protestant Christianity; while it also directs attention to case studies within Byzantine Orthodoxy, American Judaism, Islam, and Catholicism and looks to comparative situations and episodes of contention elsewhere in the world. Topics likely considered include the conversion of “pagan” temples into Christian churches in late antiquity; iconoclastic interventions on Christian floor mosaics in Palestine after the Muslim conquest; destruction of images during Byzantine Iconoclasm; attitudes toward images during the Protestant Reformation; American Puritan uses of a theology of figuration to justify genocide as an “iconoclastic” act in the Pequot War; Shaker constructions of elaborate visionary pictures as forms of “writing” rather than “art”; sculptor Rose Kohler’s determination to define and regulate “Jewish art” in her work with National Council of Jewish Women; recent adjudication of the public display of the Ten Commandments or Christian nativity scenes; the Western contexts of the destruction of the Bamiyan Buddhas; and international culture wars and the specific uses of “blasphemy” charges to restrict the visual practices of religions. Prerequisite: permission of the instructors. M 3:30–5:20

AMST 832a^U and 833b^U/FILM 735a^U and 736b^U, Documentary Film Workshop

Charles Musser

This workshop in audiovisual scholarship explores ways to present research through the moving image. Students work within a Public Humanities framework to make a documentary that draws on their disciplinary fields of study. Designed to fulfill requirements for the M.A. in Public Humanities. W 12:30–3:20, screenings T 7

AMST 839b/F&ES 843b/HIST 743b/HSBM 744b, Readings in Environmental History Paul Sabin

Readings and discussion of key works in environmental history. The course explores major forces shaping human-environment relationships, such as markets, politics, and ecological dynamics, and compares different approaches to writing about social and environmental change. M 1:30–3:20

AMST 861a/ARCH 4212a, Built Environments and the Politics of Place

Dolores Hayden

Call it the built environment, the vernacular, everyday architecture, or the cultural landscape, the material world of built and natural places is intricately bound up with social and political life. This seminar introduces research methods involving the built environment. It includes readings from urban and suburban history, geography, anthropology, and architecture as well as readings on narrative and graphic strategies for representing spaces and places. Participants present papers; chapters from longer projects are welcome. Limited enrollment. M 9:25–11:15

AMST 866b/HIST 775b/WGSS 712b, Readings in the History of Sexuality

George Chauncey

Selected topics in the history of sexuality, especially the emergence of the category of “sexuality” itself and how it has been articulated with hierarchies of gender, race, class, age, nation, and empire. The course also considers sexuality as a source of public and personal identity; a component of social organization and subcultural social life; an object of scientific study, government management, and legal regulation; and a site of political and cultural conflict. W 1:30–3:20

AMST 869a^U/WGSS 751a^U, Photography, History, Memory: Public and Private Lives

Laura Wexler

An interdisciplinary seminar that examines the role of photographic representation in archives of public and private memory. We examine the social and expressive functions of photography under the aegis of museums, libraries, art galleries, government, police, and personal albums. Critical theory includes discussions of gender, race, ethnicity, sexuality, class, and nation as they help construct remembering.

AMST 897a/ENGL 897a, Networked Solitude Amy Hungerford

This seminar examines the American understanding of solitude in the context of social and nonhuman worlds. Topics include environment and solitude, celibacy, urban solitude, religiously or politically motivated social withdrawal, punitive isolation, physical solitude within virtual connectedness, and contagious loneliness. We examine how the practices of reading and writing, both prose and lyric, from the nineteenth century to the present, configure these forms of socially networked solitude. Including readings from Emerson, Thoreau, Dickinson, Poe, Sherwood Anderson, Ellison, Reisman, Thomas Merton, Jack Kerouac, Paul Bowles, Annie Dillard, Rebecca Solnit, Marilynne Robinson, Colson Whitehead, and Michael Clune. Additional readings include J.S. Mill and recent lyric theory; Simmel, Goffman, and Riesman; and readings on punitive and religious solitudes. M 1:30–3:20

AMST 900, Independent Research**AMST 901, Directed Reading****AMST 902a and b, Prospectus Workshop**

Upon completion of course work, students are required to participate in at least one term of the prospectus workshop, ideally the term before the prospectus colloquium is held. Open to all students in the program and joint departments, the workshop serves as a forum for discussing the selection of a dissertation topic, refining a project's scope, organizing research materials, and evaluating work in progress. The workshop meets once a month. M 12–1:30

[AMST 903a, Introduction to Public Humanities]**AMST 904, Practicum in Public Humanities****AMST 905, Master's Project in Public Humanities****AMST 906/HUMS 901, (En)visualizing Knowledge: Text Mining, Mapping,****Network Analysis, and Big Data** Inderpal Grewal, Laura Wexler

Digital media and technology have opened an epochal chasm in our ways of knowing, as books, newspapers, libraries, whole universities, and worlds of scholarship are pulled into the digital realm only to reemerge in different forms. Many scholars have begun to explore how this new convergence alters knowledge production, visual culture, theories of representation and visibility, and the many and varied practices of everyday life. Text mining, mapping, network analysis, and big data visualization are among the most powerful forces now manifesting the everyday life world of the globe. This Mellon advanced graduate seminar examines these changes and convergences, investigating the legal, philosophical, scientific, artistic, and social implications of the new modes of creation and transmission of knowledge. Alongside such investigations, we examine existing projects in digital humanities and learn new tools and techniques for research in digital humanities. Students work individually and collaboratively to generate knowledge that can be demonstrated in a final term project.

ANTHROPOLOGY

10 Sachem Street, 203.432.3670
<http://anthropology.yale.edu>
 M.A., M.Phil., Ph.D.

Chair

Anne Underhill

Director of Graduate Studies

David Watts

Professors Richard Bribiescas, Richard Burger, Michael Dove (*Forestry & Environmental Studies*), Kathryn Dudley (*American Studies*), J. Joseph Errington, Eduardo Fernandez-Duque, Inderpal Grewal (*Women's, Gender & Sexuality Studies*), Andrew Hill, Marcia Inhorn (*Middle East Studies*), William Kelly (*on leave* [Sp]), Paul Kockelman, Roderick McIntosh (*on leave* [F]), Catherine Panter-Brick (*on leave* [F]), Eric Sargis (*on leave* [F]), James Scott (*Political Science*), Helen Siu, Kalyanakrishnan Sivaramakrishnan, Anne Underhill, Claudia Valeggia, David Watts, Harvey Weiss (*Near Eastern Languages & Civilizations*)

Associate Professors Jafari Allen (*African American Studies*), Brenda Bradley, Erik Harms (*on leave* [F]), William Honeychurch, Karen Nakamura, Douglas Rogers

Assistant Professors Oswaldo Chinchilla, Narges Erami (*Middle East Studies*), Karen Hébert (*Forestry & Environmental Studies*), Louisa Lombard, Brian Wood

Fields of Study

The department covers three subfields: archaeology; sociocultural and linguistic anthropology; and physical anthropology. Archaeology focuses on ritual complexes and writing, ceramic analysis, warfare, ancient civilizations, origins of agriculture, and museum studies. Sociocultural anthropology provides a range of courses: classics in ethnography and social theory, religion, myth and ritual, kinship and descent, historical anthropology, culture and political economy, agrarian studies, ecology, environment and social change, medical anthropology, emotions, public health, sexual meanings and gender, postcolonial development, ethnicity, identity politics and diaspora, urban anthropology, global mass culture, and alternate modernity. Linguistic anthropology includes language, nationalism and ideology, structuralism and semiotics, and feminist discourse. Physical anthropology focuses on paleoanthropology, evolutionary theory, human functional anatomy, race and human biological diversity, and primate ecology. There is strong geographical coverage in Africa, the Caribbean, East Asia (China and Japan), Latin America and South America, Southeast Asia (Indonesia), South Asia and the Indian Ocean, the Near East, Europe, and the United States.

Special Requirements for the Ph.D. Degree

There are no required courses or seminars for archaeology and biological anthropology graduate students. However, graduate students in these subfields are expected to confer

closely with their primary adviser and faculty to develop the most enriching and cogent program of courses. In sociocultural anthropology, more than three-fourths of a student's program consists of electives, including course work in other departments. Sociocultural students must take six required courses, with the remainder being electives among Anthropology courses and other departments. Admission to Ph.D. candidacy requires (1) completion of two years of course work (sixteen term courses); (2) independent study and research; (3) satisfactory performance on qualifying examinations; and (4) a dissertation research proposal submitted and approved before the end of the third year. For sociocultural anthropology students, the research proposal requirement takes the form of a field paper of approximately eighty pages in length. Qualifying examinations are normally taken at the end of the second year. For archaeology and biological anthropology subfields, they consist of eight hours written (four hours on one of the subfields, four hours on the student's special interest), and two hours oral. The sociocultural anthropology exam consists of five hours written and approximately one hour oral and is based on the six required courses.

Because of the diversity of our students' training program, the Department does not have a general foreign language requirement, either for admission or for admission to Ph.D. candidacy. Rather, each student's advisory committee must determine the necessary level and nature of foreign language proficiency (including scholarly languages and languages to be used in field research) to be met by the student, as well as any required competencies in statistics and other quantitative or qualitative methods. Advisory committees will stipulate such requirements in writing to the director of graduate studies (DGS) at the earliest possible stage of the student's program of study for approval by the DGS and the Department faculty. Such committee stipulations should specify exactly when and how it will be determined that the student has or has not met the requirements.

Combined Ph.D. Programs

The Anthropology department also offers a combined Ph.D. in Anthropology and Forestry & Environmental Studies in conjunction with the School of Forestry & Environmental Studies, and a combined Ph.D. in Anthropology and African American Studies in conjunction with the Department of African American Studies. These combined programs are ideal for students who intend to concentrate in, and to write dissertations on, thematic and theoretical issues centrally concerned with anthropology and one of these other areas of study. Students in the combined degree programs will be subject to the combined supervision of faculty members in the Anthropology department and in the respective department or school.

Admission into the combined degree program in Anthropology and African American Studies is based on mutual agreement between these two departments. Individual students will develop courses of study in consultation with their academic advisers and with the directors of graduate study for both departments. Students in the program must take core courses in Anthropology and in African American Studies, plus related courses in both departments approved by their advisory committees. In addition, they must successfully complete the African American Studies third-year Research Workshop. Oral and written qualifying examinations must include two topics in the field of African American Studies and two topics in Anthropology. The examination committee must

include at least one faculty member from each department. The dissertation prospectus must be submitted to the directors of graduate study of both departments and approved by the faculty of both. The thesis readers committee must also include at least one faculty member from each department, and the faculties of both departments must approve its composition.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. Applications for a terminal master's degree are not accepted. The M.A. degree is awarded only to students not continuing in the Ph.D. program. The student must complete eight graduate-level term courses approved for credit in the Anthropology department and maintain an average grade of High Pass.

Contact information: Director of Graduate Studies, Department of Anthropology, Yale University, PO Box 208277, New Haven CT 06520-8277; 203.432.3670; e-mail, anthropology@yale.edu; Web site, <http://anthropology.yale.edu>.

Courses

ANTH 500a, The Development of the Discipline: Historical Trajectories

William Kelly

The seminar emphasizes the characteristics of anthropology as a discipline and as a profession, and the historical trajectory of sociocultural anthropology from the late nineteenth century to the 1970s. The seminar is reserved for first-year doctoral students in Anthropology. M 9:25–11:15

ANTH 500b, The Development of the Discipline: Contemporary Themes

Kalyanakrishnan Sivaramakrishnan

The major theoretical orientations in social and cultural anthropology (especially in the United States and Europe), their historical development and importance, their relation to one another and to other disciplines. The seminar is reserved for first-year doctoral students in Anthropology, and students are presumed to have taken ANTH 500a in the fall term. TH 9:25–11:15

ANTH 501a, Anthropology and Classical Social Theory Paul Kockelman

Readings of primary texts in classical social theory, especially the writings of Marx, Weber, and Durkheim. Particular emphasis is placed on the role of these theorists in the early development of anthropology and social science more broadly. The course is reserved for first-year graduate students in Anthropology. T 9:25–11:15

ANTH 501b, Anthropology and Contemporary Social Theory Louisa Lombard

An overview of central themes and debates in contemporary social theory, with a focus on the integration of theory and research, rather than a hermeneutical analysis of particular theoretical texts. Concentrating on questions of power, inequality, the self, and community, assessment of the relevance of sociological theory to advancing an understanding of the complexities of late twentieth-century Western society. Critical theory, feminist theories, postmodernism, and the contributions of individual theorists reviewed and critiqued. T 1:30–3:20

ANTH 502a, Research in Sociocultural Anthropology: Design and Methods

Helen Siu

The course offers critical evaluation of the nature of ethnographic research. Research design includes the rethinking of site, voice, and ethnographic authority. T 9:25–11:15

ANTH 503a/AMST 746a, Research in Sociocultural Anthropology: Ethnographic Writing and Representation Jafari Allen

The course examines the representational practices that inform the doing and making of ethnography, broadly construed as the depiction of social life in the past and present. We consider classic and contemporary approaches to ethnography as a literary form as well as explore precedents and possibilities in the visual and performing arts. This is a core Anthropology graduate program course; others admitted only by permission of the instructor.

ANTH 508b^U/WGSS 701b^U, Queer Ethnographies Karen Nakamura

Explores both classic and contemporary ethnographies of gender and sexuality. Emphasis on understanding anthropology's contribution to, and relationship with, gay and lesbian studies and queer theory. M 7–8:50

ANTH 513a^U, Language, Culture, and Ideology J. Joseph Errington

Influential anthropological theories of culture are reviewed with critical reference to theories of language that inspired or informed them. Topics include American and European structuralism; cognitivist and interpretivist approaches to cultural description; work of Bakhtin, Bourdieu, and various "critical theorists." T 9:25–11:15

ANTH 533a^U, Bilingualism in Social Context J. Joseph Errington

The linguistic phenomenon of bilingualism is presented through broad issues in social description inseparably linked to it: growth and change in bilingual communities; bilingual usage, social identity, and allegiance; and interactional significances of bilingual speech repertoire use. W 1:30–3:20

ANTH 541a/F&ES 836a/HIST 965a/PLSC 779a, Agrarian Societies: Culture, Society, History, and Development Peter Perdue, James Scott,

Kalyanakrishnan Sivaramakrishnan

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from anthropology, economics, history, political science, and environmental studies are used to develop a meaning-centered and historically grounded account of the transformations of rural society. Team-taught. W 1:30–5:20

ANTH 545a/ARCG 545a, Organic Latin American Anthropologists of the Twentieth Century Richard Burger, Enrique Mayer

In addition to Latin American anthropology's development as an academic discipline, its practitioners played important roles in developing policy, educational programs, museums, government institutions, and international forums and institutions in an age of "science" and "nation building." We study the lives and works of seven famous anthropologists to understand the changing but interactive context of scholarship between the United States and Latin America. Prerequisite: reading knowledge of Spanish. Open to advanced undergraduate students with permission of the instructors. W 1:30–3:20

ANTH 548b, Medical Anthropology at the Intersections: Theory and Ethnography

Marcia Inhorn

TH 1:30–3:20

ANTH 555b^U, China-Africa Encounters Helen Siu

The seminar focuses on layered structures that linked China and Africa in a broad “Asian” context. It cuts through policy polemics to provide historically informed and ethnographically nuanced perspectives. The density and diversity of Chinese activities in Africa have grown dramatically in the past decade, colored by volatile markets and the global reach of China for oil and for agricultural and mineral commodities. Themes to explore include diasporic experiences (informal economies, cultural strategies, ethnic and religious tensions in migrant communities); land, finance, infrastructure, and daily lives (the intertwined worlds of state planners, global investors, and local communities); and the meaning of aid and development (comparisons between postcolonial, neoliberal and late-socialist models and long-term societal impact).

ANTH 560a^U, Representing Iran Narges Erami

This course introduces students to major themes in Iranian history and culture and builds a critical framework for understanding some of the challenges that face modern Iran today. In reading modern fiction, ethnography, historical narratives, primary sources, and theoretical texts covering local and oral history, revolutions, Islam and secularism, democracy and theocracy, and the role of cinema, students examine the Western production of knowledge about Iran and rethink what we know about such categories as history, culture, and gender. T 1:30–3:20

ANTH 561b/F&ES 877b, Anthropology of the Global Economy for Development and Conservation Carol Carpenter

The seminar explores topics in the anthropology of the global economy that are relevant to development and conservation policy and practice. Anthropologists are often assumed to focus on micro- or local-level research, and thus to have limited usefulness in the contemporary, global world of development and conservation policy. In fact, however, they have been examining global topics since at least the 1980s, and very little current anthropological research is limited to the village level. More importantly, the anthropological perspective on the global economy is unique and important. TH 9:30–12:20

ANTH 570b^U, Anthropology of Information Paul Kockelman

This course is about the digital and computational mediation of meaning. In some sense, it is about human-based significance in relation to machine-based sieving. We read classic works in media studies, cybernetics, computer science, semiotics, anthropology, and critical theory. Key topics include the relation between meaning and information; the relation between interpretation and computation; and the relation between interaction and infrastructure. W 9:25–11:15

ANTH 572b/F&ES 869b, Disaster, Degradation, Dystopia: Social Science

Approaches to Environmental Perturbation and Change Michael Dove

An advanced seminar on the long tradition of social science scholarship on environmental perturbation and natural disasters, the relevance of which has been heightened by the current global attention to climate change. The course is divided into three main

sections. The first consists of central questions and debates in the field: social dimensions of natural disasters; the discursive dimensions of environmental degradation, focusing on deforestation; and the current debate about the relationship between resource wealth and political conflict, focusing on the “green war” thesis. The second section focuses on anthropological and interdisciplinary approaches to climate change and related topics, encompassing canonical anthropological work on flood and drought; cyclones, El Niño, and interannual cycles; ethno-ecology; and risk. Additional lectures focus on interdisciplinary work. The final section of the course consists of the classroom presentation of work by the students and teaching fellow. Prerequisite: ANTH 581a or 597a. Three-hour lecture/seminar. Enrollment limited to twenty.

ANTH 575a^U, Hubs, Mobilities, and the Global Urban Helen Siu

Analysis of urban life in historical and contemporary societies. Topics include capitalist and postmodern transformations, class, gender, ethnicity, migration, and global landscapes of power and citizenship. T 1:30–3:20

ANTH 581a/F&ES 520a, Society and Environment: Introduction to Theory and

Method Michael Dove

An introductory graduate core course on the scope of social scientific contributions to environmental and natural resource issues. Section I presents an overview of the field and course. Section II deals with the way that environmental problems are initially framed. Case studies focus on placing problems in their wider political context, new approaches to uncertainty and failure, and the importance of how the analytical boundaries to resource systems are drawn. Section III focuses on questions of method, including the dynamics of working within development projects, and the art of rapid appraisal and short-term consultancies. Section IV is concerned with local peoples and the environment, with case studies addressing myths of tropical forest use and abuse development discourse, and with the question of indigenous peoples and knowledge. This is a foundations course for the M.E.M. curriculum and a core course in the curriculum for the combined F&ES/Anthropology doctoral program. Three hours lecture/seminar. Enrollment limited to thirty.

ANTH 582a/F&ES 882a, The Black Box of Implementation: Households,

Communities, Gender Carol Carpenter

The implementation of development projects has been described as existing in a “black box”: development and conservation policy (even participatory policy) is often not defined to inform effective implementation (Mosse 2004), and data on actual implementation is rarely incorporated into policy. This course examines the invisibility of implementation, and the common, mistaken assumptions about implementation targets (like households, communities, and gender) that take the place of absent data in policy. The course also makes an effort to use anthropology to shed light into this black box, to allow students to think more critically about the varied and dynamic social field in which project implementation occurs. Political and economic aspects of relations within households and communities, particularly gender relations, are examined in all of their complexity, variation, and dynamism. The real focus of the course, however, is not the contents of the black box, but the political and economic relations between households,

communities, and gender, on the one hand, and the world of development and conservation, on the other. How do households and communities respond to the differential opportunities and restrictions that development and conservation introduce? What are the implications of the fact that those responses are often invisible to policy makers? TH 9:30–12:20

ANTH 583b/GLBL 823b, Health Disparities and Health Equity: Biocultural

Perspectives Catherine Panter-Brick

A biocultural perspective on debates in medical anthropology and global health that focus on health disparities and equity. The intersection of biological and cultural issues in matters of health research and intervention. Application of theoretical frameworks to case studies in global health inequality. M 3:30–5:20

ANTH 588b^U, Politics of Culture in Southeast Asia Erik Harms

The course analyzes how Southeast Asian nations promote national culture as part of political and economic agendas. It also explores Southeast Asian cultural and political diversity to rescue the possibility for cultural difference within a global world. TH 9:25–11:15

ANTH 594b/AMST 747b/WGSS 633b, Affect and Materiality Kathryn Dudley

Recent scholarship in the fields of affect studies and the new materialisms raises important questions about the ethnographic encounter and the kind of knowledge it produces. Refusing to grant ontological status to classic oppositions between nature/culture, self/other, subject/object, and human/nonhuman, this work encourages anthropologically inclined ethnographers to rethink longstanding assumptions about the composition of the “social” and the “political” in an anthropocentric world that ignores the vulnerabilities and agential capacities of global ecosystems at its peril. Reading across ossifying disciplinary divides, this seminar examines the intellectual projects of writers such as Jane Bennett, Bruno Latour, Lauren Berlant, and Kathleen Stewart, among others. Our objective is to theorize the intersection between public and private feelings and human and nonhuman materiality in ways that bring the political and aesthetic implications of ethnographic research and writing to the fore. TH 1:30–3:20

ANTH 597a/F&ES 839a, Social Science of Development and Conservation

Carol Carpenter

This course is designed to provide M.E.M., M.E.Sc., and doctoral students with the opportunity to master the essential social science literature on sustainable development and conservation. Social science makes two contributions to the practice of development and conservation. First, it provides ways of thinking about, researching, and working with social groupings—including rural households and communities, but also development and conservation institutions, states, and NGOs. This aspect includes relations between groups at all these levels, and the role of power in these relations. Second, social science tackles the analysis of the knowledge systems that implicitly shape development and conservation policy and impinge on practice. In other words, we analyze communities but also our own ideas of what communities are. We also examine our ideas about sustainable development and conservation, and we look at development and the institutions that implement it from the perspective of communities. The emphasis throughout

is on how these things shape the practice of sustainable development and conservation. Case studies used in the course have been balanced as much as possible between Southeast Asia, South Asia, Africa, and Latin America; most are rural and Third World (largely due to the development and conservation focus). The course includes readings from all noneconomic social sciences. Readings are equally focused on conservation and development. The goal of the course is to stimulate students to apply informed and critical thinking (which means not criticizing others, but questioning our own underlying assumptions) to whatever roles they may come to play in sustainable development and conservation, in order to move toward more environmentally and socially sustainable projects and policies. The course is also designed to help students shape future research by learning to ask questions that build on, but are unanswered by, the social science theory of conservation and development. No prerequisites. This is a requirement for the joint F&ES/Anthropology doctoral program and a prerequisite for some advanced F&ES courses. Open to advanced undergraduates. Three hours lecture/seminar. T 2:30–5:20

ANTH 598b/F&ES 965b, Advanced Readings: Social Science of Development and Conservation Carol Carpenter

An advanced seminar on the social science theory of sustainable development and conservation, designed as an M.E.M. capstone course and to give M.E.Sc. and doctoral students a wider theoretical context for analyzing and writing up their research. The course traces the conceptual history of the social science theory of sustainable development and conservation, focusing on theories of power, governmentality, and capitalism. It examines relations between these theories, alternative theories, and how this history influences the field. The course covers the works of Michel Foucault most relevant to development and conservation, important social scientists who have used Foucault's ideas (e.g., James Ferguson, Timothy Mitchell, Tania Li, Donald Moore, David Mosse), alternative theories of power (e.g., James Scott, Bruno Latour), applications of Foucault's ideas to development (selections change every year), applications of Foucault's ideas to the environment (especially Arun Agrawal, Timothy Luke, Bruce Braun), theories of resistance (Michel Foucault, James Scott), and Foucault-influenced views of the economy and capitalism (Mitchell, Ferguson, Aiwa Ong, Li, Anna Tsing, among others). Students are expected to use the course to develop, and present in class, their own research and writing. Prerequisite: ANTH 561b, 582a, or 597a. Enrollment limited to twelve. T 2:30–5:20

ANTH 601b^U, Meaning and Materiality Paul Kockelman

This course is about the relation between meaning and materiality. We read classic work at the intersection of biosemiosis, technocognition, and sociogenesis. And we use these readings to understand the relation between significance, selection, sieving, and serendipity. M 9:25–11:15

ANTH 632b^U, Politics of Language J. Joseph Errington

The course centers on aspects of language difference and inequality as often neglected but crucial shapers of the political dynamics and social change in plural societies. The first part of the course involves broad comparative and theoretical approaches to the politics of sociolinguistic difference. The second part is devoted to case studies that foreground specific issues: "problems" of substandard languages, bilingual identities, globalization and language shift, language death, and others. W 1:30–3:20

ANTH 638b^U, Culture, Power, Oil Douglas Rogers

The course analyzes the production, circulation, and consumption of petroleum in order to explore key topics in recent social and cultural theory, including globalization, empire, cultural performance, natural resource extraction, and the nature of the state. Case studies from the United States, Saudi Arabia, Nigeria, Venezuela, and the former Soviet Union, among others. W 9:25–11:15

ANTH 639a^U/AFST 639a^U, Political Anthropology and Africa Louisa Lombard

A historical-anthropological study of politics in Africa. How have anthropologists made sense of the workings of African politics, both those of state and nonstate actors? This course charts how African states came into being, how they operate, and how state agents and the people they govern negotiate legitimacy, authority, and belonging. W 3:30–5:20

ANTH 651a^U/WGSS 651a^U, Intersectionality and Women's Health Marcia Inhorn

This interdisciplinary seminar explores how the intersections of race, class, gender, and other axes of “difference” (age, sexual orientation, disability status, nation, religion) affect women’s health, primarily in the contemporary United States. Recent feminist approaches to intersectionality and multiplicity of oppressions theory are introduced. In addition, the course demonstrates how anthropologists studying women’s health issues have contributed to social and feminist theory at the intersections of race, class, and gender. T 9:25–11:15

ANTH 655a^U/WGSS 659a^U, Masculinity and Men's Health Marcia Inhorn

This interdisciplinary seminar—designed for students in Anthropology; Women’s, Gender, and Sexuality Studies; and Global Health—explores in an in-depth fashion ethnographic approaches to masculinity and men’s health around the globe. The course begins with two theoretical texts on masculinity, followed by eleven anthropological ethnographies on various dimensions of men’s health and well-being. Students gain broad exposure to a number of exigent global men’s health issues, issues of ethnographic research design and methodology, and the interdisciplinary theorizing of masculinity scholars in anthropology, sociology, and cultural studies. In particular, the course demonstrates how anthropologists studying men’s health issues in a variety of Western and non-Western sites, including the Middle East, Africa, Latin America, and Asia, have contributed to both social theory and ethnographic scholarship of importance to health policy. TH 9:25–11:15

ANTH 701a^U/ARCG 701a^U, Foundations of Modern Archaeology Richard Burger

How method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. Prerequisite: a background in the basics of archaeology equivalent to one of the introductory courses. TTH 1–2:15

ANTH 702a/ARCG 702a, Archaeological Approaches to Art and Iconography

Oswaldo Chinchilla

An examination of archaeological approaches to the study of artistic representations in archaeology, focusing on the analysis of style and iconographic interpretations. Case studies are drawn from Precolumbian art, particularly Moche art of Peru and Maya art of Mesoamerica. TH 9:25–11:15

ANTH 719b^u/ARCG 719b^u, Ethnohistory and Archaeology Roderick McIntosh

Review of the major problems and methodologies associated with the use of ethnohistory by archaeologists. How do archaeologists construct a historical imagination? The course looks at a variety of sources: colonial and “visitor” documents, peoples’ written description of themselves, oral traditions, classic ethnographies, and art history. MW 9–10:15

ANTH 720b^u/ARCG 720b^u/NELC 720b^u, Babylon to Bush Harvey Weiss

Analysis of the archaeological and paleoenvironmental data for rain-fed and irrigation agriculture settlement, subsistence, and politicoeconomic innovation from the earliest sedentary agriculture villages, to the earliest cities and states, to the earliest empire. What combinations of dynamic social and environmental forces drove these developments in these regions during this ten thousand year span? TH 3:30–5:20

ANTH 729a^u/ARCG 729a^u, Integrating Remote Sensing in Archaeology

William Honeychurch, Andrew Womack

Introduction to satellite and geophysical remote sensing in anthropology. Focus on integrating this data with other techniques and databases for manipulation and application to archaeological research.

ANTH 741b/ARCG 741b/CLSS 841b/HIST 502b/NELC 841b, Frontier and Province in the Premodern World Andrew Johnston, William Honeychurch

From Achaemenid India or Han China to Roman Gaul and Egypt to Iraqi Kurdistan, the province and its organizational equivalents (e.g., *nomes* in Egypt, commanderies in China) have long constituted one of the fundamental building blocks of states, ancient and modern, and a fascinatingly complex site of cultural and political negotiation in imperial encounters. The aim of this year’s core seminar is to explore social equilibria between governance and the governed in the premodern world, via the interaction—religious, artistic, linguistic, administrative, economic—between local units and large imperial frameworks. As an object of comparative study, the province, representing the intersection of imperial power and local communities, allows us to combine “top-down” and “bottom-up” approaches to the ancient world, to investigate some of the key practices and discourses of empire while attempting to recover the agency and voices of subaltern provincial actors. It offers as well a chance to reconsider the “center-periphery” paradigm taken over from world-systems theory, and to propose new models for understanding the complex relationships between an imperial “center” and the governance of territories. This interdisciplinary seminar examines a wide range of aspects of the province as a trans-historical phenomenon—law, economy, art, literature, religion, monumentality, urbanism, and politics—across the ancient Mediterranean world and beyond, making use of the unique resources and collections at Yale, especially the Art Gallery and Beinecke Library.

ANTH 750b^u/ARCG 750b^u, Analysis of Lithic Technology Oswaldo Chinchilla

This course provides an introduction to the analysis of the chipped and ground stone tools found on archaeological sites. As a laboratory course, it includes hands-on instruction: we learn how to manufacture chipped stone tools out of obsidian. We begin by reviewing the development of chipped and ground stone tool technology from the earliest simple pebble tools to historical period tools. We discuss the relevance of lithics research to issues of subsistence, craft specialization, and trade. We also discuss how

these artifacts are recorded, analyzed, and drawn, and we review related studies such as sourcing and use-wear analysis. TH 9:25–11:15

ANTH 755b^U/ARCG 755b^U, Inca Culture and Society Richard Burger

The history and organization of the Inca empire and its impact on the nations and cultures conquered by it. The role of archaeology in understanding the transformation of Andean lifeways is explored, as is the interplay between ethnohistoric and archaeological approaches to the subject. TTH 2:30–3:45

ANTH 769a/AMST 716a/ARCG 769a/HSAR 716a, Landscapes of Meaning:

Museums and Their Objects Anne Underhill, Cyra Levenson

This seminar explores how museums convey various meanings about ethnographic, art, and archaeological objects through the processes of collecting, preparing exhibitions, and conducting research. Participants also discuss broader theoretical and methodological issues such as the roles of museums in society, relationships with source communities, management of cultural heritage, and various specializations valuable for careers in art, natural history, anthropology, history, and other museums. T 9:25–11:15

ANTH 773b^U/ARCG 773b^U/F&ES 793b/NELC 588b^U, Abrupt Climate Change and

Societal Collapse Harvey Weiss

Collapse documented in the archaeological and early historical records of the Old and New Worlds, including Mesopotamia, Mesoamerica, the Andes, and Europe. Analysis of politicoeconomic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict. TH 3:30–5:20

ANTH 780b^U/ARCG 780b^U, Archaeology of Religion Richard Burger

The course explores archaeological approaches to the study of religion. While the term “religion” is hard to define, it is generally agreed that religious phenomena occur in almost all cultures and that this realm played a significant part in most prehistoric cultures. In order to provide a broad vision of this theme, the course begins by considering influential schools of thought on the definition, origins, and social significance of religious behavior. The course then reviews a variety of methods that scholars may use to reconstruct ancient beliefs and rituals. The course assesses the applicability and success of these methodologies across the broad spectrum of ancient cultures representing differing degrees of sociopolitical complexity. Finally, we explore case studies from a diverse range of ancient societies and consider the impact of religious behaviors within their broader cultural contexts. W 1:30–3:20

ANTH 785a^U/ARCG 785a^U, Archaeological Ceramics I Anne Underhill

This seminar addresses how archaeologists analyze and interpret ceramics, arguably the most common type of object found in ancient sites. Readings, discussions, and opportunities for practical work focus on what different aspects of ceramic vessels reveal about the people who made and used them. M 1:30–3:20

ANTH 797b^U/ARCG 797b^U, Archaeology of East Asia Anne Underhill

Introduction to the findings and practice of archaeology in China, Japan, Korea, and southeast Asia. Methods used by archaeologists to interpret social organization, economic

organization, and ritual life. Attention to major transformations such as the initial peopling of an area, establishment of farming villages, the development of cities, interregional interactions, and the nature of political authority. T 9:25–11:15

ANTH 822a/ARCG 822a, Topics and Issues in Human Evolution Andrew Hill

Topics from the span of primate evolution are covered: the early primates, origin of modern-type primates, anthropoid origins, monkey and hominoid evolution. Readings and discussions focus on issues of taxonomy—judging morphological similarities and differences among fossils. Specific attention paid to traits paleontologists use to assign fossils to species and functional/behavioral significance of those traits. Lectures and lab use of fossils provide background on fossil evidence. Open to qualified undergraduates. TH 1:30–3:20

ANTH 843a, Evolutionary Biology of Human Aging Richard Bribiescas

Aging is an aspect of evolutionary biology that is common to the life histories of all organisms, including humans. Moreover, humans exhibit biological characteristics of aging that are both unique to our species and common to other organisms. This seminar aims to address how human aging has evolved and how it may inform our present understanding of age-related diseases. Topics to be covered include the somatic and behavioral aspects of aging, male and female reproductive senescence, the relationship between investment in reproduction and rates of aging, as well as the comparative physiology of aging. Open to advanced undergraduates with permission of the instructor. T 9:25–11:15

ANTH 847b^U/ARCG 847b^U, Hunter-Gatherers Brian Wood

The vast majority of the human experience centered around one way of making a living: hunting and gathering. Yet today, hunter-gatherers make up a small and diminishing proportion of human societies. This class is a broad survey of the ecology, economics, political, and social organization of recent hunter-gatherers and a review of anthropological inquiry into foraging societies. T 1:30–3:20

ANTH 848a, Hormones, Behavior, and Life History Claudia Valeggia

This seminar focuses on the interaction between hormones and behavior from an evolutionary and developmental perspective. We begin with an overview of general principles of endocrine physiology. The course then focuses, from a life history perspective, on how hormones affect the brain and body throughout development. We explore human sexuality and reproduction, energy metabolism, parenting, stress, social interactions, and affective disorders. We also cover field and laboratory endocrinology methods. W 9:25–11:15

ANTH 856a^U/ARCG 856a^U, Reconstructing Human Evolution: An Ecological

Approach Andrew Hill

If human evolutionary change has been determined or affected by ecological factors, such as changes in climate, competition with other animals, and availability and kinds of food supply, then it is important to determine ecological and environmental information about the regions and time period in which human evolution has occurred. Examination of methods for obtaining data relevant to such information, and for evaluating the techniques and results of such other fields as geology, paleobotany, and paleozoology. Ethnographic, primatological, and other biological models of early human behavior.

T 1:30–3:20

ANTH 857b^U, Topics and Issues in Evolutionary Theory Andrew Hill, Eric Sargis
Focus on classic and current literature in theoretical evolutionary biology, intended to give students intensive training in critical analysis of theoretical concepts and in scientific writing. W 1:30–3:20

ANTH 858b^U, Demography and Human Experience Brian Wood
Introduction to the study of the growth, decline, composition, migration, and interaction of human populations. Methods for measuring, visualizing, and analyzing population processes. Theory from disciplines such as history, social science, public health, and environmental science used to explore the ways in which individual human experience reflects and contributes to population dynamics.

ANTH 860a/ARCG 860a, Human Behavioral Ecology Brian Wood
This course focuses on human behavior as shaped by our species' evolutionary history and guided by particular ecological contexts. Through readings and discussion, we survey the historical and theoretical foundations of this research paradigm and examine the ways that human behavioral ecology differs from other evolutionary approaches to the study of human behavior. Readings cover research in the field examining human subsistence, sharing, mobility, territoriality, the division of labor, mating, parenting, and social organization, using ethnographic, archaeological, and experimental datasets. TH 3:30–5:20

ANTH 861a, Love, Friendship, and Marriage: The Biological Basis of Male-Female Relationships Eduardo Duque-Fernandez
Across the world, relationships between men and women shape the structure and functioning of human societies. Whether as friendship, love, or marriage, a man and a woman develop a relationship between them that is special, different from the relationship that they have with other adults in the community. Psychologists, historians, poets, anthropologists, artists, biologists, economists have all testified to this ubiquitous phenomenon. There is a bond, an attachment between them, and there is some implicit or explicit commitment to share space, time, resources, offspring, and labor. T 1:30–3:20

ANTH 864b^U/ARCG 864b^U, Human Osteology Eric Sargis
A lecture and laboratory course focusing on the characteristics of the human skeleton and its use in studies of functional morphology, paleodemography, and paleopathology. Laboratories familiarize students with skeletal parts; lectures focus on the nature of bone tissue, its biomechanical modification, sexing, aging, and interpretation of lesions. TTH 2:30–3:45

ANTH 890a, Advanced Topics in Health of Indigenous Peoples Claudia Vallegia
This seminar is an exploration of the current health status of indigenous populations around the world. We discuss epidemiological profiles, health disparities, and the uniqueness (or not) of the health situation of indigenous populations. We also use these topics as a base for developing oral presentation and teaching skills.

ANTH 941a and b, Research Seminar in Japan Anthropology Karen Nakamura [F]
The seminar offers professional preparation for doctoral students in Japan anthropology through systematic readings and analysis of the anthropological literature, in English and in Japanese. Prerequisite: permission of the instructor.

ANTH 942a and b/SAST 900a and b, Research Seminar in Anthropology of South

Asia Kalyanakrishnan Sivaramakrishnan

This seminar is for students preparing to become scholars of South Asia. It consists of systematic reading, analysis, discussion, and writing about the anthropological literature in English. It deals with a selection of key ethnographic monographs that cover important topics and debates in the anthropology of South Asia and India, including caste, class, community, gender, language, development, environment, politics, and popular culture. Students actively prepare and lead discussions and write either a proposal or research paper at the end of the term. The seminar is designed for doctoral students working on South Asia. Others with appropriate background and interests may be admitted with permission of the instructor. M 3:30–5:20

ANTH 950a and b, Directed Research: Preparation for Qualifying Exam

By arrangement with faculty.

ANTH 951a and b, Directed Research in Ethnology and Social Anthropology

By arrangement with faculty.

ANTH 952a and b, Directed Research in Linguistics

By arrangement with faculty.

ANTH 953a and b, Directed Research in Archaeology and Prehistory

By arrangement with faculty.

ANTH 954a and b, Directed Research in Biological Anthropology

By arrangement with faculty.

APPLIED MATHEMATICS

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Peter Jones

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Associate Professors John Emerson (*Statistics*), Thierry Emonet (*Molecular, Cellular & Developmental Biology; Physics*), Josephine Hoh (*Public Health*), Yuval Kluger (*Pathology*), Michael Krauthammer (*Pathology*), Sekhar Tatikonda (*Electrical Engineering; Statistics; Computer Science*)

Assistant Professors Xiuyuan Cheng, Alexander Cloninger, Manas Rachh, Guy Wolf

Fields of Study

The graduate Program in Applied Mathematics comprises the study and application of mathematics to problems motivated by a wide range of application domains. Areas of concentration include the analysis of data in very high-dimensional spaces, the geometry of information, computational biology, and randomized algorithms. Topics covered by the program include classical and modern applied harmonic analysis, linear and nonlinear partial differential equations, numerical analysis, scientific computing and applications, discrete algorithms, combinatorics and combinatorial optimization, graph algorithms, geometric algorithms, discrete mathematics and applications, cryptography, statistical theory and applications, probability theory and applications, information theory, econometrics, financial mathematics, statistical computing, and applications of mathematical and computational techniques to fluid mechanics, combustion, and other scientific and engineering problems.

Requirements for the Ph.D. in Applied Mathematics

All students are required to: (1) complete twelve term courses (including reading courses) at the graduate level, at least two with Honors grades; (2) pass a qualifying examination on their general applied mathematical knowledge (in algebra, analysis, and probability and statistics) by the end of their second year; (3) submit a dissertation prospectus;

(4) participate in the instruction of undergraduates; (5) be in residence for at least three years; and (6) complete a dissertation that clearly advances understanding of the subject it considers. Prior to registering for a second year of study, and in addition to all other academic requirements, students must successfully complete MATH 991a, Ethical Conduct of Research, or another approved course on responsible conduct in research. Teaching is considered an integral part of training at Yale University, so all students are expected to complete two terms of teaching within their first two years. The normal time for completion of the Ph.D. program is four years.

Requirement (1) normally includes four core courses in each of the methods of applied analysis, numerical computation, algorithms, and probability; these should be taken during the first year. The qualifying examination is normally taken by the end of the third term and will test knowledge of the core courses as well as more specialized topics. The thesis is expected to be independent work, done under the guidance of an adviser. This adviser should be contacted not long after the student passes the qualifying examinations. A student is admitted to candidacy after completing requirements (1)–(5) and obtaining an adviser.

In addition to the above, all first-year students (including terminal M.S. students) must successfully complete one course on the responsible conduct of research (e.g., MATH 991 or CPSC 991) and AMTH 525, Seminar in Applied Mathematics.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study.

Master's Degrees

M. Phil. See Degree Requirements under Policies and Regulations.

M.S. (en route to the Ph.D.) The M.S. degree is a terminal degree and is not awarded en route to the Ph.D. Students who withdraw from the Ph.D. program may be eligible for the M.S. if they meet the requirements of the terminal master's degree program (below).

Terminal Master's Degree Program Students may also be admitted to a terminal master's degree program directly. This program is normally completed in one year, but a part-time program may be spread over as many as four years. To qualify for the M.S., the student must pass ten graduate-level courses. Courses taken as part of the M.S. program must be preapproved by the director of graduate studies to ensure that a suitable distribution of topics is covered.

Program materials and additional information concerning degrees offered and admissions requirements are available upon request to the Graduate School of Arts and Sciences, Yale University, PO Box 208323, New Haven CT 06520-8323.

Courses

AMTH 525, Seminar in Applied Mathematics

This course consists of weekly seminar talks given by a wide range of speakers. Required for all first-year students.

AMTH 561a/CPSC 662a, Spectral Graph Theory Daniel Spielman

An applied approach to spectral graph theory. The combinatorial meaning of the eigenvalues and eigenvectors of matrices associated with graphs. Applications to optimization, numerical linear algebra, error-correcting codes, computational biology, and the discovery of graph structure.

[AMTH 562a^U/CPSC 562a^U, Graphs and Networks]

AMTH 605b/ENAS 503b/STAT 667b, Probabilistic Networks, Algorithms, and Applications

This course examines probabilistic and computational methods for the statistical modeling of complex data. The emphasis is on the unifying framework provided by graphical models, a formalism that merges aspects of graph theory and probability theory. Graphical models: Markov random fields, Bayesian networks, and factor graphs. Algorithms: filtering, smoothing, belief-propagation, sum-product, and junction tree. Variational techniques: mean-field and convex relaxations. Markov processes on graphs: MCMC, factored HMMs, and Glauber dynamics. Some statistical physics techniques: cavity and replica methods. Applications to error-correcting codes, computer vision, bio-informatics, and combinatorial optimization. MW 2:30–3:45

AMTH 666b/ASTR 666b/G&G 666b, Classical Statistical Thermodynamics

John Wettlaufer

Classical thermodynamics is derived from statistical thermodynamics. Using the multi-particle nature of physical systems, we derive ergodicity, the central limit theorem, and the elemental description of the second law of thermodynamics. We then develop kinetics, transport theory, and reciprocity from the linear thermodynamics of irreversible processes. Topics of focus include Onsager reciprocal relations, the Fokker-Planck equation, stability in the sense of Lyapunov, and time invariance symmetry. We explore phenomena that are of direct relevance to astrophysical and geophysical settings. No quantum mechanics is necessary as a prerequisite.

[AMTH 667b/CPSC 576b^U/ENAS 576b^U, Advanced Computational Vision]

AMTH 765a/CB&B 562a/ENAS 561a/MB&B 562a^U/MCDB 562a^U/PHYS 562a,

Dynamical Systems in Biology Damon Clark, Jonathon Howard

This course covers advanced topics in computational biology. How do cells compute, how do they count and tell time, how do they oscillate and generate spatial patterns? Topics include time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form; mechanics of cell shape and motion; spatially heterogeneous processes; diffusion. Prerequisite: MCDB 561b or equivalent, or a 200-level biology course, or permission of the instructor. TTH 2:30–3:45

APPLIED PHYSICS

Becton Center, 203.432.2210

<http://appliedphysics.yale.edu>

M.S., M.Phil., Ph.D.

Chair

A. Douglas Stone

Director of Graduate Studies

Hui Cao (309 BCT, hui.cao@yale.edu)

Professors Charles Ahn, Sean Barrett, Hui Cao, Richard Chang (*Emeritus*), Michel Devoret, Paul Fleury, Steven Girvin, Leonid Glazman, Victor Henrich, Marshall Long, Tso-Ping Ma, Simon Mochrie, Daniel Prober, Nicholas Read, Mark Reed, Robert Schoelkopf, Ramamurti Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*)

Associate Professors Eric Dufresne, Jack Harris, Sohrab Ismail-Beigi, Corey O'Hern, Hongxing Tang

Assistant Professors Michael Choma (*Engineering & Applied Science*), Liang Jiang, Peter Rakich

Fields of Study

Fields include areas of theoretical and experimental condensed-matter and materials physics, optical and laser physics, quantum engineering, and nanoscale science. Specific programs include surface and interface science, first principles electronic structure methods, photonic materials and devices, complex oxides, magnetic and superconducting artificially engineered systems, quantum computing and superconducting device research, quantum transport and nanotube physics, quantum optics, and random lasers.

Special Admissions Requirements

The prerequisites for work toward a Ph.D. degree in Applied Physics include a sound undergraduate training in physics and a good mathematical background. The GRE General Test is required, and the Subject Test in Physics is strongly recommended.

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to the Ph.D. program in Applied Physics may also apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Special Requirements for the Ph.D. Degree

The student plans his/her course of study in consultation with faculty advisers (the student's advisory committee). A minimum of twelve term courses is required. These

courses must be full-credit graduate courses with clear technical, scientific, or mathematical focus. These twelve courses must include seven core courses. The first core course satisfies the math requirement, must be fulfilled in the first year, and is met by taking Mathematical Methods I (APHY 500a) or Mathematical Methods of Physics (PHYS 506a). The remaining six core courses are Solid State Physics I (APHY 548a) and II (APHY 549b), Quantum Mechanics I (PHYS 508a) and II (PHYS 608b), Electromagnetic Theory I (PHYS 502b), and Statistical Physics I (PHYS 512b). It is expected that most of these six core courses will be taken in the first year; no more than two may be taken in the second year. No more than two of the twelve courses can be Special Investigations, and at least two must be outside the area of the dissertation.

Well-prepared students may be able to place out of the seven required core courses after demonstrating equivalent training and competence by passing an exam in the relevant subject.

All students must complete the one-term course Responsible Conduct of Research (APHY 508b) in the first year of study.

Each term, the faculty review the overall performance of the student and report their findings to the director of graduate studies (DGS), who determines whether the student may continue toward the Ph.D. degree. By the end of the second term, it is expected that a faculty member has agreed to accept the student as a research assistant. By December 5 of the third year, an area examination must be passed and a written prospectus submitted before dissertation research is begun. These events result in the student's admission to candidacy. Subsequently, the student will report orally each year to the full advisory committee on progress. When the research is nearing completion, but before the thesis writing has commenced, the full advisory committee will advise the student on the thesis plan. A final oral presentation of the dissertation research is required to be given during term time.

There is no foreign language requirement.

Teaching experience is regarded as an integral part of the graduate training program at Yale University, and all Applied Physics graduate students are required to serve as a Teaching Fellow for one term, typically during year two. Teaching duties normally involve assisting in laboratories or discussion sections and grading papers and are not expected to require more than ten hours per week. Students are not permitted to teach during the first year of study.

If a student was admitted to the program having earned a score of less than 26 on the Speaking Section of the Internet-based TOEFL, the student will be required to take an English as a Second Language (ESL) course each term at Yale until the Graduate School's Oral English Proficiency standard has been met. This must be achieved by the end of the third year in order for the student to remain in good standing.

Honors Requirement

Students must meet the Graduate School's Honors requirement in at least two term courses (excluding Special Investigations) by the end of the second term of full-time study. An extension of one term may be granted at the discretion of the DGS.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. (en route to the Ph.D.) To qualify for the M.S., the student must pass eight term courses; no more than two may be Special Investigations. An average grade of at least High Pass is required, with at least one grade of Honors.

Terminal Master's Degree Program Students may also be admitted directly to a terminal master's degree program. The requirements are the same as for the M.S. en route to the Ph.D., although there are no core course requirements for students in this program. This program is normally completed in one year, but a part-time program may be spread over as many as four years. Some courses are available in the evening, to suit the needs of students from local industry.

Program materials are available upon request to the Director of Graduate Studies, Department of Applied Physics, Yale University, PO Box 208267, New Haven CT 06520-8267; e-mail, applied.physics@yale.edu; Web site, <http://appliedphysics.yale.edu>.

Courses

The list of courses may be slightly modified by the time the term begins. Please check the Web site <http://students.yale.edu/oci> for the most up-to-date course listing.

APHY 500a/ENAS 500a, Mathematical Methods I Paul Van Tassel

A beginning, graduate-level introduction to ordinary and partial differential equations, vector analysis, linear algebra, and complex functions. Laplace transform, series expansion, Fourier transform, and matrix methods are given particular attention. Applications to problems frequently encountered in engineering practice are stressed throughout.
TTH 9–10:15

APHY 506a^u, Basic Quantum Mechanics Robert Schoelkopf

Basic concepts and techniques of quantum mechanics essential for solid state physics and quantum electronics. Topics include the Schrödinger treatment of the harmonic oscillator, atoms and molecules and tunneling, matrix methods, and perturbation theory.

APHY 508b/ENAS 508b, Responsible Conduct of Research

Required of first-year students. Presentation and discussion of topics and best practices relevant to responsible conduct of research including academic fraud and misconduct, conflict of interest and conflict of commitment, data acquisition and human subjects, use and care of animals, publication practices and responsible authorship, mentor/trainee responsibilities and peer review, and collaborative science.

APHY 548a^u and 549b^u/ENAS 850a^u and 851b^u/PHYS 548a^u and 549b^u, Solid State Physics I and II Victor Henrich [F], Michel Devoret [Sp]

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonons, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. Fall: 2.5 HTBA; Spring: TTH 2:30–3:45

[APHY 601b/PHYS 601b, Quantum Information and Computation]**APHY 610b/PHYS 610b, Quantum Many-Body Theory** Leonid Glazman

Identical particles and second quantization. Electron tunneling and spectral function. General linear response theory. Approximate methods of quantum many-body theory. Dielectric response, screening of long-range interactions, electric conductance, collective modes, and photon absorption spectra. Fermi liquid; Cooper and Stoner instabilities; notions of superconductivity and magnetism. BCS theory, Josephson effect, and Majorana fermions in condensed matter; superconducting qubits. Bose-Einstein condensation; Bogoliubov quasiparticles and solitons. TTH 11:35–12:50

APHY 633b/PHYS 633b, Introduction to Superconductivity Daniel Prober

The fundamentals of superconductivity, including both theoretical understandings of basic mechanism and description of major applications. Topics include historical overview, Ginzburg-Landau (mean field) theory, critical currents and fields of type II superconductors, BCS theory, Josephson junctions and microelectronic and quantum-bit devices, and high-Tc oxide superconductors. TTH 11:35–12:50

[APHY 634a/PHYS 634a, Mesoscopic Physics I]**[APHY 667b/PHYS 667b, Special Topics in Condensed Matter Physics: Quantum Hall Effect and Conformal Field Theory]****APHY 675a^u/PHYS 675a^u, Principles of Optics with Applications** Hui Cao

Introduction to the principles of optics and electromagnetic wave phenomena with applications to microscopy, optical fibers, laser spectroscopy, nanophotonics, plasmonics, and metamaterials. Topics include propagation of light, reflection and refraction, guiding light, polarization, interference, diffraction, scattering, Fourier optics, and optical coherence. TTH 11:35–12:50

APHY 676a/PHYS 676a, Introduction to Light-Matter Interactions Peter Rakich

Optical properties of materials and a variety of coherent light-matter interactions are explored through the classical and quantum treatments. The role of electronic, phononic, and plasmonic interactions in shaping the optical properties of materials is examined using generalized quantum and classical coupled-mode theories. The dynamic response of media to strain, magnetic, and electric fields is also treated. Modern topics are explored, including optical forces, photonic crystals, and metamaterials; multi-photon absorption; and parametric processes resulting from electronic, optomechanical, and Raman interactions. TTH 1–2:15

APHY 677a/PHYS 677a, Noise, Dissipation, Amplification, and Information

Michel Devoret

Graduate-level non-equilibrium statistical physics applied to noise phenomena, both classical and quantum. The aim of the course is to explain the fundamental link between the random fluctuations of a physical system in steady state and the response of the same system to an external perturbation. Several key examples in which noise appears as a resource rather than a limitation are treated: spin relaxation in nuclear magnetic resonance (motional narrowing), Johnson-Nyquist noise in solid state transport physics

(noise thermometry), photon correlation measurements in quantum optics (Hanbury Brown-Twiss experiment), and so on. The course explores both passive and active systems. It discusses the ultimate limits of amplifier sensitivity and speed in physics measurements. MW 9–10:15

APHY 679b/PHYS 679b, Nonlinear Optics and Lasers Hui Cao

Fundamental principles of nonlinear optics and lasers. Nonlinear optical susceptibilities; wave propagation and coupling in nonlinear media; harmonic, sum, and difference frequency generation; parametric amplification and oscillation; phase conjugation via four-wave mixing; self-phase modulation and solitons. Stimulated and spontaneous emission, interaction of two-level atoms with light, optical amplification. Optical resonators and threshold conditions for laser oscillation. Semiclassical laser theory, nonlinear and multimode lasing. Noise and quantum effects in lasers (time permitting). TTH 11:35–12:50

[APHY 691a/PHYS 691a, Quantum Optics]

[APHY 816a/PHYS 816a, Techniques of Microwave Measurements and RF Design]

[APHY 993a, Topics in DFT and First Principle Methods]

APHY 990a and 990b, Special Investigation

ARCHAEOLOGICAL STUDIES

10 Sachem Street, 203.432.3670
 www.yale.edu/archaeology
 M.A.

Chair and Director of Graduate Studies

Richard Burger (*Anthropology*)

Professors Richard Burger (*Anthropology*), Edward Cooke, Jr. (*History of Art*), John Darnell (*Near Eastern Languages & Civilizations*), Stephen Davis (*Religious Studies*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Andrew Hill (*Anthropology*), Diana Kleiner (*Classics; History of Art; on leave [Sp]*), Roderick McIntosh (*Anthropology; on leave [F]*), J.G. Manning (*Classics; History*), Mary Miller (*History of Art*), Eric Sargis (*Anthropology; on leave [F]*), Ronald Smith (*Geology & Geophysics*), Anne Underhill (*Anthropology*), Harvey Weiss (*Near Eastern Languages & Civilizations*)

Associate Professors Milette Gaifman (*History of Art; Classics*), William Honeychurch (*Anthropology*)

Assistant Professors Oswaldo Chinchilla (*Anthropology*), Andrew Johnston (*Classics*)

Lecturer Karen Foster (*Near Eastern Languages & Civilizations*)

The aims of the program are to give students the academic background needed for careers in museums, cultural resource management, and teaching in community colleges and secondary schools. It also provides the opportunity for teachers, curators, and administrators to refresh themselves on recent developments in archaeology. In addition, the program allows some of our students to strengthen their background in archaeology before applying to Ph.D. programs. The program is administered by Yale's Council on Archaeological Studies, with faculty from the departments of Anthropology, Classics, Geology & Geophysics, History, History of Art, Near Eastern Languages & Civilizations, and Religious Studies.

Special Admissions Requirements

The GRE General Test; an archaeology background is recommended but not required.

Special Requirements for the M.A. Degree

Courses are drawn from the graduate programs of the participating departments and from those undergraduate courses that are also open to graduate students. Eight courses are required. Unless previously taken for credit, these will include the archeological laboratory overview; at least one additional laboratory course; a course related to archaeology in two of the following three groups: (1) Anthropology; (2) Classics, History, History of Art, Near Eastern Languages & Civilizations, or Religious Studies; (3) Ecology & Evolutionary Biology, Forestry & Environmental Studies, or Geology & Geophysics; and four electives. All students are required to participate in an approved summer field project. In addition, each student will write a master's thesis. Degree candidates are required to pay a minimum of one year of full tuition. Full-time students can complete the course

requirements in one academic year, and all students are expected to complete the program within a maximum period of three academic years.

For further information, visit the Archaeological Studies Web site, www.yale.edu/archaeology. Inquiries may be directed to Director of Graduate Studies, c/o Registrar, Archaeological Studies, Department of Anthropology, Yale University, PO Box 208277, New Haven CT 06520-8277, or via e-mail, cynthia.dreier@yale.edu.

Courses

ARCG 545a/ANTH 545a, Organic Latin American Anthropologists of the Twentieth Century Richard Burger, Enrique Mayer

In addition to Latin American anthropology's development as an academic discipline, its practitioners played important roles in developing policy, educational programs, museums, government institutions, and international forums and institutions in an age of "science" and "nation building." We study the lives and works of seven famous anthropologists to understand the changing but interactive context of scholarship between the United States and Latin America. Prerequisite: reading knowledge of Spanish. Open to advanced undergraduate students with permission of the instructors. W 1:30–3:20

ARCG 569a/CLSS 868a/HSAR 569a, Living the Life of Nero: Megalomania and Making Great Art Diana Kleiner

Nero is Rome's most infamous emperor. Played with gusto by Peter Ustinov in *Quo Vadis*, Nero personifies Roman leadership at its most tyrannical. Nonetheless, the Roman Age of Nero witnessed an extraordinary efflorescence of art and architecture that set the stage for Rome's magisterial second century. Furthermore, in a society in which few names of artists and architects were recorded, the work of those of Nero's era (Severus, Celer, Fabullus, Zenodorus) is well documented and enhanced by new archaeological discoveries. Student projects focus on the fabled Domus Aurea, the alleged Tomb of Nero, Third- and Fourth-Style Roman wall painting, the legendary Colossus of Nero, and other Neronian portraiture. The commissioning of art by powerful elite Roman women and freedmen in the Neronian age is also explored, and there is emphasis on the possible correlation between megalomania and great art. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. T 1:30–3:20

ARCG 701a^U/ANTH 701a^U, Foundations of Modern Archaeology Richard Burger
How method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. Prerequisite: a background in the basics of archaeology equivalent to one of the introductory courses. TTH 1–2:15

ARCG 702a/ANTH 702a, Archaeological Approaches to Art and Iconography Oswaldo Chinchilla

An examination of archaeological approaches to the study of artistic representations in archaeology, focusing on the analysis of style and iconographic interpretations. Case studies are drawn from Precolumbian art, particularly Moche art of Peru and Maya art of Mesoamerica. TH 9:25–11:15

ARCG 719b^U/ANTH 719b^U, Ethnohistory and Archaeology Roderick McIntosh

Review of the major problems and methodologies associated with the use of ethnohistory by archaeologists. How do archaeologists construct a historical imagination? The course looks at a variety of sources: colonial and “visitor” documents, peoples’ written description of themselves, oral traditions, classic ethnographies, and art history. MW 9–10:15

ARCG 720b^U/ANTH 720b^U/NELC 720b^U, Babylon to Bush Harvey Weiss

Analysis of the archaeological and paleoenvironmental data for rain-fed and irrigation agriculture settlement, subsistence, and politicoeconomic innovation from the earliest sedentary agriculture villages, to the earliest cities and states, to the earliest empire. What combinations of dynamic social and environmental forces drove these developments in these regions during this ten thousand year span? TH 3:30–5:20

ARCG 729a^U/ANTH 729a^U, Integrating Remote Sensing in Archaeology

William Honeychurch, Andrew Womack

Introduction to satellite and geophysical remote sensing in anthropology. Focus on integrating this data with other techniques and databases for manipulation and application to archaeological research.

ARCG 741b/ANTH 741b/CLSS 841b/HIST 502b/NELC 841b, Frontier and Province in the Premodern World Andrew Johnston, William Honeychurch

From Achaemenid India or Han China to Roman Gaul and Egypt to Iraqi Kurdistan, the province and its organizational equivalents (e.g., nomes in Egypt, commanderies in China) have long constituted one of the fundamental building blocks of states, ancient and modern, and a fascinatingly complex site of cultural and political negotiation in imperial encounters. The aim of this year’s core seminar is to explore social equilibria between governance and the governed in the premodern world, via the interaction—religious, artistic, linguistic, administrative, economic—between local units and large imperial frameworks. As an object of comparative study, the province, representing the intersection of imperial power and local communities, allows us to combine “top-down” and “bottom-up” approaches to the ancient world, to investigate some of the key practices and discourses of empire while attempting to recover the agency and voices of subaltern provincial actors. It offers as well a chance to reconsider the “center-periphery” paradigm taken over from world-systems theory, and to propose new models for understanding the complex relationships between an imperial “center” and the governance of territories. This interdisciplinary seminar examines a wide range of aspects of the province as a transhistorical phenomenon—law, economy, art, literature, religion, monumentality, urbanism, and politics—across the ancient Mediterranean world and beyond, making use of the unique resources and collections at Yale, especially the Art Gallery and Beinecke Library.

ARCG 744b^U/NELC 509b^U, The Age of Akhenaton John Darnell

Study of the period of the Egyptian pharaoh Akhenaton (reigned 1353–1336 B.C.E.), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives. Consideration of the wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. Examination of the international diplomacy, solar theology, and artistic developments of the period. Reading of primary source material in translation. MW 9–10:15

[ARCG 746a^U/NELC 567a^U, Ancient Civilizations of Nubia]**ARCG 750b^U/ANTH 750b^U, Analysis of Lithic Technology** Oswaldo Chinchilla

This course provides an introduction to the analysis of the chipped and ground stone tools found on archaeological sites. As a laboratory course, it includes hands-on instruction: we learn how to manufacture chipped stone tools out of obsidian. We begin by reviewing the development of chipped and ground stone tool technology from the earliest simple pebble tools to historical period tools. We discuss the relevance of lithics research to issues of subsistence, craft specialization, and trade. We also discuss how these artifacts are recorded, analyzed, and drawn, and we review related studies such as sourcing and use-wear analysis. TH 9:25–11:15

ARCG 755b^U/ANTH 755b^U, Inca Culture and Society Richard Burger

The history and organization of the Inca empire and its impact on the nations and cultures conquered by it. The role of archaeology in understanding the transformation of Andean lifeways is explored, as is the interplay between ethnohistoric and archaeological approaches to the subject. TTH 2:30–3:45

ARCG 762b^U/EMD 548b/F&ES 726b/G&G 562b^U, Observing Earth from Space

Ronald Smith, Xuhui Lee, Mark Ashton

A practical introduction to satellite image analysis of Earth's surface. Topics include the spectrum of electromagnetic radiation, satellite-borne radiometers, data transmission and storage, computer image analysis, the merging of satellite imagery with GIS and applications to weather and climate, oceanography, surficial geology, ecology and epidemiology, forestry, agriculture, archaeology, and watershed management.

ARCG 769a/AMST 716a/ANTH 769a/HSAR 716a, Landscapes of Meaning:

Museums and Their Objects Anne Underhill, Cyra Levenson

This seminar explores how museums convey various meanings about ethnographic, art, and archaeological objects through the processes of collecting, preparing exhibitions, and conducting research. Participants also discuss broader theoretical and methodological issues such as the roles of museums in society, relationships with source communities, management of cultural heritage, and various specializations valuable for careers in art, natural history, anthropology, history, and other museums. T 9:25–11:15

ARCG 773b^U/ANTH 773b^U/F&ES 793b/NELC 588b^U, Abrupt Climate Change and

Societal Collapse Harvey Weiss

Collapse documented in the archaeological and early historical records of the Old and New Worlds, including Mesopotamia, Mesoamerica, the Andes, and Europe. Analysis of politicoeconomic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict. TH 3:30–5:20

ARCG 780b^U/ANTH 780b^U, Archaeology of Religion Richard Burger

The course explores archaeological approaches to the study of religion. While the term “religion” is hard to define, it is generally agreed that religious phenomena occur in almost all cultures and that this realm played a significant part in most prehistoric cultures. In order to provide a broad vision of this theme, the course begins by considering

influential schools of thought on the definition, origins, and social significance of religious behavior. The course then reviews a variety of methods that scholars may use to reconstruct ancient beliefs and rituals. The course assesses the applicability and success of these methodologies across the broad spectrum of ancient cultures representing differing degrees of sociopolitical complexity. Finally, we explore case studies from a diverse range of ancient societies and consider the impact of religious behaviors within their broader cultural contexts. W 1:30–3:20

ARCG 785a^U/ANTH 785a^U, Archaeological Ceramics I Anne Underhill

This seminar addresses how archaeologists analyze and interpret ceramics, arguably the most common type of object found in ancient sites. Readings, discussions, and opportunities for practical work focus on what different aspects of ceramic vessels reveal about the people who made and used them. M 1:30–3:20

ARCG 797b^U/ANTH 797b^U, Archaeology of East Asia Anne Underhill

Introduction to the findings and practice of archaeology in China, Japan, Korea, and southeast Asia. Methods used by archaeologists to interpret social organization, economic organization, and ritual life. Attention to major transformations such as the initial peopling of an area, establishment of farming villages, the development of cities, inter-regional interactions, and the nature of political authority. T 9:25–11:15

ARCG 822a/ANTH 822a, Topics and Issues in Human Evolution Andrew Hill

Topics from the span of primate evolution are covered: the early primates, origin of modern-type primates, anthropoid origins, monkey and hominoid evolution. Readings and discussions focus on issues of taxonomy—judging morphological similarities and differences among fossils. Specific attention paid to traits paleontologists use to assign fossils to species and functional/behavioral significance of those traits. Lectures and lab use of fossils provide background on fossil evidence. Open to qualified undergraduates. TH 1:30–3:20

ARCG 847b^U/ANTH 847b^U, Hunter-Gatherers Brian Wood

The vast majority of the human experience centered around one way of making a living: hunting and gathering. Yet today, hunter-gatherers make up a small and diminishing proportion of human societies. This class is a broad survey of the ecology, economics, political, and social organization of recent hunter-gatherers and a review of anthropological inquiry into foraging societies. T 1:30–3:20

ARCG 856a^U/ANTH 856a^U, Reconstructing Human Evolution: An Ecological

Approach Andrew Hill

If human evolutionary change has been determined or affected by ecological factors, such as changes in climate, competition with other animals, and availability and kinds of food supply, then it is important to determine ecological and environmental information about the regions and time period in which human evolution has occurred. Examination of methods for obtaining data relevant to such information, and for evaluating the techniques and results of such other fields as geology, paleobotany, and paleozoology. Ethnographic, primatological, and other biological models of early human behavior. T 1:30–3:20

ARCG 860a/ANTH 860a, Human Behavioral Ecology Brian Wood

This course focuses on human behavior as shaped by our species' evolutionary history and guided by particular ecological contexts. Through readings and discussion, we survey the historical and theoretical foundations of this research paradigm and examine the ways that human behavioral ecology differs from other evolutionary approaches to the study of human behavior. Readings cover research in the field examining human subsistence, sharing, mobility, territoriality, the division of labor, mating, parenting, and social organization, using ethnographic, archaeological, and experimental datasets.
TH 3:30–5:20

ARCG 864b^U/ANTH 864b^U, Human Osteology Eric Sargis

A lecture and laboratory course focusing on the characteristics of the human skeleton and its use in studies of functional morphology, paleodemography, and paleopathology. Laboratories familiarize students with skeletal parts; lectures focus on the nature of bone tissue, its biomechanical modification, sexing, aging, and interpretation of lesions.
TTH 2:30–3:45

ARCG 953a or b, Directed Research in Archaeology and Prehistory

By arrangement with faculty.

ARCHITECTURE

Rudolph Hall, 203.432.2288
www.architecture.yale.edu/phd
 M.Phil., Ph.D.

Dean

Robert A. M. Stern

Director of Doctoral Studies

Alan Plattus (710 Rudolph, 203.432.2290, alan.plattus@yale.edu)

Professors Michelle Addington, Peggy Deamer, Keller Easterling, Peter Eisenman, Kurt Forster, Dolores Hayden, Kathleen James-Chakraborty, Alan Plattus, Robert A. M. Stern, Anthony Vidler

Associate Professors Mark Foster Gage, Kyoung Sun Moon, Eeva-Liisa Pelkonen

Assistant Professors Alexander Felson, Elihu Rubin

Adjunct Faculty Sunil Bald, Thomas Beeby, Deborah Berke, Kent Bloomer, Turner Brooks, Alexander Garvin, Steven Harris, John Jacobson, Bimal Mendis, Edward Mitchell, Joel Sanders

Fields of Study

The five-year doctoral program prepares candidates for careers in university teaching, cultural advocacy and administration, museum curatorship, and publishing. It aims chiefly, however, to educate teachers capable of effectively instructing future architects in the history of their own field and its manifold connections with the culture at large. The program forges a unique combination of professional knowledge with a historical and analytical grasp of key phases in the history of architecture, especially those that have a demonstrable share in the field's current state and the critical issues it faces.

The program secures sound training in historical study and historiography, imparting technical knowledge and awareness of intellectual trends that inform the reception and role of architecture around the world. The history of science and technology (as well as its reception in popular culture and the arts), the history of media, and an understanding of architectural practice are as important as the fine arts and literature.

Admission Requirements

Applicants must have appropriate academic credentials (a master's degree or equivalent in Architecture, Engineering, Environmental Design, or, exceptionally, in a related field) and two years of professional work in an architecture office. The Graduate Record Examination (GRE) General Test taken no more than five years prior to application is required. All applicants whose native language is not English are required to take the Internet-based Test of English as a Foreign Language (TOEFL iBT), a test that includes a section on spoken English. The TOEFL requirement is waived only for applicants who, prior to matriculation at Yale, will have received a baccalaureate degree or its international equivalent from a college or university where English is the primary language of

instruction. In addition to meeting qualifying criteria, candidates are required as part of the application to submit a portfolio of their own architectural work, a writing sample in the form of a substantial research paper or publication, and an explanation of their motivation for engaging in this course of study. Qualified applicants may be invited to interview with a member of the doctoral faculty.

The portfolio should be a well-edited representation of the applicant's creative work. Portfolios may not contain videos. Anything submitted that is not entirely the applicant's own work must be clearly identified as such.

The portfolio is submitted digitally as a single pdf document optimized not to exceed 20mb; it will need to be uploaded to the online application. Pages of the pdf portfolio should be uploaded as spreads. The digital portfolio will be viewed on computer screens, so resolution above 150 dpi is not necessary.

The Ph.D. program is administered by the Yale Graduate School of Arts and Sciences. For questions regarding admissions, please contact graduate.admissions@yale.edu.

School of Architecture Summer Preparation Courses for Incoming Ph.D. Students

In the week before the beginning of the fall term, the School of Architecture offers two preparation courses that are required of incoming Ph.D. students.

- Summer Digital Media Orientation Course. This half-day orientation covers accessing the School's servers, use of the School's equipment, and the School's digital media policies and procedures.
- Arts Library Research Methodology Course. This course covers research methodologies and tools specific to the Ph.D. curriculum.

Special Requirements for the Ph.D. Degree

Entering students with sound professional preparation engage in a concerted course of study that leads directly to dissertation research and a doctoral degree.

Students are required to be full-time and in residence in the New Haven area during the first two academic years (see the Bulletin of the Graduate School of Arts and Sciences, *Programs and Policies*). Students typically take twelve graduate and Ph.D. seminars for credit, including a Ph.D. seminar taught in each of the first four terms by a member of the School of Architecture faculty that introduces the student to various methodologies and areas of study. Some seminars encourage primary research on a narrow topic or focus on producing a collective body of work. Others offer a broader survey of historiographies or focus on the close reading of a body of texts. These four required seminars form the methodological core of the program.

Students are encouraged to take courses related to their specific areas of interest outside the School of Architecture. For example, a student working on Italian modernism would be encouraged to take a course in Italian history or literature. Typically, at least two of the eight elective seminars would be in related fields. Students can also opt to do independent readings with individual faculty members on their specific areas of interest.

Not later than the end of their second year, students are also expected to demonstrate competence in at least one foreign language relevant to their field of study. Language

competence is more than a formality and requires some acquaintance with the literature in the chosen language. Competency may be determined by a grade of B or better in a yearlong intermediate-level language course, or through examination.

The student's field of interest is defined by the end of the second year, at which time the director of doctoral studies assigns the student an adviser, who may or may not be from the School of Architecture. At the end of the second year and after the student has taken the three oral examinations, the director of doctoral studies, in consultation with the student's adviser, appoints a dissertation committee for the student. The dissertation committee consists of the student's adviser plus two additional faculty members. One of the dissertation committee members should be from outside the School of Architecture, with selection based on the student's area of interest. The dissertation committee guides and monitors the student's progress in writing the dissertation and evaluates the dissertation upon completion.

By the end of their second year, doctoral students normally complete all course and language requirements. Oral examinations are taken on topics relevant to the student's doctoral research. Examiners question the candidate in the presence of the director of doctoral studies and the thesis adviser.

During the third year, candidates present and defend a preliminary proposal for a dissertation topic, consisting of a topic statement, detailed program of research, and an annotated bibliography. By the end of the third year, students begin dissertation research and writing, submitting drafts of the dissertation chapters as they are completed.

Graduate Research Assistant and Teaching Fellow Experience

The program in Architecture considers teaching to be an important part of graduate training. Students in the Ph.D. program in Architecture, therefore, are expected to teach for four terms, normally in their third and fourth years. During these four terms, it is anticipated that a Ph.D. student teach in two history and theory survey courses in the student's area of study at the School of Architecture or elsewhere in the University and teach in two design studios at the School of Architecture. Each teaching assignment shall be under the direct supervision of senior faculty.

Master's Degree

M.Phil. The Master of Philosophy degree is awarded en route to the Ph.D. The minimum requirements for this degree are that a student has completed all requirements for the Ph.D., except the teaching fellow assignments and the dissertation.

Required Courses

ARCH 551a, Ph.D. Seminar I

1 credit. (Required in, and limited to, Ph.D. first year, fall term.) This seminar centers on a thorough examination of fundamental ideas of historiography, centering on Rome and exploring aspects of geology, culture, mapping, site development, the establishment of institutions, and the construction of buildings across several millennia, as well as a study of literature on the *urbs* and its worldwide impact.

ARCH 552b, Ph.D. Seminar II

1 credit. (Required in, and limited to, Ph.D. first year, spring term.) This seminar centers on concepts of history and their application to architecture from Jacob Burckhardt to the present and a close reading of historiographic theories, including ethnography, modernity, and the emergence of the profession of architecture in the light of present-day critique.

ARCH 553a, Ph.D. Seminar III

1 credit. (Required in, and limited to, Ph.D. second year, fall term.)

ARCH 554b, Dissertation Preparation

1 credit. (Required in, and limited to, Ph.D. second year, spring term.) Ph.D. tutoring in preparation for oral examinations and formulation of a thesis topic.

ASTRONOMY

J. W. Gibbs Laboratories, 203.432.3000

<http://astronomy.yale.edu>

M.S., M.Phil., Ph.D.

Chair

Pieter van Dokkum

Director of Graduate Studies

Jeffrey Kenney (203.432.3013, jeff.kenney@yale.edu)

Professors Charles Bailyn, Charles Baltay (*Physics*), Sarbani Basu, Paolo Coppi, Pierre Demarque (*Emeritus*), Debra Fischer, Marla Geha, Jeffrey Kenney, Richard Larson (*Emeritus*), Priyamvada Natarajan, C. Megan Urry (*Physics*), William van Altena (*Emeritus*), Pieter van Dokkum, Robert Zinn

Associate Professors Héctor Arce, Daisuke Nagai (*Physics*), Nikhil Padmanabhan (*Physics*), Frank van den Bosch

Fields of Study

Fields include observational and theoretical astronomy, solar and stellar astrophysics, exoplanets, astrometry, galactic astronomy, extragalactic astronomy, radio astronomy, high-energy astrophysics, and cosmology.

Special Admissions Requirements

Applicants are expected to have a strong undergraduate preparation in physics and mathematics. Although some formal training in astronomy is useful, it is by no means a pre-requisite for admission. Applicants are required to take the General GRE as well as the subject test in Physics.

Special Requirements for the Ph.D. Degree

A typical program of study includes twelve courses taken during the first four terms, and must include the core courses listed below:

The Physics of Astrophysics (ASTR 500), Computational Methods in Astrophysics and Geophysics (ASTR 520), Observational Astronomy (ASTR 555), Interstellar Matter and Star Formation (ASTR 560), either Stellar Populations (ASTR 510) or Stellar Astrophysics (ASTR 550), and either Galaxies (ASTR 530) or The Evolving Universe (ASTR 565).

Students require the permission of the instructor and the director of graduate studies (DGS) to skip a core class if they think that they have sufficient knowledge of the field. Students will be required to demonstrate their knowledge of the field before they are allowed to skip any core class.

Two of the twelve courses must be research credits, each earned by working in close collaboration with a faculty member. Of the two research credits, one must be earned doing a theoretical project and one doing an experimental research project. The students

need to present the results of the project as a written report and will be given an evaluation of their performance.

The choice of the four remaining courses depends on the candidate's interest and background and must be decided in consultation with the DGS and/or the prospective thesis adviser. Advisers may require students to take particular classes and obtain a specified minimum grade in order for a student to work with them for their thesis. Students must take any additional course that their supervisors require even after their fourth term. In addition, all students, regardless of their term of study, have to attend Professional Seminar (ASTR 710) every term. Students must also take Responsible Conduct in Research for Physical Scientists (PHYS 590), which discusses ethics and responsible conduct in scientific research and fulfills the requirement stipulated by the National Science Foundation for all students and for all postdoctoral researchers funded by the NSF. Note that ASTR 710 and PHYS 590 may not be used to fulfill the twelve-course requirement.

Students are encouraged to take graduate courses in physics or related subjects. On an irregular basis, special topic courses and seminars are offered, which provide the opportunity to study some fields in greater depth than is possible in standard courses. To achieve both breadth and depth in their education, students are encouraged to take a few courses beyond their second year of study.

There is no foreign language requirement. A written comprehensive examination, normally taken at the end of the fourth term of graduate work, tests the student's familiarity with the entire field of astronomy and related branches of physics and mathematics. Particular attention will be paid to the student's performance in the field in which the student plans to do research. An oral examination, held a few weeks after the written examination, is based on the student's chosen field of research. Satisfactory performance in these examinations, an acceptable record in course and research work, and an approved dissertation prospectus are required for admission to candidacy for the Ph.D. degree. The dissertation should present the results of an original and thorough investigation, worthy of publication. Most importantly, it should reflect the candidate's capacity for independent research. An oral dissertation defense is required.

Teaching experience is an integral part of graduate education in astronomy. All students are required to serve as teaching fellows and complete a total of fifty TF hours. Both the level of teaching assignments and the scheduling of teaching are flexible and determined by the needs of the department. By the end of the third term, however, most students will have completed thirty TF hours. The additional TF hours will normally be carried out after the fourth term of study.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study.

Master's Degrees

M.Phil. Upon application, the department will recommend for the award of the M.Phil. degree any student who has completed all the requirements of the Ph.D. degree, except

the Ph.D. dissertation. A written master's thesis containing original astronomical research is also required. Students are not admitted for this degree.

M.S. (en route to the Ph.D.) Upon application, the department will recommend for the award of the M.S. degree any student who has taken at least nine courses (not including ASTR 710) and one research project (ASTR 580). The student should have a grade average of High Pass in the courses and a grade of High Pass or above in the research project.

Program materials are available upon request to the Director of Graduate Studies, Department of Astronomy, Yale University, PO Box 208101, New Haven CT 06520-8101.

Courses

ASTR 500a, The Physics of Astrophysics Sarbani Basu

Primarily for incoming students in the Ph.D. program in Astronomy. The basic physics and related mathematics needed to take the advanced graduate courses. Topics in mechanics, thermodynamics and statistical mechanics, fluid mechanics, special relativity, and electrodynamics with applications to astrophysical systems are covered. Open to undergraduates with permission of the instructor. MW 9–10:15

ASTR 510a^U, Stellar Populations Robert Zinn

The stellar population of our galaxy and the galaxies of the local group. The properties of stars and star clusters, stellar evolution, and the structure and evolution of our galaxy. TTH 9–10:15

ASTR 518b, Stellar Dynamics Marla Geha

The dynamics and evolution of star clusters; structure and dynamics of our galaxy; theories of spiral structure; dynamical evolution of galaxies. TTH 4–5:15

ASTR 525a, Advanced Statistical Methods for Astronomy Paolo Coppi

Statistical techniques for extracting the maximum signal from data. Non-Gaussian probability distributions, optimal noise reduction techniques, period-finding, and parameter estimation using Bayesian and Monte Carlo Markov chain methods. Prerequisite: experience with programming. Open to undergraduates with permission of the instructor. TTH 4–5:15

ASTR 530a^U, Galaxies Jeffrey Kenney

The structure and morphology of galaxies, stellar populations, interstellar media, star formation, central black holes, galaxy mergers, and galaxy properties as a function of environment. MW 4–5:15

[ASTR 540b^U/G&G 501b^U, Radiative Processes in Astrophysics/Stellar Atmospheres]

[ASTR 550b^U, Stellar Astrophysics]

[ASTR 555a^U, Observational Astronomy]

[ASTR 560a, Interstellar Matter and Star Formation]

ASTR 565b^U, The Evolving Universe Pieter van Dokkum

Overview of cosmic history from the formation of the first star to the present day, focusing on direct observations of the high-redshift universe. TTH 9–10:15

ASTR 570a/PHYS 570a, High-Energy Astrophysics Priyamvada Natarajan

A survey of current topics in high-energy astrophysics, including accreting black hole and neutron star systems in our galaxy, pulsars, active galactic nuclei and relativistic jets, gamma-ray bursts, and ultra-high-energy cosmic rays. The basic physical processes underlying the observed high-energy phenomena are also covered. TTH 10:30–11:45

ASTR 575b, Exoplanets Debra Fischer

In recent years hundreds of exoplanets have been discovered orbiting around other stars. This course reviews the physics of planetary orbits, current exoplanet detection techniques, recent progress in characterizing exoplanet interiors and atmospheres, and the implications of these findings for our understanding of planet formation and evolution. MW 9–10:15

ASTR 580a or b, Research

By arrangement with faculty.

[ASTR 585b, Radio Astronomy]

[ASTR 590b^U, Solar Physics]

[ASTR 600b^U/PHYS 600b, Cosmology]

[ASTR 610b, The Theory of Galaxy Formation]

[ASTR 620b, Advanced Programming Tutorial for Astronomy]

ASTR 666b/AMTH 666b/G&G 666b, Classical Statistical Thermodynamics

John Wettlaufer

Classical thermodynamics is derived from statistical thermodynamics. Using the multi-particle nature of physical systems, we derive ergodicity, the central limit theorem, and the elemental description of the second law of thermodynamics. We then develop kinetics, transport theory, and reciprocity from the linear thermodynamics of irreversible processes. Topics of focus include Onsager reciprocal relations, the Fokker-Planck equation, stability in the sense of Lyapunov, and time invariance symmetry. We explore phenomena that are of direct relevance to astrophysical and geophysical settings. No quantum mechanics is necessary as a prerequisite.

ASTR 710a and b, Professional Seminar

A weekly seminar covering science and professional issues in astronomy and ethics.

BIOMEDICAL ENGINEERING

Dunham Laboratory, 203.432.4252

M.S., M.Phil., Ph.D.

Chair

Jay Humphrey

Director of Graduate Studies

Richard Carson (richard.carson@yale.edu)

Professors Richard Carson, Nicholas Christakis, James Duncan, Jay Humphrey, Fahmeed Hyder, Themis Kyriakides (*Pathology*), Andre Levchenko, Laura Niklason, Douglas Rothman, W. Mark Saltzman, Mark Schwartz, Fred Sigworth, Brian Smith, Lawrence Staib, Hemant Tagare, Paul Van Tassel, Steven Zucker (*Computer Science*)

Associate Professors Joerg Bewersdorf (*Cell Biology*), Robin de Graaf, Tarek Fahmy, Rong Fan, Evan Morris, Xenophon Papademetris, Corey Wilson

Assistant Professors Stuart Campbell, Michael Choma, Anjelica Gonzalez, Chi Liu, Kathryn Miller-Jensen, Michael Murrell, Steven Tommasini, Jiangbing Zhou

Fields of Study

Fields include biological devices, biological signals and sensors, biomaterials, biomechanics, biophotonics, computer vision, digital image analysis and processing, drug delivery, modeling in mechanobiology, MRI, MRS, PET and modeling, the physics of image formation (MRI, optics, ultrasound, nuclear medicine, and X-ray), physiology and human factors engineering, systems biology, systems medicine, and tissue engineering and regenerative medicine.

For admissions and degree requirements, and for course listings, see Engineering & Applied Science.

CELL BIOLOGY

Sterling Hall of Medicine C207, 203.737.5603

www.cellbiology.yale.edu

M.S., M.Phil., Ph.D.

Chair

James Rothman

Director of Graduate Studies

Karin Reinisch (SHM C214a, 203.785.6469, karin.reinisch@yale.edu)

Professors Christopher Burd, Michael Caplan (*Cellular & Molecular Physiology*), Lynn Cooley (*Genetics*), Peter Cresswell (*Immunobiology*), Pietro De Camilli, Jorge Galán (*Microbial Pathogenesis*), Fred Gorelick, Carl Hashimoto, James Jamieson, Diane Krause (*Laboratory Medicine*), Thomas Lentz (*Emeritus*), Haifan Lin, Vincent Marchesi (*Pathology*), Mark Mooseker (*Molecular, Cellular & Developmental Biology*), Michael Nathanson (*Internal Medicine/Digestive Diseases*), Karla Neugebauer (*Molecular Biophysics & Biochemistry*), Thomas Pollard (*Molecular, Cellular & Developmental Biology; on leave [F]*), Karin Reinisch, James Rothman, Martin Schwartz (*Internal Medicine/Cardiology*), Michael Simons (*Internal Medicine/Cardiology*), Sandra Wolin

Associate Professors Joerg Bewersdorf, Jonathan Bogan (*Internal Medicine/Endocrinology*), David Calderwood (*Pharmacology*), Daniel Colón-Ramos, Eric Dufresne (*Mechanical Engineering & Materials Science*), Valentina Greco (*Genetics*), Megan King, Thomas Melia, Christian Schlieker (*Molecular Biophysics & Biochemistry*), Derek Toomre, Yongli Zhang

Assistant Professors David Baddeley, Topher Carroll, Shawn Ferguson, Shangqin Guo, Chenxiang Lin, Patrick Lusk, Malaiyalam Mariappan, Peter Takizawa, Jie Yao

Fields of Study

Fields include membrane traffic and protein sorting, organelle biogenesis, epithelial cell polarity, membrane function in the nervous system (synapse formation and function), neural circuit development, cell biology of protozoan parasites and of pathogen/host interactions, cell biology of the immune response, mRNA biogenesis and localization, RNA folding, non-coding RNAs, stem cells, the cytoskeleton, nuclear structure and dynamics, DNA nanostructures, cellular signaling and motility, cytokinesis. Approaches to these topics include biochemistry, biophysics, molecular biology, and crystallography; bacterial, yeast, *Drosophila*, *C. elegans*, and mouse genetics; immunocytochemistry and electron microscopy; live cell and super-resolution imaging.

Special Admissions Requirements

An undergraduate major in the biological sciences is recommended. GRE General Test is required; GRE Subject Test is recommended (in Biology or in Biochemistry, Cell and Molecular Biology).

To enter the Ph.D. program, students apply to an interest-based track, usually the Molecular Cell Biology, Genetics, and Development track, in the combined program in Biological and Biomedical Sciences (BBS), <http://info.med.yale.edu/bbs>.

Special Requirements for the Ph.D. Degree

Students are required to take at least five graduate-level courses. No specific curriculum of courses is required, but CBIO 602 (Molecular Cell Biology) is recommended for all students to attain a solid foundation in molecular cell biology. Also recommended is a seminar course, such as CBIO 603 (Seminar in Molecular Cell Biology), in which students can develop the skill for critical analysis of research papers. Students design their own curriculum of courses to meet individual interests and needs, in consultation with the director of graduate studies. During the first year, students participate in three laboratory rotations. In the second year, a committee of faculty members determines whether each student is qualified to continue in the Ph.D. program. There is an oral qualifying examination by the end of the third term. In order to be admitted to candidacy, students must have met the Graduate School Honors requirement, maintained a High Pass average in course work, passed the qualifying examination, submitted an approved prospectus, and received a positive evaluation of their laboratory work from the thesis committee. All students are required to present a talk at the departmental progress report series each year after passing the qualifying exam. The remaining degree requirements include completion of the dissertation project and the writing of the dissertation and its oral defense, the formal submission of copies of the written dissertation to the Graduate School, and the deposit of an additional copy with the department. Laboratory rotations and thesis research may be conducted outside of the department.

An important aspect of graduate training in cell biology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school levels. Ph.D. students are required to participate in two terms (or the equivalent) of teaching. Students are not expected to teach during their first year.

In addition to all other requirements, students must successfully complete CBIO 901b, First-Year Introduction to Research—Ethics: Scientific Integrity in Biomedical Research, prior to the end of their first year of study. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

M.D./Ph.D. Students

M.D./Ph.D. students are required to take a total of five graduate-level courses for a grade, including Molecules to Systems (CBIO 502), Molecular Cell Biology (CBIO 602), and a seminar course that involves the reading and class discussion of research papers. The remaining courses can be in areas such as Genetics, Neurobiology, Immunology, Microbiology, Pharmacology, and Physiology. Students must meet the Graduate School requirement of a grade of Honors in two courses, if necessary taking additional courses beyond the five required in the department to fulfill this requirement. Students must also maintain an average grade of High Pass in all courses. One term of teaching is required.

Master's Degrees

M.Phil. Requirements for the M.Phil. degree are the same as for admission to candidacy (see above).

M.S. This degree is normally granted only to students who are withdrawing from the Ph.D. program. To be eligible for the degree, a student must have completed at least five graduate-level term courses at Yale, including CBIO 602a (Molecular Cell Biology) and a seminar course, with a grade of Pass and at least one grade of Honors or three of High Pass. In addition to these five courses, the student must have received a Satisfactory grade in the following five courses: CBIO 900a (First-Year Introduction to Research – Grant Writing and Scientific Communication), CBIO 901b (First-Year Introduction to Research – Ethics: Scientific Integrity in Biomedical Research), CBIO 911a (First Laboratory Rotation), CBIO 912b (Second Laboratory Rotation), and CBIO 913b (Third Laboratory Rotation).

Prospective applicants are encouraged to visit the BBS Web site (<http://info.med.yale.edu/bbs>), MCGD Track. Program materials are available upon request to the Director of Graduate Studies, Department of Cell Biology, Yale University, PO Box 208002, New Haven CT 06520-8002.

Courses

CBIO 502, Molecules to Systems Peter Takizawa, Fred Gorelick, James Jamieson, Thomas Lentz, and faculty

This course is designed to provide medical students with a current and comprehensive review of biologic structure and function at the cellular, tissue, and organ system levels. Areas covered include structure and organization of cells; regulation of the cell cycle and mitosis; protein biosynthesis and membrane targeting; cell motility and the cytoskeleton; signal transduction; cell adhesion; cell and tissue organization of organ systems. Clinical correlation sessions, which illustrate the contributions of cell biology to specific medical problems, are interspersed in the lecture schedule. Histophysiology laboratories provide practical experience with an understanding of exploring cell and tissue structure. The course is offered only to M.D. and M.D./Ph.D. students. It runs for three terms from September to December of the next academic year to coincide with the School of Medicine curriculum. Registration and the release of grades takes place in the third term. The course is equivalent to two graduate credits.

CBIO 601a/b, Molecular and Cellular Basis of Human Disease Fred Gorelick, James Jamieson, and faculty

The course emphasizes the connections between diseases and basic science using a lecture and seminar format. It is designed for students who are committed to a career in medical research, those who are considering such a career, or students who wish to explore scientific topics in depth. The first half of the course is organized in four- to five-week blocks that topically parallel CBIO 502a/b. Examples of blocks from past years include “Diseases of protein folding” and “Diseases of ion channels.” Each topic is introduced with a lecture given by the faculty. The lecture is followed by sessions in which students review relevant manuscripts under the supervision of a faculty mentor. The second half of

the course focuses on the relationship of basic science to disease processes while emphasizing translational and clinical research. In addition, sessions are devoted to academic careers and cover subjects such as obtaining an academic position, promotions, and grant writing. The course is open to M.D. and M.D./Ph.D. students who are taking or have taken CBIO 502a/b. Student evaluations are based on attendance, participation in group discussions, formal presentations, and a written review of an NIH proposal. The course runs from September to mid-May and is equivalent to two graduate credits. M 4–5:30

CBIO 602a/MB&B 602a/MCDB 602a, Molecular Cell Biology Sandra Wolin,

Michael Caplan, Topher Carroll, Craig Crews, Pietro De Camilli, Megan King,
Thomas Melia, In-Hyun Park, James Rothman, Martin Schwartz

A comprehensive introduction to the molecular and mechanistic aspects of cell biology for graduate students in all programs. Emphasizes fundamental issues of cellular organization, regulation, biogenesis, and function at the molecular level. MW 1:45–3

CBIO 603a/MCDB 603a, Seminar in Molecular Cell Biology Megan King,

Michael Caplan, Topher Carroll, Craig Crews, Pietro De Camilli, Thomas Melia,
James Rothman, Martin Schwartz, Sandra Wolin

A graduate-level seminar course in modern cell biology. The class is devoted to the reading and critical evaluation of classical and current papers. The topics are coordinated with the CBIO 602a lecture schedule. Thus, concurrent enrollment in CBIO 602a is required. TH 9–11

CBIO 604b, Systems Cell Biology Carl Hashimoto, Daniel Colón-Ramos, and
faculty

Introduction to the organization and function of cells within complex multicellular systems as encountered in the human body. Covers major tissues and organs as well as the cardiovascular, immune, and nervous systems, with special emphasis on the molecular and cellular bases of developmental processes and human diseases. Lectures supplemented by electronic-based tutorials on the histology of tissues and organs. T 9:30–10:30, TH 9:30–11

CBIO 606b, Advanced Topics in Cell Biology Patrick Lusk, Christopher Burd,
Shawn Ferguson

This seminar course, which meets once weekly, covers advanced topics in cell biology. Each topic is spread over two or three sessions, which start with an introductory overview and are followed by a discussion of key papers led by an expert in the field. T 4:15–6

CBIO 611b, Vascular Cell Biology Martin Schwartz and faculty

This course introduces the structure and organ-level physiology of the vascular system, then covers in greater depth the development, regulation, mechanics, and pathology of blood vessels. The major focus is on cellular and molecular mechanisms. The course includes both lectures and reading and discussion of recent literature. WF 1:30–2:30

CBIO 655a/GENE 655a, Stem Cells: Biology and Application In-Hyun Park,
Haifan Lin, and faculty

This course is designed for first-year or second-year students to learn the fundamentals of stem cell biology and to gain familiarity with current research in the field. The course

is presented in a lecture and discussion format based on primary literature. Topics include stem cell concepts, methodologies for stem cell research, embryonic stem cells, adult stem cells, cloning and stem cell reprogramming, and clinical applications of stem cell research. Prerequisites: undergraduate-level cell biology, molecular biology, and genetics. TH 1:30–3

CBIO 701b, Illuminating Cellular Function Derek Toomre, Joerg Bewersdorf, and faculty

Introduction to the principles and practical methods of live cell imaging. Covers principles of fluorescent microscopy (including genetically encoded probes and physiological indicators), image formation, image detection, and image analysis. Includes hands-on demonstrations of state-of-the-art instrumentation, such as video-rate confocal and super-resolution “nanoscopes.” TTH 11–12:30

CBIO 900a/GENE 900a/MCDB 900a, First-Year Introduction to Research – Grant Writing and Scientific Communication Scott Holley and faculty

Grant writing, scientific communication, and laboratory rotation talks for Molecular Cell Biology, Genetics, and Development track students. M 4–5:30

CBIO 901b/GENE 901b/MCDB 901b, First-Year Introduction to Research – Ethics: Scientific Integrity in Biomedical Research Joerg Bewersdorf

Ethics and laboratory rotation talks for Molecular Cell Biology, Genetics, and Development track students. TH 4:15–5:45

CBIO 903a or b, Reading Course in Cell Biology Karin Reinisch

Independent study of specific topics in cell biology through directed reading of the literature under faculty supervision. Student may choose any topic and any Yale faculty subject to approval by the Cell Biology DGS. Open to Cell Biology students, and to students in other departments with approval from their respective DGS. Term paper required.

CBIO 911a/GENE 911a/MCDB 911a, First Laboratory Rotation Craig Crews

First laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

CBIO 912b/GENE 912b/MCDB 912b, Second Laboratory Rotation Craig Crews

Second laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

CBIO 913b/GENE 913b/MCDB 913b, Third Laboratory Rotation Craig Crews

Third laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

CELLULAR AND MOLECULAR PHYSIOLOGY

Sterling Hall of Medicine B147, 203.785.4041

www.physiology.yale.edu

M.S., M.Phil., Ph.D.

Chair

Michael Caplan

Director of Graduate Studies

David Zenisek (SHM B114, 203.785.6474, david.zenisek@yale.edu)

Professors Peter Aronson (*Internal Medicine/Nephrology*), Angelique Bordey (*Neurosurgery*), Emile Boulpaep, Thomas Brown (*Psychology*), Cecilia Canessa, Lloyd Cantley (*Internal Medicine/Nephrology*), Michael Caplan, Nancy Carrasco, Lawrence Cohen, Marie Egan (*Pediatrics*), Barbara Ehrlich (*Pharmacology*), Anne Eichmann (*Internal Medicine/Cardiology*), Biff Forbush III, John Geibel (*Surgery*), Leonard Kaczmarek (*Pharmacology*), George Lister (*Pediatrics*), Pramod Mistry (*Pediatrics*), Michael Nitabach, Vincent Pieribone, Patricia Preisig (*Internal Medicine/Nephrology*), W. Mark Saltzman (*Biomedical Engineering*), Joseph Santos-Sacchi (*Surgery/Otolaryngology*), Gerald Shulman (*Internal Medicine/Endocrinology*), Fred Sigworth, Carolyn Slayman (*Genetics*), Clifford Slayman, Susumu Tomita, Fred Wright (*Internal Medicine/Nephrology*), Lawrence Young (*Internal Medicine/Cardiology*), David Zenisek, Z. Jimmy Zhou (*Ophthalmology & Visual Science*)

Associate Professors Nadia Ameen (*Pediatrics*), Ivan de Araujo (*Psychiatry*), Jonathan Demb (*Ophthalmology & Visual Science*), Xiaoyong Yang (*Comparative Medicine*)

Assistant Professors Nii Addy (*Psychiatry*), Sviatoslav Bagriantsev, Stuart Campbell (*Biomedical Engineering*), Guillaume de Lartigue, Elena Gracheva, Shuta Ishibe (*Internal Medicine/Nephrology*), Erdem Karatekin, Richard Kibbey (*Internal Medicine/Endocrinology*), Satinder Singh, Jesse Rinehart, Carson Thoreen

Fields of Study

Fields of study range from cellular and molecular physiology to integrative medical biology. Areas of current interest include: ion channels, transporters and pumps, membrane biophysics, cellular and systems neurobiology, protein trafficking, epithelial transport, signal transduction pathways, cardiovascular biology, organ physiology, genetic models of human disease, pathophysiology, structural biology of membrane proteins, and physiological genomics.

Special Admissions Requirements

We welcome applications from students with backgrounds in the biological, chemical, and/or physical sciences. These include majors in biology, biochemistry, physiology, genetics, chemistry, physics, mathematics, engineering, computer science, and psychology. Courses in biology, biochemistry, organic and physical chemistry, and mathematics through elementary calculus are recommended. The GRE General Test is required. To

enter the Ph.D. program, students will apply to the Molecular Medicine, Pharmacology, and Physiology track within the interdepartmental graduate program in the Biological and Biomedical Sciences.

Special Requirements for the Ph.D. Degree

Formal requirements for the Ph.D. degree include two or three terms of course work, a qualifying examination taken by the end of the second year, submission of a thesis prospectus, two terms of teaching, and completion and satisfactory defense of the thesis.

Students are expected to design a suitable program of courses in consultation with a faculty adviser. The director of graduate studies (DGS) will provide general oversight of the course selections. These courses will provide a coherent background for the expected area of thesis research and also satisfy the department's subject and proficiency requirements. Students must satisfactorily pass at least six graduate-level courses, including C&MP 550a, 560b, and 630a. Also during the first two terms, each student should explore research projects by performing rotations in at least three laboratories to create an informed basis upon which to select a thesis project by the end of the first year. There is no foreign language requirement. The qualifying examination, which must be passed by the end of the student's fourth term, will cover areas of physiology that complement the student's major research interest.

An important dimension of graduate training in Cellular and Molecular Physiology is the acquisition of teaching skills through participation in courses appropriate for the student's academic interests. Ph.D. students are expected to participate in two terms (or the equivalent) of teaching, at the level of TF-20. Students are not expected to teach before passing the qualifying examination.

In addition to all other requirements, students must successfully complete C&MP 650, The Responsible Conduct of Research, prior to the end of their first year of study; and, in their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

After satisfying the departmental predissertation requirements, passing the qualifying examination, submitting a satisfactory thesis prospectus, and presenting a satisfactory report to the appropriate thesis advisory committee, students are admitted to candidacy. The completed dissertation must describe original research making a significant contribution to knowledge.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study. Students must also maintain an overall High Pass average. Student progress toward these goals is reviewed at the end of the second term.

Special Requirements for M.D./Ph.D. Students

M.D./Ph.D. students must pass at least three graduate-level courses that are not part of the Yale School of Medicine's regular M.D. program, including at least one C&MP course, preferably C&MP 560b.

Courses taken toward the M.D. degree can be counted toward the Graduate School's Honors requirement provided that the course carries a graduate course number and the student has registered for it as a graduate course.

Two laboratory rotations, each lasting five weeks, are required. One term of teaching is required.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Awarded to students who have fulfilled all the requirements for the Ph.D. except the prospectus, teaching requirement, and dissertation, normally at the end of the second year. Students are not admitted for this degree.

M.S. Awarded only to students who are not continuing for the Ph.D. degree but who have successfully completed one year of the doctoral program (i.e., passing of at least four graduate-level courses, including two Honors grades, and three successful laboratory rotations). Students are not admitted for this degree.

Program materials are available upon request to the Department Registrar, Department of Cellular and Molecular Physiology, Yale School of Medicine, PO Box 208026, New Haven CT 06520-8026.

Courses

C&MP 550a^U/ENAS 550a^U/MCDB 550a^U/PHAR 550a, Physiological Systems

Emile Boulpaep, W. Mark Saltzman

The course develops a foundation in human physiology by examining the homeostasis of vital parameters within the body, and the biophysical properties of cells, tissues, and organs. Basic concepts in cell and membrane physiology are synthesized through exploring the function of skeletal, smooth, and cardiac muscle. The physical basis of blood flow, mechanisms of vascular exchange, cardiac performance, and regulation of overall circulatory function are discussed. Respiratory physiology explores the mechanics of ventilation, gas diffusion, and acid-base balance. Renal physiology examines the formation and composition of urine and the regulation of electrolyte, fluid, and acid-base balance. Organs of the digestive system are discussed from the perspective of substrate metabolism and energy balance. Hormonal regulation is applied to metabolic control and to calcium, water, and electrolyte balance. The biology of nerve cells is addressed with emphasis on synaptic transmission and simple neuronal circuits within the central nervous system. The special senses are considered in the framework of sensory transduction. Weekly discussion sections provide a forum for in-depth exploration of topics. Graduate students evaluate research findings through literature review and weekly meetings with the instructor. MWF 9:25–10:15

C&MP 560b^U/ENAS 570b^U/MCDB 560b^U/PHAR 560b, Cellular and Molecular

Physiology: Molecular Machines in Human Disease Emile Boulpaep,
Fred Sigworth

The course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiological levels. Students learn

about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed on the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiological behaviors of cells and tissues are also stressed. Molecular motors are introduced and their mechanical relationship to cell function is explored. Students read papers from the scientific literature that establish the connections between mutations in genes encoding membrane proteins and a wide variety of human genetic diseases. MWF 9:25–10:15

C&MP 570b/NBIO 570b, Sensory Physiology David Zenisek, Joseph Santos-Sacchi, Z. Jimmy Zhou

The course provides an overview of the mammalian special sensory systems, including molecular and cellular bases of vision, audition, taste, olfaction, and somatosensation. Faculty with focus in those areas lead presentations and discussions on peripheral and central mechanisms. Psychophysical aspects of sensation are introduced. TTH 2:30–3:45

C&MP 600, Medical Physiology Case Conferences Emile Boulpaep and staff

Two-term course taught in groups of ten to twelve students by the same group leader(s) throughout the year. Workshop format permits students to apply basic concepts of physiology to clinical syndromes and disease processes. Students are expected to participate actively in a weekly discussion of a clinical case that illustrates principles of human physiology and pathophysiology at the whole-body, system, organ, cellular, or molecular level. Prerequisites: C&MP 550a and permission of the instructor. Credit for full year only. TH 11–12:30

C&MP 610, Medical Research Scholars Program: Mentored Clinical Experience

Raymond Russell, Michael Caplan

The goals of the course are to introduce MRSP students to aspects of clinically important human diseases. Students explore each disease over three one-and-one-half-hour sessions led by a clinician-scientist who is an expert in the relevant organ system. Students explore two disease processes per term. The first of the three sessions is devoted to a discussion of the clinical presentation, natural history, pathology, epidemiology, treatment, and prognosis of the disease process. During this session students have the opportunity to view gross or microscopic specimens of diseased tissue in association with members of the Pathology faculty. Students are assigned readings in pathology, pathophysiology, and clinical texts to prepare for the first class session. The second session focuses on translational aspects of the disease process. Students read and present papers relevant to the molecular basis of the disease and cutting-edge approaches to its therapy. In the third session students meet with patients who have experienced the disease and/or visit and explore facilities associated with diagnosis and treatment of the disease process. Prior to the third session students receive guidance as to what they will observe and how to approach the experience; and at the end of the session, the group discusses its thoughts and impressions. Students are expected to prepare for sessions, to participate actively, and to be scrupulously respectful of patients and patient facilities.

C&MP 620b/NBIO 610b, Fundamentals in Neurophysiology Vincent Pieribone,
Fred Sigworth

The course is designed for students who wish to gain a theoretical and practical knowledge of modern neurophysiology. Graduate students specializing in neurophysiology and non-neurophysiology are encouraged to attend, as the course begins at a very basic level and progresses to more complicated topics. Topics include properties of ion channels, firing properties of neurons, synaptic transmission, and neurophysiology methodology.

**C&MP 630a/PATH 680a/PHAR 502a, Seminar in Molecular Medicine,
Pharmacology, and Physiology** Don Nguyen, Titus Boggon

Readings and discussion on a diverse range of current topics in molecular medicine, pharmacology, and physiology. The class emphasizes analysis of primary research literature and development of presentation and writing skills. Contemporary articles are assigned on a related topic every week, and a student leads discussions with input from faculty who are experts in the topic area. The overall goal is to cover a specific topic of medical relevance (e.g., cancer, neurodegeneration) from the perspective of three primary disciplines (i.e., physiology: normal function; pathology: abnormal function; and pharmacology: intervention).

C&MP 650/PATH 660/PHAR 580, The Responsible Conduct of Research

Barbara Ehrlich, Demetrios Braddock

Organized to foster discussion, the course is taught by faculty in the Pharmacology, Pathology, and Physiology departments and two or three senior graduate students. Each session is based on case studies from primary literature, reviews, and two texts: Francis Macrina's *Scientific Integrity* and Kathy Barker's *At the Bench*. Each week, students are required to submit a reaction paper discussing the reading assignment. Students take turns leading the class discussion; a final short paper on a hot topic in bioethics is required. TH 11–12:15

C&MP 710b/MB&B 710b4, Electron Cryo-Microscopy for Protein Structure

Determination Fred Sigworth, Charles Sindelar

Understanding cellular function requires structural and biochemical studies at an ever-increasing level of complexity. The course is an introduction to the concepts and applications of high-resolution electron cryo-microscopy. This rapidly emerging new technique is the only method that allows biological macromolecules to be studied at all levels of resolution from cellular organization to near atomic detail. Counts as 0.5 credit. TTH 9–10:15

CHEMICAL & ENVIRONMENTAL ENGINEERING

Dunham Laboratory, 203.432.4252

M.S., M.Phil., Ph.D.

Chair

Paul Van Tassel

Director of Graduate Studies

Menachem Elimelech (menachem.elimelech@yale.edu)

Professors Eric Altman, Michelle Bell, Gaboury Benoit, Ruth Blake, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Edward Kaplan, Yehia Khalil (*Adjunct*), Michael Loewenberg, Robert McGraw (*Adjunct*), Andrew Miranker, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), James Saiers, W. Mark Saltzman, Udo Schwarz, T. Kyle Vanderlick, Paul Van Tassel, Kurt Zilm

Associate Professors Eric Dufresne, Tarek Fahmy, Jaehong Kim, Chinedum Osuji, Jordan Peccia, André Taylor, Corey Wilson, Julie Zimmerman

Assistant Professors Drew Gentner, Desirée Plata

Fields of Study

Fields include nanomaterials, soft matter, interfacial phenomena, biomolecular engineering, energy, water, and sustainability.

For admissions and degree requirements, and for course listings, see Engineering & Applied Science.

CHEMISTRY

Sterling Chemistry Laboratory, 203.432.3913

www.chem.yale.edu

M.S., Ph.D.

Chair

Scott Miller (1 SCL, 203.432.3912, chemistry.chair@yale.edu)

Director of Graduate Studies

Patrick Holland (chemistry.dgs@yale.edu)

Professors Victor Batista, Jerome Berson (*Emeritus*), Gary Brudvig, Robert Crabtree, Craig Crews (*Molecular, Cellular & Developmental Biology*), R. James Cross, Jr. (*Emeritus*), Jonathan Ellman, John Faller (*Emeritus*), Gary Haller (*Emeritus*), Seth Herzon, Patrick Holland, Francesco Iachello (*Physics*), Mark Johnson, William Jorgensen, J. Patrick Loria, James Mayer, J. Michael McBride, Scott Miller, Peter Moore (*Emeritus*), Anna Pyle (*Molecular, Cellular & Developmental Biology*), Lynne Regan (*Molecular Biophysics & Biochemistry*), James Rothman (*Cell Biology*), Martin Saunders, Alanna Schepartz, Charles Schmuttenmaer, Dieter Söll (*Molecular Biophysics & Biochemistry*), David Spiegel, Thomas Steitz (*Molecular Biophysics & Biochemistry*), Scott Strobel (*Molecular Biophysics & Biochemistry*), John Tully, Patrick Vaccaro, Kenneth Wiberg (*Emeritus*), Frederick Ziegler (*Emeritus*), Kurt Zilm

Associate Professor Nilay Hazari

Assistant Professors Richard Baxter, Jason Crawford, Ziad Ganim, Sarah Slavoff, Timothy Newhouse, Hailiang Wang

Fields of Study

Fields include bio-inorganic chemistry, bio-organic chemistry, biophysical chemistry, chemical biology, chemical physics, inorganic chemistry, materials chemistry, organic chemistry, physical chemistry, physical-inorganic chemistry, physical-organic chemistry, synthetic-organic chemistry, and theoretical chemistry.

Special Admissions Requirements

Applicants are expected to have completed or be completing a standard undergraduate chemistry major including a year of elementary organic chemistry, with laboratory, and a year of elementary physical chemistry. Other majors are acceptable if the above requirements are met. The GRE General Test is required. The GRE Subject Test is strongly recommended though not required. Students whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

A foreign language is not required. Three term courses are required in each of the first two terms of residence, and participation in additional courses is encouraged in subsequent terms. Courses are chosen according to the student's background and research area. To be admitted to candidacy a student must (1) receive at least two term grades of Honors,

exclusive of those for research; (2) pass one oral examination (organic students) or two oral examinations (nonorganic students) by the end of the second year of study; and (3) submit a thesis prospectus no later than the end of the third year of study. Remaining degree requirements include completing a third-year formal proposal (inorganic students) and a fourth-year research proposal (organic and chemical biology students), a written thesis describing the research, and an oral defense of the thesis. The ability to communicate scientific knowledge to others outside the specialized area is crucial to any career in chemistry. Therefore, all students are required to teach a minimum of two terms at the TF-20 level. All students are required to take CHEM 590a, Ethical Conduct and Scientific Research, in the fall term of their first year of study.

Master's Degree

M.S. (en route to the Ph.D.) A student must pass at least five graduate-level term courses in the Chemistry department exclusive of seminars and research. In addition, an overall average (exclusive of seminars and research) of High Pass must be maintained in all courses. One full year of residence is required.

Program materials are available upon request to the Director of Graduate Studies, Department of Chemistry, Yale University, PO Box 208107, New Haven CT 06520-8107.

Courses

[CHEM 505a, Alternative Energy]

CHEM 518a^U, Advanced Organic Chemistry William Jorgensen

Concise overview of structure, properties, thermodynamics, kinetics, reactions, and intermolecular interactions for organic molecular systems. TTH 11:35–12:50

CHEM 521a^U, Chemical Biology Jason Crawford, Sarah Slavoff

A one-term introduction to the origins and emerging frontiers of chemical biology. Discussion of the key molecular building blocks of biological systems and the history of macromolecular research in chemistry. MW 9–10:15

[CHEM 522b, Chemical Biology II]

CHEM 523a^U, Synthetic Methods in Organic Chemistry Timothy Newhouse

This course surveys practical methods in synthetic organic chemistry with an emphasis on learning how to acquire new information and understand chemical reactivity from a fundamental and mechanistic perspective. Memorization is deemphasized. Undergraduates are encouraged to enroll. MW 11:35–12:50

[CHEM 524b, Advanced Synthetic Methods in Chemistry]

[CHEM 525b^U, Spectroscopic Methods of Structure Determination]

[CHEM 526b, Computational Chemistry and Biochemistry]

[CHEM 528a, Natural Products Synthesis]

CHEM 529b, Special Topics in Chemical Biology Timothy Newhouse, David Spiegel

Current topics at the interface of chemistry, biology, and medicine with an emphasis on synthetic biology approaches. TTH 11:35–12:50

CHEM 530a^U, Statistical Methods and Thermodynamics Ziad Ganim

The fundamentals of statistical mechanics developed and used to elucidate gas phase and condensed phase behavior, as well as to establish a microscopic derivation of the postulates of thermodynamics. Topics include ensembles; Fermi, Bose, and Boltzmann statistics; density matrices; mean field theories; phase transitions; chemical reaction dynamics; time-correlation functions; Monte Carlo and molecular dynamics simulations. MWF 9:25–10:15

CHEM 531b, Special Topics in Organic Chemistry Jonathan Ellman,
William Jorgensen

Current topics in organic chemistry. MW 11:35–12:50

CHEM 537a, Chemistry of Isotopes Martin Saunders

Advanced applications of isotopes to chemical problems and the theory associated with them, including kinetic and equilibrium isotope effects, tracer applications, and dating. MWF 9:25–11:15

CHEM 540a^U, Molecules and Radiation I Kurt Zilm

An integrated treatment of quantum mechanics and modern spectroscopy. Basic wave and matrix mechanics, perturbation theory, angular momentum, group theory, time-dependent quantum mechanics, selection rules, coherent evolution in two-level systems, line shapes, and NMR spectroscopy. MWF 8:20–9:10

CHEM 542b^U, Molecules and Radiation II Mark Johnson

An extension of the material covered in CHEM 540a to atomic and molecular spectroscopy, including rotational, vibrational, and electronic spectroscopy, as well as an introduction to laser spectroscopy. MW 11:35–12:50

[CHEM 547b, Electron Paramagnetic Resonance]

[CHEM 548b, Nuclear Magnetic Resonance in Liquids]

CHEM 549a, Materials Chemistry Hailiang Wang

This course covers fundamental principles in materials chemistry including basic solid-state chemistry; structures, properties, and applications of metals, semiconductors, polymers, and nanomaterials; and material characterization techniques. Special topics at research frontiers of materials chemistry are also covered, including graphene and carbon nanotubes, nanomaterials for batteries, nanomaterials for catalysis, etc. This course aims to serve graduate and senior undergraduate students from various academic departments who are interested in advanced chemistry and nanoscience for materials research. TTH 9–10:15

[CHEM 550b^U, Physical Methods in Inorganic Chemistry]

CHEM 551b, Biophysics I Richard Baxter

A detailed discussion of several important experimental techniques used to study the properties of biological macromolecules, focusing on the application of Fourier methods and concepts to NMR spectroscopic, optical, and electron microscopy, image reconstruction, X-ray scattering/diffraction, and mass spectrometry. Emphasis on the physical chemistry that underlies both the execution of such experiments and the interpretation of the resulting data. MW 9–10:15

CHEM 552a^U, Organometallic Chemistry Robert Crabtree

A survey of the organometallic chemistry of the transition elements and of homogeneous catalysis. TTH 9–10:15

CHEM 553b, Small Molecule X-ray Crystallography Brandon Mercado,
Patrick Holland

This course provides an introduction to small molecule crystallography. It covers both theoretical and applied concepts and includes hands-on experience on how to solve and refine the structure of small molecules. MW 11:35–12:50

CHEM 554b, Bio-Inorganic Chemistry Gary Brudvig

An advanced introduction to biological inorganic chemistry. Important topics in metallo-protein chemistry are illustrated. Objective is to define and understand function in terms of structure. Topics include catalysis with and without electron transfer, and carbon, oxygen, and nitrogen metabolism. TTH 9–10:15

CHEM 555b, Inorganic Mechanisms James Mayer

An advanced course studying the mechanisms of important inorganic transformations. Topics such as proton-coupled electron transfer are covered. MW 9–10:15

CHEM 556b, Biochemical Rates and Mechanisms J. Patrick Loria

An advanced treatment of enzymology. Topics include transition state theory and derivation of steady-state and pre-steady-state rate equations. The role of entropy and enthalpy in accelerating chemical reactions is considered, along with modern methods for the study of enzyme chemistry. These topics are supplemented with in-depth analysis of the primary literature. TTH 9–10:15

CHEM 557a^U, Modern Coordination Chemistry Nilay Hazari

The principles of modern inorganic chemistry. Main group and transition element chemistry: reactions, bonding, structure, and spectra. MWF 8:20–9:15

CHEM 558a, Biophysics II: Biophysical Spectroscopy Elsa Yan

A discussion of application of spectroscopy to biomolecules. Topics include Raman, single-molecule, fluorescence, FTIR, optical ultrafast, NMR, and EPR spectroscopies. Emphasis is placed on interpreting spectroscopic data to gain structural and dynamic information to answer biological questions at the molecular level. MWF 11:35–12:25

CHEM 560La, Advanced Instrumentation Laboratory I Mark Johnson

A laboratory course introducing physical chemistry tools used in the experimental and theoretical investigation of large and small molecules. Modules include electronics, vacuum technology, optical spectroscopy and lasers, and computer programming.

[CHEM 561Lb, Advanced Instrumentation Laboratory II]**CHEM 562L, Laboratory in Instrument Design and the Mechanical Arts** Kurt Zilm,
David Johnson

Familiarization with modern machine shop practices and techniques. Use of basic metal-working machinery and instruction in techniques of precision measurement and properties of commonly used metals, alloys, and plastics.

CHEM 564L, Advanced Mechanical Instrumentation Kurt Zilm, David Johnson

A course geared for both the arts and sciences that goes beyond the basic introductory shop courses, offering an in-depth foundation study utilizing hands-on instructional techniques that must be learned from experience. Prerequisite: CHEM 562L.

CHEM 565L, Introduction to Glass Blowing Patrick Vaccaro, Daryl Smith

The course provides a basic introduction to the fabrication of scientific apparatus from glass. Topics covered include laboratory setup, the fundamental skills and techniques of glass blowing, the operation of glass fabrication equipment, and requisite safety procedures.

CHEM 570b^U, Quantum Chemistry Victor Batista

The elements of quantum mechanics developed and illustrated with applications in chemistry and chemical physics. TTH 9–10:15

CHEM 572a, Advanced Quantum Mechanics Victor Batista

Topics in quantum mechanics that are essential for understanding modern chemistry, physics, and biophysics. Topics include the interaction of radiation with matter and the use of quantized radiation fields and may include time-dependent quantum theory, scattering, semiclassical methods, angular momentum, density matrices, and electronic structure methods. TTH 9–10:15

CHEM 590a, Ethical Conduct and Scientific Research Jonathan Parr

A survey of ethical questions relevant to the conduct of research in the sciences with particular emphasis on chemistry. A variety of issues, including plagiarism, the falsification of data, and financial malfeasance, are discussed, using as examples recent cases of misconduct by scientists. Enrollment is restricted to graduate students in chemistry. M 5–5:50

CHEM 600–670, Research Seminars

Presentation of a student's research results to his/her adviser and fellow research group members. Extensive discussion and literature review are normally a part of the series.

CHEM 700, Laboratory Rotation for First-Year Biophysical and Chemical Biology Graduate Students J. Patrick Loria, Craig Crews**CHEM 720a,b, Current Topics in Organic Chemistry** Seth Herzon [Sp]

A seminar series based on invited speakers in the general area of organic chemistry.

CHEM 730, Molecular Science Seminar

A seminar series based on invited speakers in the areas of physical, inorganic, and biological chemistry.

CHEM 990, Research

Individual research for Ph.D. degree candidates in the Department of Chemistry, under the direct supervision of one or more faculty members.

CLASSICS

402 Phelps Hall, 203.432.0977

www.yale.edu/classics

M.A., M.Phil., Ph.D.

Chair

Kirk Freudenburg

Director of Graduate Studies

Egbert Bakker [F] (404 Phelps, 203.432.0980)

Irene Peirano Garrison [Sp] (404 Phelps, 203.432.8536)

Professors Egbert Bakker (*on leave* [Sp]), Victor Bers, Kirk Freudenburg, Emily Greenwood (*Classics; African American Studies*), Verity Harte (*Classics; Philosophy; on leave* [Sp]), Brad Inwood, Diana Kleiner (*Classics; History of Art; on leave* [Sp]), Christina Kraus, Noel Lenski (*Classics; History*), J.G. Manning (*Classics; History*)

Associate Professors Milette Gaifman (*Classics; History of Art*), Pauline LeVen, Irene Peirano Garrison

Assistant Professors Joshua Billings (*Humanities; Classics; on leave*), Andrew Johnston

Lecturers Ann Hanson, Timothy Robinson, Barbara Shailor (*Senior Research Scholar*), Joseph Solodow

Affiliated Faculty and Secondary Appointments Harold Attridge (*Divinity School*), Adela Yarbro Collins (*Divinity School; Emerita*), John J. Collins (*Divinity School*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), John Hare (*Divinity School*), Dale Martin (*Religious Studies*), Susan Matheson (*Curator of Ancient Art, Art Gallery*), David Quint (*English; on leave* [Sp]), Kathryn Slanski (*Humanities; Near Eastern Languages & Civilizations*), George Syrimis (*Hellenic Studies*)

Fields of Study

The degree programs in Classics seek to provide an overall knowledge of Greek and Roman civilization, combined with specialized work in a number of fields or disciplines within the total area of classical antiquity.

Admission Requirements

A minimum of three years (four preferred) of college training in one of the classical languages and two years (three preferred) in the other.

Grading and Good Standing

In addition to the Graduate School's requirement of Honors grades in at least one year course or two term courses, students must have a High Pass average in the remaining courses. Admission to candidacy for the Ph.D. is granted upon completion of all predisertation requirements not later than the end of the seventh term of study.

The faculty considers experience in the teaching of language and literature to be an important part of this program. Students in Classics typically teach in their third and fourth years of study.

Requirements for the Ph.D. Degree in Classical Philology

1. Diagnostic sight translations in Greek and Latin (these are taken before the beginning of the first and third terms and are meant to assess the student's proficiency and progress in both languages).
2. A proseminar offering an introduction to the discipline of Classics and its various subdisciplines.
3. Departmental reading examinations in French (or Italian) and German. The first (in either language) is to be passed by the end of the first year, the second by the end of the second year in residence.
4. A minimum of fourteen term courses: (i) two yearlong survey courses in the history of Greek and Latin literature (four courses in total); (ii) at least four seminars, of which two have to be literary seminars in one language, and one in the other; (iii) one course in historical or comparative linguistics; (iv) one course in ancient history (either an 800-level seminar or a 600-level materials course), and one in classical art and archaeology; (v) of these fourteen courses, twelve must be taken in the first two years of study; the last two, which must be 800-level seminars, are to be taken in the third year, normally one in each term.
5. Greek and Latin composition (this requirement may but need not be satisfied by courses taken under [4] above).
6. Oral examinations in Greek and Latin literature, based on the syllabus covered by the survey courses, drawn from the Classical Philology Ph.D. reading list. These are to be taken closely following the surveys in the respective literatures, as follows: the first, at the end of the second term (May of the first year), the second at the end of the fourth term (May of the second year).
7. Translation examinations in Greek and Latin, based on the Classical Philology Ph.D. reading list, by the beginning of the fifth term in residence.
8. Special fields oral examinations will occur at the beginning of the sixth term, and consist of four areas of special concentration selected by the candidate in consultation with the DGS. One of the special fields should be related to the student's chosen dissertation topic; the three other fields are in each of the two ancient languages/cultures; one historical topic, or a topic with historical potential, is advised. In addition to the oral exam, the student will be asked to write a short summary of the dissertation topic and submit this summary and a working dissertation title to the special fields examiners and to the dissertation adviser (who may or may not have worked on the project as a "special topic" with the student). The summary should discuss where the student's work stands at the beginning of the term and how the student expects the research will progress over the course of the sixth term as he or she writes the formal dissertation prospectus.
9. A dissertation prospectus by the end of the sixth term in residence.
10. A dissertation. All students at the end of each term of dissertation research and writing will present their work in progress in a "chapter colloquium," which will

mimic the prospectus defense in format (i.e., a discussion with interested faculty of a presubmitted chunk of written work). If no chapter or written work is presentable at the time of the colloquium, the student would have to justify this.

Requirements for the Ph.D. Degree in Ancient History

1. Diagnostic sight translations in Greek and Latin (these are taken before the beginning of the first and third terms and are meant to assess the student's proficiency and progress in both languages).
2. A proseminar offering an introduction to the discipline of Classics and its various subdisciplines.
3. Departmental reading examinations in French (or Italian) and German. The first (in either language) is to be passed by the end of the first year, the second by the end of the second year in residence.
4. A minimum of fourteen term courses: (i) one yearlong survey (two courses) in the history of Greek or Latin literature; (ii) one seminar in Greek or Latin literature; (iii) six courses in Greek and Roman history (three of these must be either seminars or materials courses, two in one language/culture, one in the other); (iv) two courses in another period of history; (v) of these fourteen courses, thirteen must be taken in the first two years of study; the remaining course must be taken in the third year, normally in the first term; this has to be an 800-level seminar.
5. An oral examination in Greek or Latin literature, drawn from the Ancient History Ph.D. reading list, in May following the yearlong survey of the language in question and based on the syllabus covered by the survey course.
6. A translation examination in the language (Greek or Latin) for which the survey course was followed, based on the Ancient History Ph.D. reading list, by the beginning of the fifth term in residence; the student will write an exam in the other language based on a reading list created in consultation with the DGS.
7. Special fields oral examinations will occur at the beginning of the sixth term, and consist of four areas of special concentration selected by the candidate in consultation with the DGS. One of the special fields should be related to the student's chosen dissertation topic; the three other fields are in each of the two ancient languages. In addition to the oral exam, the student will be asked to write a short summary of the dissertation topic and submit this summary and a working dissertation title to the special fields examiners and to the dissertation adviser (who may or may not have worked on the project as a "special topic" with the student). The summary should discuss where the student's work stands at the beginning of the term and how the student expects the research will progress over the course of the sixth term as he or she writes the formal dissertation prospectus.
8. A dissertation prospectus by the end of the sixth term in residence.
9. A dissertation. All students at the end of each term of dissertation research and writing will present their work in progress in a "chapter colloquium," which will mimic the prospectus defense in format (i.e., a discussion with interested faculty of a presubmitted chunk of written work). If no chapter or written work is presentable at the time of the colloquium, the student would have to justify this.

Requirements for the Ph.D. Degree in Classical Art and Archaeology

The program is designed to give a general knowledge of the development of art and architecture in the classical world from the Bronze Age to Late Antiquity, combined with a detailed study of one particular period and area; and an acquaintance with the contribution made by field archaeology. The program has a strong art historical component, and it is expected that each student will take advantage of available opportunities to visit the major sites and monuments.

1. Diagnostic sight translations in Greek and Latin (these are taken before the beginning of the first and third terms and are meant to assess the student's proficiency and progress in both languages).
2. A proseminar offering an introduction to the discipline of Classics and its various subdisciplines.
3. Departmental reading examinations in Italian (or French) and German. The first (in either language) is to be passed by the end of the first year, the second by the end of the second year in residence.
4. A minimum of fourteen term courses: (i) a minimum of six courses should be in Greek and/or Roman art and/or archaeology (at least four must be seminars); (ii) a minimum of two courses should be in a related field of the history of art, for example Medieval or Renaissance; (iii) a minimum of two courses should be in Greek or Roman history, numismatics, or papyrology; (iv) students must demonstrate a competence in Greek and Latin, usually by passing at least one 400/700-level course in each language; (v) of the remaining four courses, at least two should be seminars in Greek or Latin literature.
5. A written examination in classical art and archaeology, by the beginning of the sixth term. The examination consists of identifications of works of art and architecture, essays, and a twenty-four-hour research paper, followed by an oral exam in four areas of Greek and Roman art and architecture (time period, locale, genre, free choice), with specific topics within those categories agreed upon in advance by the candidate, adviser, and the DGS in Classics. Consideration is normally given to the probable dissertation topic and the way in which preparation for the orals might enhance the writing of the dissertation prospectus.
6. A dissertation prospectus, normally by the end of the sixth term in residence.
7. A dissertation. All students at the end of each term of dissertation research and writing will present their work in progress in a "chapter colloquium," which will mimic the prospectus defense in format (i.e., a discussion with interested faculty of a presubmitted chunk of written work). If no chapter or written work is presentable at the time of the colloquium, the student would have to justify this.

Combined Programs

CLASSICS AND COMPARATIVE LITERATURE

Admission requirements Prerequisites for admission through the Department of Classics: same as for Classical Philology. (For admission requirements in the Department of Comparative Literature, consult the DGS of that department.) After admission to the Department of Classics, qualified students may apply to be admitted to this combined

program, normally during the first term of residence; the directors of graduate studies of both departments should be consulted before application to the combined program is made.

Requirements for the Ph.D. degree in Classics and Comparative Literature

1. Diagnostic sight translations in Greek and Latin (these are taken before the beginning of the first and third terms and are meant to assess the student's proficiency and progress in both languages).
2. A proseminar offering an introduction to the discipline of classics and its various subdisciplines.
3. A minimum of fourteen term courses: (i) at least seven in Classics; (ii) including two yearlong surveys (four courses) in the history of Greek and Latin literature; (iii) two 800-level seminars; (iv) at least six courses in Comparative Literature; (v) including the departmental proseminar; (vi) of these at least four courses should be on postclassical European literature; (vii) of these fourteen courses, twelve must be taken in the first two years of study; the last two, which must be Classics 800-level seminars, are to be taken in the third year, normally one in each term; (viii) the course work across the two programs should include at least two courses on literary theory or methodology, and at least one course each in poetry, narrative fiction, and drama.
4. Literary proficiency in German and in one other modern language, to be demonstrated by the end of the second year in residence.
5. Oral examinations in Greek and Latin literature, based on the syllabus covered by the survey courses, drawn from the Classical Philology Ph.D. reading list. These are to be taken closely following the surveys in the respective literatures, as follows: the first, at the end of the second term (May of the first year), the second at the end of the fourth term (May of the second year).
6. Translation examinations in Greek and Latin, based on the Classical Philology Ph.D. reading list, by the beginning of the fifth term in residence.
7. An oral examination in the Comparative Literature department on six topics appropriate to both disciplines, selected in consultation with the two directors of graduate studies, balancing a range of kinds of topics and including poetry, narrative fiction, and drama, and at least one significant cluster of postclassical texts, by the middle of the sixth term. One of the topics studied will be related to the student's dissertation topic.
8. A dissertation prospectus, by the end of the sixth term in residence. The prospectus must be approved by the DGS in each department (and by the Comparative Literature prospectus committee) by the end of the sixth term in residence. At least one dissertation director must come from the Comparative Literature core faculty.
9. A dissertation. All students at the end of each term of dissertation research and writing will present their work in progress in a "chapter colloquium," which will mimic the prospectus defense in format (i.e., a discussion with interested faculty of a presubmitted chunk of written work). If no chapter or written work is presentable at the time of the colloquium, the student would have to justify this.

CLASSICS AND PHILOSOPHY

The Classics and Philosophy Program is a combined program, offered by the Departments of Classics and Philosophy, for students wishing to pursue graduate study in ancient philosophy. Suitably qualified students may apply for entry to the program either through the Classics department for the Classics track, details of which are given below, or through the Philosophy department for the Philosophy track, details of which may be found at <http://philosophy.yale.edu/graduate-program/classics-and-philosophy-program>.

Applicants for the Classics track of the combined program must satisfy the general requirements for admission to the Classics graduate program, in addition to the requirements of the Classics track of the combined program. Applicants for the Philosophy track of the combined program must satisfy the general requirements for admission to the Philosophy graduate program, in addition to the requirements of the Philosophy track of the combined program.

The combined program is overseen by an interdepartmental committee currently consisting of Verity Harte, David Charles, and Brad Inwood together with the DGS in Classics and the DGS in Philosophy.

Requirements of the Classics track of the Classics and Philosophy Program

1. Diagnostic sight translations in Greek and Latin (these are taken before the beginning of the first and third terms and are meant to assess the student's proficiency and progress in both languages).
2. A proseminar offering an introduction to the discipline of Classics and its various subdisciplines.
3. Departmental reading examinations in French (or Italian) and German. The first (in either language) is to be passed by the end of the first year, the second by the end of the second year in residence.
4. A minimum of fourteen term courses, of which (i) at least four should be in ancient philosophy, including at least two involving original language work; (ii) of ten remaining courses, five should be in Classics, five in Philosophy, including (a) of five in Classics, either two terms of history of Greek literature or two terms of history of Latin literature are required, and two courses at 700/800-level in Greek or Latin; and (b) of five in Philosophy, one in history of philosophy other than ancient philosophy, three in nonhistorical philosophy. It is recommended that students without formal training in logic take a logic course appropriate to their philosophical background.
5. Translation examinations in Greek and Latin, based on the Classics and Philosophy Ph.D. reading list for the Classics track of the program, by the beginning of the fifth term in residence.
6. Oral examinations in Greek and Latin literature, based on the Classics and Philosophy Ph.D. reading list for the Classics track of the program, by the end of the fifth term in residence and consisting of one hourlong oral examination on nonphilosophical Greek and Latin works from the list (which may be taken in two parts, one half-hour exam on Greek and one half-hour exam on Latin) and one hourlong oral examination on philosophical Greek and Latin works from the list, to be completed by the end of the fifth term in residence. Students may choose to take the nonphilosophical Greek and/or Latin half-hour component of their oral examination in conjunction with

taking the history of Greek or Latin literature, along with the Classical Philology cohort, in May of the year in which the corresponding history is taken.

7. One of the two qualifying papers required for the Ph.D. in Philosophy by the end of the sixth term in residence; this paper should be on a philosophical topic other than ancient philosophy.
8. Oral examinations/special fields in two areas of concentration selected by the candidate in consultation with the DGS in Classics and the program committee, one of which must be in ancient philosophy and which will in addition include a written component, while the other must cover a classical topic other than ancient philosophy, by the end of the sixth term in residence.
9. A dissertation prospectus, by the end of the seventh term in residence.
10. A dissertation. All students at the end of each term of dissertation research and writing will present their work in progress in a “chapter colloquium,” which will mimic the prospectus defense in format (i.e., a discussion with interested faculty of a presubmitted chunk of written work). If no chapter or written work is presentable at the time of the colloquium, the student would have to justify this.

CLASSICS AND RENAISSANCE STUDIES

Admission requirements Same as for Classical Philology. Applications should be submitted directly to Classics with an indication that the student wishes to apply for the combined degree in Classics and Renaissance Studies.

Requirements for the Ph.D. degree in Classics and Renaissance Studies

1. Diagnostic sight translations in Greek and Latin (these are taken before the beginning of the first and third terms and are meant to assess the student’s proficiency and progress in both languages).
2. A proseminar offering an introduction to the discipline of Classics and its various subdisciplines.
3. Sixteen term courses, divided equally between Classics and Renaissance Studies: (i) eight courses in Classics; (ii) including two yearlong surveys (four courses) of Greek and Latin literature; (iii) at least three seminars; (iv) eight courses in Renaissance Studies; (v) two terms of the Renaissance Studies Core Course; (vi) six additional term courses to be taken in at least two disciplines (such as literature, history, history of art, music, religious studies, etc.); one of these courses should meet the normal Classics requirements of a course in classical art or archaeology; (vii) of these sixteen courses, fourteen must be taken in the first two years of study; the last two, which must be Classics 800-level seminars, are to be taken in the third year, normally one in each term.
4. Literary proficiency in Italian, as examined by Renaissance Studies, and in a second language, normally German or French.
5. Oral examinations in Greek and Latin literature, based on the syllabus covered by the survey courses, drawn from the Classics and Renaissance Studies Ph.D. reading list. These are to be taken closely following the surveys in the respective literatures, as follows: the first, at the end of the second term (May of the first year), the second at the end of the fourth term (May of the second year).

6. Translation examinations in Greek and Latin, based on the Classics and Renaissance Studies Ph.D. reading list, by the end of the fifth term in residence.
7. Oral examinations on special fields appropriate to both disciplines, by the beginning of the sixth term. Seventy-five minutes on three or four topics in classical Greek and Latin literature; and forty-five minutes (three fifteen-minute questions) on Renaissance topics to be divided between at least two disciplines, i.e., literature, history, history of art, etc., selected in consultation with the directors of graduate studies in both disciplines. One of the fields studied will be related to the student's dissertation topic. In addition to the oral exam, the student will be asked to write a short summary of his or her dissertation topic and submit this summary and a working dissertation title to the special fields examiners and to the dissertation adviser (who may or may not have worked on the project as a "special topic" with the student). The summary should discuss where the student's work stands at the beginning of the term and how the student expects the research will progress over the course of the sixth term as he or she writes the formal dissertation prospectus.
8. A dissertation prospectus, by the end of the sixth term in residence.
9. A dissertation. All students at the end of each term of dissertation research and writing will present their work in progress in a "chapter colloquium," which will mimic the prospectus defense in format (i.e., a discussion with interested faculty of a presubmitted chunk of written work). If no chapter or written work is presentable at the time of the colloquium, the student would have to justify this.

For information about the Ph.D. program in Graeco-Arabic Studies, please contact Professor Gutas, Department of Near Eastern Languages and Civilizations.

YISAP Graduate Qualification

The Yale Initiative for the Study of Antiquity and the Premodern World (YISAP) offers a graduate qualification. For further information, see YISAP, under Non-Degree-Granting Programs, Councils, and Research Institutes.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. The Department of Classics does not admit students for a terminal master's degree, nor does it award an M.A. en route to the Ph.D. degree. If, however, a student admitted for the Ph.D. leaves the program prior to completion of the doctoral degree, he or she may be eligible to receive a terminal master's degree upon completion of eight courses, ordinarily with a High Pass average in two successive terms.

Program materials are available upon request to the Director of Graduate Studies, Department of Classics, Yale University, PO Box 208266, New Haven CT 06520-8266.

Courses

GREK 743b^U, Homer's *Iliad* Pauline LeVen

Reading of selected books of the *Iliad*, with attention to Homeric language and style, the Homeric view of heroes and gods, and the reception of Homer in antiquity.

GREK 755a^U, Athenian Law Courts Victor Bers

Rhetoric and law, procedural and substantive, in the Athenian courts of the fifth and fourth centuries B.C. as seen in forensic speeches and discursive treatments, and as satirized in Aristophanes' *Wasps*.

GREK 771b^U, Plutarch's *Lives* Emily Greenwood

Close reading of selections from the *Parallel Lives*, including the lives of Pericles, Alcibiades, and Nicias. Plutarch's reception and mediation of Greco-Roman historical traditions; the nature and design of the *Lives*; ways in which genres such as biography, history, and historical fiction influenced and were influenced by Plutarch's work.

GREK 790a^U, Greek Syntax and Stylistics Victor Bers

Stylistics analysis and extended prose composition in imitation of particular genres and "subgenres," concentrating on classical Attic prose. Students enrolled in this course are normally required to attend and do the work in GREK 390a, a review of accidence and syntax, elementary composition, and stylistic analysis of Greek prose of the fifth and fourth centuries B.C., including a comparison of "prosaic" and "poetic" syntax. TTH 9–10:15, T 10:30–11:20

LATN 729a^U, The Roman World of the Plinys Andrew Johnston

The Roman world of the Flavian Age and the principate of Trajan (ca. 70–110 C.E.) as seen through the writings of two of its public intellectuals, Pliny the Elder and his nephew Pliny the Younger. The former's encyclopedic *Natural History* and the latter's *Letters* and *Panegyric*. Politics, physical science, history, literature, zoology, magic, patronage, art history, and slavery during the period.

LATN 733b^U, Sallust Irene Peirano Garrison

An introduction to the works, style, and thought of Sallust. Close reading and discussion of Sallust's two main works, the *Bellum Catilinae* and *Bellum Jugurthinum*, with attention to language and style. Topics include historiography as a genre, intertextuality, the Sallustian persona and style, ethnography, and characterization.

LATN 764a^U, Ovid's *Metamorphoses* Joseph Solodow

An intensive introduction to the *Metamorphoses*, with particular attention to questions of narrative, gender, politics, and literary history.

LATN 790b^U, Latin Syntax and Stylistics Joseph Solodow

A systematic review of syntax and an introduction to Latin style. Selections from Latin prose authors are read and analyzed, and students compose short pieces of Latin prose. For students with some experience reading Latin literature who desire a better foundation in forms, syntax, idiom, and style. MW 2:30–3:45

CLSS 622a^U/PHIL 622a^U, Plato's *Republic* Verity Harte, Mary Margaret McCabe

Reading and philosophical discussion of the whole of Plato's major work, *The Republic*. Core class has readings in translation. Additional discussion section for graduate students. W 3:30–5:20, F 2–3:30

CLSS 630a^U, Medical Thought in Greek and Latin Literature Ann Hanson

Examination of concepts current in the medical writers of Greece and Rome that also receive attention from writers of epic, history, drama, and oratory.

CLSS 841b/ANTH 741b/ARCG 741b/HIST 502b/NELC 841b, Frontier and Province in the Premodern World Andrew Johnston, William Honeychurch

From Achaemenid India or Han China to Roman Gaul and Egypt to Iraqi Kurdistan, the province and its organizational equivalents (e.g., nomes in Egypt, commanderies in China) have long constituted one of the fundamental building blocks of states, ancient and modern, and a fascinatingly complex site of cultural and political negotiation in imperial encounters. The aim of this year's core seminar is to explore social equilibria between governance and the governed in the premodern world, via the interaction—religious, artistic, linguistic, administrative, economic—between local units and large imperial frameworks. As an object of comparative study, the province, representing the intersection of imperial power and local communities, allows us to combine “top-down” and “bottom-up” approaches to the ancient world, to investigate some of the key practices and discourses of empire while attempting to recover the agency and voices of subaltern provincial actors. It offers as well a chance to reconsider the “center-periphery” paradigm taken over from world-systems theory, and to propose new models for understanding the complex relationships between an imperial “center” and the governance of territories. This interdisciplinary seminar examines a wide range of aspects of the province as a trans-historical phenomenon—law, economy, art, literature, religion, monumentality, urbanism, and politics—across the ancient Mediterranean world and beyond, making use of the unique resources and collections at Yale, especially the Art Gallery and Beinecke Library.

CLSS 852a, Augustine Noel Lenski

In this course we examine the Latin of the late-fourth- and early-fifth-century author Augustine of Hippo, one of the most learned and prolific authors from all of antiquity, with an extant corpus that dwarfs those of even the largest of classical Latin authors. We examine a selection of these works, focusing on three themes: an overview of Augustine's life (using the *Confessions* as our guide), an examination of the question of religious conflict and sectarian violence (especially regarding the Donatists), and a survey of polemical writings (especially those against the Manicheans). The course thus has two primary centers of gravity: the reading of a large swath of Augustine's Latin and the exploration of important themes in the cultural and religious history of Late Antiquity.

CLSS 853b/HIST 505b, Hellenistic Civilization J.G. Manning

Survey of trends and recent developments and research in Hellenistic history; connections to other historical periods. F 1:30–3:20

CLSS 867b/HSAR 544b, In Search of the Ancient Artist Milette Gaifman

Classical literature has bequeathed us the names of many celebrated Greek artists, from Pheidias, who made the colossal statue of Olympian Zeus, to Apelles, the court painter of Alexander the Great. Strikingly, very few works by these “Old Masters” survive in the archaeological record. This course tackles the problems that arise from the gap that exists between famous artists known to us from the ancient textual tradition and the mass of objects that survive by lesser-known, often anonymous makers. Is it appropriate to apply the concept of the “artist” (rather than “craftsman”) to ancient material culture? What evidence is there for actual artistic production in the Greek and Roman world, and what can this tell us about ancient artists? What light does antiquity throw on the modern category of the “artist”? How useful is literary evidence for traditional art historical practices

of attribution and connoisseurship, in the case of antiquity? Covering the period from Archaic Greece until the early Roman Empire, we explore the role, status, agency, and identity of the ancient artist across a variety of media, including vase painting, metal work, marble and bronze sculpture, and engraved gems. This course is taught as part of the Yale–Cornell Consortium for the Study of Ancient Art, in conjunction with a course at Cornell University taught by Verity Platt. In March 2016, we will meet our Cornell colleagues in Washington, D.C., where we will attend the exhibition *Power and Pathos: Bronze Sculpture of the Hellenistic World*, and students will present their work to each other in an informal workshop. W 10:30–12:20

CLSS 868a/ARCG 569a/HSAR 569a, Living the Life of Nero: Megalomania and Making Great Art Diana Kleiner

Nero is Rome's most infamous emperor. Played with gusto by Peter Ustinov in *Quo Vadis*, Nero personifies Roman leadership at its most tyrannical. Nonetheless, the Roman Age of Nero witnessed an extraordinary efflorescence of art and architecture that set the stage for Rome's magisterial second century. Furthermore, in a society in which few names of artists and architects were recorded, the work of those of Nero's era (Severus, Celer, Fabullus, Zenodorus) is well documented and enhanced by new archaeological discoveries. Student projects focus on the fabled Domus Aurea, the alleged Tomb of Nero, Third- and Fourth-Style Roman wall painting, the legendary Colossus of Nero, and other Neronian portraiture. The commissioning of art by powerful elite Roman women and freedmen in the Neronian age is also explored, and there is emphasis on the possible correlation between megalomania and great art. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. T 1:30–3:20

CLSS 875a, Perspectives on Greek and Roman Narrative Egbert Bakker

This seminar is a critical study of a wide range of Greek and Roman narratives in a variety of literary genres through the combined lenses of narratology and the linguistics of tense and deixis. Students' projects explore typological features of narrative with an eye toward (1) the systematic differentiation of the various narrative genres, and (2) the ways in which such systematic linguistic-narratological analysis can inform literary interpretation.

CLSS 880b/PHIL 740b, Seneca on Society: The Treatise *On Benefits* Brad Inwood

All major ancient philosophers had well-developed views on social and political relations, and the treatise *On Benefits* is the most extensive Stoic work surviving on the topic. This sophisticated essay integrates Stoic ethical and political thought with ethics and philosophy of mind, situating it in the concrete social conditions of elite Roman culture in the first century C.E. Open to those reading in Latin (the Teubner text of Hosius is recommended) as well as in the English translation by Griffin and Inwood (University of Chicago Press, 2014), the seminar accommodates a variety of approaches (primarily philosophical, but also social-historical and literary).

CLSS 881a, Proseminar: Classical Studies Egbert Bakker

An introduction to the bibliography and disciplines of classical scholarship. Faculty address larger questions of method and theory, as well as specialized subdisciplines such

as linguistics, papyrology, epigraphy, paleography, and numismatics. Required of all entering graduate students.

CLSS 891b, *Translatio: Translation and the Classics* Emily Greenwood

This course examines translations of a wide range of Greek and Latin texts in the context of translation studies. As well as exploring the practice and theory of translation in ancient Greece and Rome, including the intersection of translation, tradition, and reception, we address modern texts that are literary classics in their own right, and which are also in some sense translations/adaptations/versions of Greek and Roman classics. Individual seminars focus on the translation of Homer, Sappho, Catullus, Horace, and Ovid, and topics for discussion include the dialogue between translations of Greco-Roman “classics” and theories of translation and gender; postcolonial translation; and intralingual translation. Against the backdrop of debates about what we lose from studying Classics in translation, this course is alert to what traditional philology gains from that study and from theorizing the activity of translation.

CLSS 898a, Graduate Latin Survey I Kirk Freudenburg

A survey of Latin literature from the earliest texts to the sixth century C.E., with the main focus on the period from the second century B.C.E. to the second century C.E. Diachronic, synchronic, generic, and topical models of organization. Prepares for the comprehensive examinations in Classics for those majoring in both literatures or concentrating on Latin. Prerequisite: at least two term courses in Latin numbered in the 400s.

CLSS 899b, Graduate Latin Survey II Irene Peirano Garrison

A continuation of CLSS 898a.

CLSS 900a/b, Directed Reading

By arrangement with faculty.

CLSS 910a/b, Directed Reading

By arrangement with faculty.

COMPARATIVE LITERATURE

451 College Street, Rm. 202, 203.432.2760

<http://complit.yale.edu>

M.A., M.Phil., Ph.D.

Chair

David Quint (*on leave* [Sp])

Acting Chair [Sp]

Martin Hägglund

Director of Graduate Studies

Ayesha Ramachandran [F]

Katerina Clark [Sp]

Professors Dudley Andrew, Katerina Clark, Roberto González Echevarría, Martin Hägglund, Hannan Hever (*on leave* [Sp]), Carol Jacobs, Rainer Nägele, David Quint (*on leave* [Sp]), Katie Trumpener, Jing Tsu

Associate Professor Moira Fradinger (*on leave* [Sp])

Assistant Professors Robyn Creswell (*on leave*), Marta Figlerowicz (*on leave*), David Gabriel, Ayesha Ramachandran (*on leave* [Sp])

Lecturers Peter Cole, Jan Hagens, Barbara Harshav

Emeritus Peter Brooks, Peter Demetz, Shoshana Feldman, Benjamin Harshav, Geoffrey Hartman, Michael Holquist

Affiliated Faculty Rolena Adorno (*Spanish & Portuguese*), R. Howard Bloch (*French*), Rüdiger Campe (*German*), Francesco Casetti (*Film & Media Studies*), Kang-I Sun Chang (*East Asian Languages & Literatures; on leave* [Sp]), Michael Denning (*American Studies*), Wai Chee Dimock (*English; on leave* [F]), Paul Fry (*English; on leave* [F]), Karsten Harries (*Philosophy; on leave* [Sp]), Pericles Lewis (*Yale-NUS College*), Tinu Lu (*East Asian Languages & Literatures*), John MacKay (*Slavic Languages & Literatures*), Giuseppe Mazzotta (*Italian*), Christopher L. Miller (*French*), Joseph Roach (*English*), Maurice Samuels (*French; on leave*), Henry Sussman (*Visiting; German*), Ruth Bernard Yeazell (*English*)

Fields of Study

The Department of Comparative Literature introduces students to the study and understanding of literature beyond linguistic or national boundaries; the theory, interpretation, and criticism of literature; and its interactions with adjacent fields like visual and material culture, linguistics, film, psychology, law, and philosophy. The comparative perspective invites the exploration of such transnational phenomena as literary or cultural periods and trends (Renaissance, Romanticism, Modernism, postcolonialism) or genres and modes of discourse. Students may specialize in any cultures or languages, to the extent that they are sufficiently covered at Yale. The Ph.D. degree qualifies the candidate to teach comparative literature as well as the national literature(s) of her or his specialization.

Special Admissions Requirements

Applicants must hold a B.A. or equivalent degree and should normally have majored in comparative literature, English, a classical or foreign literature, or in an interdepartmental major that includes literature. They must be ready to take advanced courses in two foreign literatures in addition to English upon admission. The GRE General Test is required. A ten- to twenty-page writing sample, written in English, should be submitted with the application.

Special Requirements for the Ph.D. Degree

Students must successfully complete fourteen term courses, including the departmental proseminar and at least six further courses listed under the departmental heading. The student's overall schedule must fulfill the following requirements: (1) at least one course in medieval or classical European literature, philology, or linguistics (or their equivalents in other cultures); one course in the Renaissance or Baroque (or equivalents); and one course in the modern period; (2) three courses in literary theory or methodology; (3) at least one course each in poetry, narrative fiction, and drama; (4) course work that deals with texts from three literatures, one of which may be English or American; and (5) a substantive focus on one or two national or language-based literatures. Any course may be counted for several requirements simultaneously.

Languages Literary proficiency in four languages (including English, at least one other modern language, and one classical or ancient language, such as Latin, Greek, Biblical Hebrew, Classical Arabic, Classical Chinese, Provençal). The fulfillment of this requirement will be demonstrated by a written exam consisting of a translation of a literary or critical text, to be held by the end of the sixth term; or by an equivalent level in the student's course work.

Orals An oral examination to be taken in the third year of studies, demonstrating both the breadth and specialization as well as the comparative scope of the student's acquired knowledge. The examination consists of six topics that include texts from at least three national literatures and several historical periods (at least one modern and one before the Renaissance). The texts discussed should also include representatives of the three traditional literary genres (poetry, drama, narrative fiction).

Ph.D. dissertation Supervised by a dissertation director (or directors) — at least one from the core or affiliate departmental faculty — and approved by the departmental faculty at large, the dissertation completes the degree. Its initial step is a dissertation prospectus, to be submitted and approved by the dissertation director and a standing faculty committee no later than halfway through the seventh term of study. Admission to candidacy for the Ph.D. is granted after six terms of residence and the completion of all requirements (courses, languages, orals, prospectus) except the dissertation.

Teaching Training in teaching, through teaching fellowships, is an important part of every student's program. Normally students will teach in their third and fourth years.

Combined Ph.D. Programs

COMPARATIVE LITERATURE AND CLASSICS

Course work Students concentrating in Comparative Literature and Classics are required to complete fourteen graduate term courses (plus the Classics proseminar). In Classics, at least seven courses, including the Classics proseminar and four courses (two year-long sequences) in the history of Greek and Latin literature (usually taken in successive years, each to be followed by the respective oral in that field) and two 800-level Classics seminars (generally taken in each term of the third year). In Comparative Literature, the departmental proseminar and at least five further Comparative Literature courses, including at least four courses in postclassical European literature. The course work across the two programs should also include at least two courses in literary theory or methodology, and at least one course each in poetry, narrative fiction, and drama. At least two courses, excluding directed readings, need to receive the grade of Honors. At least thirteen of the fifteen required courses are to be taken in the first two years; the last two, which must be Classics 800-level seminars, are to be taken in the third year, normally one in each term.

Languages To assess each student's proficiency and progress in both key languages, two sight translation examinations each in Greek and Latin (taken before the beginning of the first and third terms). During the first two years, literary proficiency, demonstrated in course work, in Greek, Latin, and English, as well as reading proficiency in German and one other modern language (usually French).

Orals *Classics*: Oral examinations in Greek and Latin literature, based on the Classics Ph.D. reading list. These are to be taken closely following the surveys in the respective literatures, as follows: the first, at the end of the second term (May of the first year), the second at the end of the fourth term (May of the second year). By the end of the fifth term, translation examinations in Greek and Latin literature, based on the Classics Ph.D. reading list. *Comparative Literature*: oral examination (six topics appropriate to both disciplines, balancing a range of kinds of topics and including poetry, narrative fiction, and drama, and at least one significant cluster of postclassical texts), to be taken by the middle of the sixth term. Lists will be worked out with individual examiners, primarily under the guidance of the Comparative Literature DGS, but also with the approval of the Classics DGS. One of the topics studied will be relevant to the student's planned dissertation topic.

Prospectus and dissertation The prospectus must be approved by the DGS in each department (and by the Comparative Literature prospectus committee) by the end of the sixth term in residence. At least one dissertation director must come from the Comparative Literature core faculty. At the end of each term, each dissertation student will presubmit, then discuss their work in progress in a Classics "chapter colloquium" discussion with interested faculty.

COMPARATIVE LITERATURE AND FILM AND MEDIA STUDIES

Applicants to the combined program must indicate on their application that they are applying both to the program in Film and Media Studies and to Comparative Literature. All documentation within the application should include this information.

Course work Students in the combined program are required to complete fifteen graduate term courses. In Comparative Literature, the proseminar and at least five further courses, including at least one course in literary theory or methodology beyond the proseminar; at least one course each in poetry, narrative fiction, and drama; two courses before 1900, including at least one before 1800; a wide range of courses with a focus on one or two national or language-based literatures; and at least two courses with the grade of Honors. In Film and Media Studies, two core seminars (FILM 601 and FILM 603) and four additional seminars.

Languages At least two languages (besides English) with excellent reading ability (normally one of these languages is French).

Orals Students must pass the Film and Media Studies oral examination. They must also pass the six-field Comparative Literature oral examination, with at least one examiner from the core Comparative Literature faculty; at least three fields involving literary topics, and readings including poetry, fiction, and drama; the other topics may be on film or film-related subjects; some lists may combine film and literature.

Prospectus and dissertation At least one dissertation director must be from Comparative Literature and at least one from Film and Media Studies (in some cases, a single adviser may fulfill both roles). The prospectus must be approved by the Comparative Literature subcommittee and ratified by the Film and Media Studies faculty. The dissertation must pass a presubmission Public Defense of Work (with at least one examiner from the graduate Film and Media Studies committee, and at least one member from Comparative Literature).

COMPARATIVE LITERATURE AND RENAISSANCE STUDIES

Course work Students are required to complete sixteen graduate term courses, at least seven of these (including the Comparative Literature proseminar) in the Department of Comparative Literature. Students must take at least ten courses in the field of Renaissance Studies (offered in several departments), including two terms of the Renaissance Studies core seminar and three courses in two disciplines other than literature (such as history, history of art, or religious studies). At least three of a student's overall list of courses must be in literary theory, criticism, or methodology; at least one course each in poetry, narrative fiction, and drama; and at least one course each in ancient or medieval literature and Enlightenment or modern literature. At least two courses must be completed with the grade of Honors. In general, students should take a wide range of courses with a focus on one or two national or language-based literatures.

Languages Latin and Italian, as set by Renaissance Studies—one hour of Renaissance Latin prose; one hour of sixteenth-century Italian prose, one of modern Italian scholarship—and two additional languages, at least one of them European.

Orals The joint oral examination will consist of seven twenty-minute questions (two topics in Renaissance literature from a comparative perspective; three on non-Renaissance literature, including at least one theoretical or critical question; and two questions on Renaissance topics in nonliterary disciplines). Orals should be completed no later than the end of the sixth term.

Prospectus and dissertation The prospectus should be completed in September of the fourth year. Procedures regarding the dissertation will follow departmental practice, although the final readers will normally include at least one member of the Renaissance Studies Executive Committee.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in Comparative Literature are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program may receive the M.A. upon completion of ten courses with at least two grades of Honors and a maximum of three grades of Pass, and the demonstration of proficiency in two of the languages, ancient or modern, through course work or departmental examinations. No student is admitted to a terminal M.A.

Program materials are available upon request to the Director of Graduate Studies, Department of Comparative Literature, Yale University, PO Box 208299, New Haven CT 06520-8299, or stacey.hampton@yale.edu.

Courses

CPLT 511b^U, Introduction to Theory of Literature Paul Fry

An examination of concepts and assumptions in contemporary views of literature. Theories of meaning, interpretation, and representation. Critical analysis of formalist, psychoanalytic, structuralist, poststructuralist, Marxist, and feminist approaches to theory and to literature. TTH 11:35–12:25

[**CPLT 515a, Proseminar in Comparative Literature** Offered every other year]

CPLT 517a^U/GMAN 605a^U, Interpretation and Authority Carol Jacobs

Close readings of works on problems of authority and interpretation by Sigmund Freud, Walter Benjamin, Roland Barthes, and Paul de Man. Exploration of their writing as a performance that questions simplistic notions of truth. Consideration of the problem of how to interpret texts that unsettle the very nature of interpretation. M 1:30–3:20

CPLT 530a^U/GMAN 619a^U, The Question of Form Carol Jacobs

The concept of art in relation to form and deformation. Starting with Plato (*The Republic*), we then trace its echoes in modern literature (Keats, Shelley, Hardy, Kleist, Kafka) and film (Godard, Egoyan, Dreyer, Sun Zhou, Wong Kar-Wai). W 1:30–3:20

CPLT 533b^U/GMAN 630b^U, Illegitimacy Kirk Wetters

Theoretical exploration of legitimacy as a fundamental historical, legal, and political concept; works by Weber, Schmitt, Blumenberg, and Luhmann. Literary readings on illegitimacy in the specific sense “born out of wedlock”; authors include Shakespeare, Goethe, Kleist, Dostoevsky, and Gide. W 3:30–5:20

CPLT 536b^U/GMAN 536b^U, Around Kafka Henry Sussman

Franz Kafka's writings viewed as a site for the radical questioning and dislocation of Western systems, institutions, and mores of the early twentieth century. Attention to

the shorter fiction, the novels, the letters, and their strategic interrelations; examination of the fields of knowledge, ideological presumptions, and aesthetic and cultural experiments that Kafka touched, and to some degree deranged, with his writing. W 1:30–3:20

CPLT 545a/EALL 803a, Sympathy and Its Limits Jing Tsu

It is said that the study of literature, unlike other disciplines, has the power to inspire and hone our capacity to feel for others. It trains us by putting us in hypothetical, affectively compelling but controlled worlds where we can experience, reflect, and analyze how we respond to those around us. This seminar tests that view by drawing on literary, social, archival, and theoretical texts, as well as modern accounts of atrocities and disasters in Western and non-Western contexts. Readings include Adam Smith, Lu Xun, Charles Darwin, Carlo Ginzburg, Mo Yan, Samantha Powers, Tokushi Kasahara, Yang Jisheng, Hannah Arendt, and Raul Hilberg. M 1:30–3:20

CPLT 575a^U/GMAN 558a^U/JDST 694a^U, Georg Lukács: Literature and Politics

Kirk Wetters, Hannan Hever

Lukács is presented through his complex and multifaceted development as a crucial and enigmatic figure, at once a leading Jewish intellectual and perhaps the most important of all twentieth-century Marxist theorists. Following the Second World War, while he was still alive, his legacy had already become polarized in terms of “young Lukács” vs. “old Lukács,” East vs. West, romantic vs. realist vs. modernist, revolutionary vs. reactionary. Though Lukács’s influence rose and fell in conjunction with the Cold War, key critical terms and methods (such as “reification”) survived and are very much a part of current political problems and contemporary critical approaches (e.g., Jameson, Moretti, Honneth). TH 1:30–3:20

CPLT 586b^U/GMAN 560b^U, Knowing Fiction Carol Jacobs

Fiction and related prose pieces in which the relationships between narration, fiction, understanding, and knowing play a critical role. Focus on works by Western writers of the nineteenth century through the present. The texts’ theoretical implications and implicit self-definitions; the import of concepts such as truth, fiction, self-consciousness, perception, science, and narrative. M 1:30–3:20

CPLT 589b^U/GMAN 645b^U, Walter Benjamin and the Modernization of Nineteenth-Century Paris Henry Sussman

The radical modernization of Paris under the Second Empire (1851–70) as seen through the eyes of Walter Benjamin. Focus on Benjamin’s *Arcades Project*, a compendium that charted developments such as Parisian mass transit and streamlined traffic, the construction of apartment houses, and the dissemination of mass media. Readings from other literary texts on the same events include works by Balzac, Zola, and Aragon. M 3:30–5:20

CPLT 595b/GMAN 677b/HSAR 644b, Passions, 1600–1800 Rüdiger Campe, Nicola Suthor

Theories of passion from Descartes, Spinoza, and Hobbes to Burke, Adam Smith, and Kant. The relationship between passion and its representation in art and literature: Alberti, Raphael, Rembrandt; Shakespeare; Poussin, Marino; Sandrart, LeBrun; Greuze, Diderot, Lessing, Goethe, and others. In the background, discussion of contemporary history and theory of emotion. T 1:30–3:20

CPLT 622a,b/AMST 622a/623b, Working Group on Globalization and Culture

Michael Denning

A continuing collective research project, a cultural studies “laboratory,” that has been running since the fall of 2003. The group, made up of graduate students and faculty from several disciplines, meets regularly to discuss common readings, to develop collective and individual research projects, and to present that research publicly. The general theme for the working group is globalization and culture, with three principal aspects: (1) the globalization of cultural industries and goods, and its consequences for patterns of everyday life as well as for forms of fiction, film, broadcasting, and music; (2) the trajectories of social movements and their relation to patterns of migration, the rise of global cities, the transformation of labor processes, and forms of ethnic, class, and gender conflict; (3) the emergence of and debates within transnational social and cultural theory. The specific focus, projects, and directions of the working group are determined by the interests, expertise, and ambitions of the members of the group, and change as its members change. There are a small number of openings for second-year graduate students. Students interested in participating should contact michael.denning@yale.edu. M 1:30–3:20

CPLT 629b^U/GMAN 563b^U/PHIL 645b^U, Nietzsche and His Readers Paul North

Reading and discussion of Friedrich Nietzsche’s major texts, as well as critiques and interpretations by some of his most influential twentieth-century readers. T 3:30–5:20

CPLT 672b/ENGL 672b, Milton John Rogers

This course studies Milton’s poetry and some of his controversial prose. We investigate the relation of the poetry to its historical contexts, focusing on the literary, religious, social, and political forces that shaped Milton’s verse. We survey and assess some of the dominant issues in contemporary Milton studies, examining the types of readings that psychoanalytic, feminist, Marxist, and historicist critics have produced. A brief oral report and a term paper (as well as a prospectus and preliminary bibliography for the term paper) required. T 9:25–11:15

CPLT 690a^U/JDST 838a^U/RLST 762a^U, Diaspora, Nationalism, and Sovereignty:**Introduction to Modern Hebrew Literature** Hannan Hever

An overview of the poetics, culture, history, and political dynamics of modern Hebrew literature over the past 250 years. No background in Jewish literature and Jewish culture is required. All readings are in English translation. W 3:30–5:20

CPLT 699a, Heidegger’s *Being and Time* Martin Hägglund

A systematic, chapter-by-chapter study of Heidegger’s *Being and Time*, arguably the most important work of philosophy of the twentieth century. All the major themes of the book are addressed in detail, with a particular emphasis on care, time, death, and the meaning of being. T 1:30–3:20

CPLT 716b^U/GMAN 730b^U/FILM 729b^U, New Waves: East/West Germany in Cold**War Europe** Katie Trumpener

Before 1961, Berlin was the best place in Europe to follow both Eastern and Western Europe’s emerging cinematic New Waves. And first in East, then in West Germany, young filmmakers developed distinctive approaches to political and documentary filmmaking, to the Nazi past and the Cold War, to class, gender, and social transformation.

This course juxtaposes the two German New Waves, focusing on aesthetic ferment, institutional barriers, and transformation. Features, documentaries, and experimental films by Gerhard Klein, Konrad Wolf, Alexander Kluge, Herbert Vesely, Edgar Reitz, Jean-Marie Straub and Danièle Huillet, Jürgen Böttcher, Heiner Carow, Frank Beyer, Wim Wenders, Rainer Werner Fassbinder, Helke Sander, Helke Misselwitz, read against other Eastern and Western New Wave films (i.e., by Lindsay Anderson, Karel Reisz, Andrzej Munk, Alain Resnais, Mikhail Kalatozov, Milos Forman). T 1:30–3:20

CPLT 734a/FREN 930a, Fact and Fiction in the Archives Alice Kaplan

The turn to archival research in French literary studies; theoretical and personal essays on the archive (Derrida, Davis, Farge, Coeuré); and fiction that includes archival digging as part of a larger investment in memory. We are interested in archival research both as a writer's practice and as a critic's scholarly activity. The focus this year is on Occupied France. Includes practical work with newspapers and archives, both paper and digital. Conducted in English. T 1:30–3:20

CPLT 787a^U/GMAN 600a^U, Novels of the Institution Rüdiger Campe

Close reading of novels of institutions – school, law court, administration, hospital – from ca. 1900. The shift of focus from the individual to the institution; consequences of this shift for the concept and form of the novel. Works by R. Walser, Joyce, Kafka, Musil, and Thomas Mann; readings in social and aesthetic theory by Simmel, Lukács, and Benjamin. T 1:30–3:20

CPLT 812a/HIST 563a/ITAL 600a/RNST 500a, The Renaissance in Italy

David Quint

An introduction to the Renaissance in Italy, focused on reading and analyzing key texts. TH 9:25–11:15

CPLT 840a/FILM 840a/GMAN 652a/HSAR 687a/RUSS 712a, Moscow/Berlin:

Leftist Avant-Gardes and Interwar Modernism Katerina Clark, Katie Trumpener

From 1918 to the mid-1930s, Moscow and Berlin were central gathering points for left-wing modernists. Each city developed its own modes of modernism, yet in sustained dialogue, given massive Russian emigration to Berlin after 1918, the Weimar obsession with early Soviet aesthetics (and cinema), intellectuals traveling in both directions, and the large-scale emigration of German leftists to the Soviet Union after 1933. And in the late 1940s and '50s, Soviet intellectuals (and German emigrants returning from Moscow) shaped a "late modernism" in East Berlin. Centered on literature and film, the course also considers a wide array of art forms (including painting, photography, architecture, music, and aesthetic theory). Works by modernists such as Eisenstein, Pudovkin, Vertov, Nabokov, Shklovsky, El Lissitzky, Rodchenko, Malevich, Tretiakov, Lukács, Moholy-Nagy, Benjamin, Brecht, Richter, Beckmann, Grosz, Heartfield, Höch, Lang, Döblin, Ruttman, Mies van der Rohe, Eisler, Busch, Konrad Wolf, Peter Weiss. T 1:30–3:20

CPLT 871a, Subjectivity, Fantasy, and Violence Moira Fradinger

This seminar interrogates psychoanalytic theories of subjectivity with a focus on the problem of aggressivity and violence. We investigate how violence has been thought through in key metapsychological and social texts written by Freud and by some of Freud's most influential commentators, especially coming from the French and the

Argentine schools. Authors include Jacques Lacan, Jean Laplanche, Jean-Bertrand Pontalis, Guy Rosolato, Georges Bataille, Gilles Deleuze, David Nasio, Néstor Braunstein. We closely read Freud's 1905 theory of the drives and its rewriting through the first two decades of the twentieth century, including the concept of the death drive and the Lacanian reformulation of enjoyment as "jouissance"; the articulation between violence, aggression, and narcissism as of 1914; the concept of psychic fantasy; and the theory of perversions, especially concerning the case of sadism. Readings include literary writers (such as the Marquis de Sade, L. von Sacher-Masoch, Alejandra Pizarnik on Erzsébet Báthory's life) whose articulation of the representation of violence and subjectivity has yielded much commentary within the psychoanalytic community. A list of foundational texts within the Freudian corpus will be posted as prerequisite readings before the start of the term. The seminar aims at giving students proficiency in using certain concepts belonging to what has been called "the language of psychoanalysis."

CPLT 900a, Directed Reading

CPLT 900b, Directed Reading

CPLT 901a, Individual Research

CPLT 901b, Individual Research

CPLT 914a/AMST 677a/ENGL 962a, Modern Drama and Mass Culture

Joseph Roach

Taking account of the genealogy of modern drama in eighteenth-century performance, this seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events from *Oroonoko* (1695) to *Oroonoko*, a new adaptation by Biyi Bandele (1999), and from *The Beggar's Opera* (1728) to *The Threepenny Opera* (1928). Topics include the transformation of classical genres into the *drame*, the commercialization of leisure through the mass-marketing of vicarious experience, and the emerging culture of celebrity. Critical readings include selections from the Frankfurt School, Walter Benjamin, Bertolt Brecht, Raymond Williams, Roland Barthes, and Jean Baudrillard. Plays are drawn from popular comedies, Sheridan to Shaw (*Pygmalion* and *My Fair Lady*), and long-running bourgeois dramas, beginning with Lillo's *The London Merchant*. Readings are supplemented by selected materials on theatrical production, acting, and management. W 9:25–11:15

CPLT 916a/FILM 830a/ITAL 590a, Literature into Film Millicent Marcus

We study a series of written works and their cinematic adaptations, considering first the texts in autonomous, literary terms, and then their transformation into audiovisual spectacles. In most cases we screen the film on Tuesday evening and do a comparative study in the Thursday class period, making extensive use of video clips to do close visual analysis of scenes in the light of their corresponding textual sources. Rather than develop a general theory of adaptation, we construct methodological approaches on an ad hoc basis, taking each instance of adaptation as a case study amenable to a variety of methodologies—psychoanalytic, feminist, ideological, generic, semiotic, and so forth. The class is conducted as a seminar, and active student participation is expected. There are two papers—one shorter one of a critical nature at midterm and a final research paper

(approximately 15–20 pages). Films examined include (tentatively) Pasolini's *Medea* and *Decameron*, the Tavianis' *Padre padrone*, Visconti's *Death in Venice*, Rosi's *Three Brothers*, Salvatores's *I'm Not Afraid*, and De Sica's *Two Women*. Writing assignments comprise 75 percent of the final grade and class participation 25 percent. TH 3:30–5:20, screenings T 7–10

CPLT 917a/FILM 601a, Films and Their Study Aaron Gerow

The course sets in place some undergirding for graduate students who want to anchor their film interest to something like the “professional discourse” of this field. A coordinated set of topics in film theory is interrupted first by the often discordant voice of history and second by the obtuseness of the films examined each week. As the title of this seminar is meant to convey, films themselves take the lead in our discussions. TTH 11:35–12:50

CPLT 925b^U, The Practice of Literary Translation Peter Cole

Intensive readings in the history and theory of translation paired with practice in translating. Case studies from ancient languages (the Bible, Greek and Latin classics), medieval languages (classical Arabic literature), and modern languages (poetic texts). T 1–2:50

CPLT 935a^U/FILM 755a^U, French Cinema through the New Wave Dudley Andrew

This seminar uses a sample of twenty films (with clips from many others) to survey four decades of the tradition of French cinema crowned by the privileged moment of the New Wave. Graduate students are asked to challenge the idea of “national cinema” by reporting on some non-canonical or marginal film before midterm. Keeping the culture industry in view, we question the extent to which such a consistently robust cinema has been bound to—or remained partly independent of—a nation that from 1930 to 1970 underwent a depression, a socialist experiment, an occupation, a liberation, and the humiliations of decolonization abroad and social unrest (May '68) at home. In addition to the midterm contribution, graduate students write a substantial term paper. MW 11:35–12:50, screenings T 7

CPLT 940b/SPAN 913b, Magical Realism and Its Sequels in Modern Latin American Fiction Roberto González Echevarría

The course concentrates on the major writers who practiced what is called “magical realism”—Alejo Carpentier, Gabriel García Márquez, Carlos Fuentes, and others—after studying the trend's antecedents in the colonial, post-independence, and early twentieth century. The role of Jorge Luis Borges in the beginnings of magical realism, the works of writers such as Miguel Ángel Asturias and Juan Rulfo, and those of more recent writers who rejected the trend, such as Roberto Bolaño and Fernando Vallejo. The considerable critical corpus on the topic is studied. In Spanish. W 3:30–5:20

COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

300 George Street, Suite 501, 203.737.6029

<http://cbb.yale.edu>

M.S., Ph.D.

Directors of Graduate Studies

Mark Gerstein (Bass 432A, 203.432.6105, mark.gerstein@yale.edu)

Hongyu Zhao (300 George St., Suite 503, 203.785.3613, hongyu.zhao@yale.edu)

Professors James Aspnes (*Computer Science*), Joseph Chang (*Statistics*), Ronald Coifman (*Mathematics; Computer Science*), Donald Engelman (*Molecular Biophysics & Biochemistry*), Alison Galvani (*Public Health*), Mark Gerstein (*Biomedical Informatics; Molecular Biophysics & Biochemistry; Computer Science*), Antonio Giraldez (*Genetics*), William Jorgensen (*Chemistry*), Douglas Kankel (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics; Ecology & Evolutionary Biology*), Haifan Lin (*Cell Biology; Genetics*), Elias Lolis (*Pharmacology*), Perry Miller (*Anesthesiology; Medical Informatics; Molecular, Cellular & Developmental Biology*), Andrew Miranker (*Molecular Biophysics & Biochemistry*), Anna Pyle (*Molecular Biophysics & Biochemistry*), Lynne Regan (*Molecular Biophysics & Biochemistry; Chemistry*), Gordon Shepherd (*Neuroscience*), Abraham Silberschatz (*Computer Science*), Dieter Söll (*Molecular Biophysics & Biochemistry; Chemistry*), Günter Wagner (*Ecology & Evolutionary Biology; on leave [F]*), Heping Zhang (*Public Health; Statistics*), Hongyu Zhao (*Public Health; Genetics*), Steven Zucker (*Computer Science; Electrical Engineering; Biomedical Engineering*)

Associate Professors Kei-Hoi Cheung (*Anesthesiology; Computer Science; Genetics*), Thierry Emonet (*Molecular, Cellular & Developmental Biology*), Steven Kleinstein (*Pathology*), Yuval Kluger (*Pathology*), Michael Krauthammer (*Pathology*), Jun Lu (*Genetics*), Steven Ma (*Public Health*), James Noonan (*Genetics*), Corey O'Hern (*Mechanical Engineering & Materials Science; Physics*), Valerie Reinke (*Genetics*), Jeffrey Townsend (*Public Health; on leave [F]*)

Assistant Professors Murat Acar (*Molecular, Cellular & Developmental Biology*), Chris Cotsapas (*Neurology*), Forrest Crawford (*Public Health*), Anita Wang (*Public Health*)

Fields of Study

Computational biology and bioinformatics (CB&B) is a rapidly developing multidisciplinary field. The systematic acquisition of data made possible by genomics and proteomics technologies has created a tremendous gap between available data and their biological interpretation. Given the rate of data generation, it is well recognized that this gap will not be closed with direct individual experimentation. Computational and theoretical approaches to understanding biological systems provide an essential vehicle to help close this gap. These activities include computational modeling of biological processes, computational management of large-scale projects, database development and data mining, algorithm development, and high-performance computing, as well as statistical and mathematical analyses.

To enter the Ph.D. program, students apply to an interest-based track within the interdepartmental program in the Biological and Biomedical Sciences.

Special Admissions Requirements

Applicants are expected (1) to have a strong foundation in the basic sciences, such as biology, chemistry, and mathematics, and (2) to have training in computing/informatics, including significant computer programming experience. The Graduate Record Examination (GRE) General Test is required, and the GRE Subject Test in cell and molecular biology, biology, biochemistry, chemistry, computer science, or other relevant discipline is recommended. Alternatively, the Medical College Admission Test (MCAT) may be substituted for the GRE tests. Applicants for whom English is not their native language are required to submit results from the Test of English as a Foreign Language (TOEFL).

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to one of the interest-based tracks of the Biological and Biomedical Sciences program may simultaneously apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Special Requirements for the Ph.D. Degree

With the help of a faculty advisory committee, each student plans a program that includes courses, seminars, laboratory rotations, and independent reading. Students are expected to gain competence in three core areas: (1) computational biology and bioinformatics, (2) biological sciences, and (3) informatics (including computer science, statistics, and applied mathematics). While the courses taken to satisfy the core areas of competency may vary considerably, all students are required to take the following courses: CB&B 562a, 740a, and 752b. A typical program will include ten courses. Completion of the core curriculum will typically take three to four terms, depending in part on the prior training of the student. With approval of the CB&B director of graduate studies (DGS), students may take one or two undergraduate courses to satisfy areas of minimum expected competency. Students will typically take two to three courses each term and three research rotations (CB&B 711a, 712b, 713b) during the first year. After the first year, students will start working in the laboratory of their Ph.D. thesis supervisor. Students must pass a qualifying examination normally given at the end of the second year or the beginning of the third year. There is no language requirement. Students will serve as teaching assistants in two term courses. In addition to all other requirements, students must successfully complete CB&B 601b, Fundamentals of Research: Responsible Conduct of Research (or another course that covers the material) prior to the end of their first year of study. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

M.D./Ph.D. Students

Students pursuing the joint M.D./Ph.D. degrees must satisfy the course requirements listed above for Ph.D. students. With approval of the DGS, some courses taken toward the M.D. degree can be counted toward the ten required courses. Such courses must have a graduate course number, and the student must register for them as graduate courses (in which grades are received). The details of the School of Medicine curriculum had not been determined at the time of publication. Laboratory rotations are available but not required. One teaching assistantship is required.

Master's Degree

M.S. (en route to the Ph.D.) To qualify for the awarding of the M.S. degree a student must (1) complete two years (four terms) of study in the Ph.D. program, with ten required courses taken at Yale, (2) complete the required course work for the Ph.D. program with an average grade of High Pass or higher, (3) successfully complete three research rotations, and (4) meet the Graduate School's Honors requirement.

Terminal Master's Degree Program The CB&B terminal master's program has limited availability and is intended primarily for postdoctoral fellows supported by training grants and for students with sponsored funding, e.g., from industry. The curriculum requirements are the same as in the CB&B Ph.D. program, except that there are no requirements for laboratory research rotations, for serving as a teaching assistant, and for a Ph.D. dissertation. Terminal M.S. students will be expected to complete an M.S. project, including a project report. Completion of the terminal M.S. degree will typically take four terms of full-time study. Applicants should contact the CB&B registrar before submitting an M.S. application.

Courses

CB&B 562a/AMTH 765a/ENAS 561a/MB&B 562a^U/MCDB 562a^U/PHYS 562a,

Dynamical Systems in Biology Damon Clark, Jonathon Howard

This course covers advanced topics in computational biology. How do cells compute, how do they count and tell time, how do they oscillate and generate spatial patterns? Topics include time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form; mechanics of cell shape and motion; spatially heterogeneous processes; diffusion. Prerequisite: MCDB 561b or equivalent, or a 200-level biology course, or permission of the instructor. TTH 2:30–3:45

CB&B 601b/IBIO 601b, Fundamentals of Research: Responsible Conduct of

Research Alfred Bothwell and faculty

A weekly seminar presented by faculty trainers on topics relating to proper conduct of research. Required for first-year CB&B students, first-year Immunobiology students, and training grant-funded postdocs. Pass/Fail. T 5

[CB&B 645b/BIS 692b/STAT 645b, Statistical Methods in Genetics and Bioinformatics]

CB&B 647b/BIS 645b/GENE 645b, Statistical Methods in Human Genetics

Hongyu Zhao, Kenneth Kidd

Probability modeling and statistical methodology for the analysis of human genetics data are presented. Topics include population genetics, single locus and polygenic inheritance, linkage analysis, quantitative trait analysis, association analysis, haplotype analysis, population structure, whole genome genotyping platforms, copy number variation, pathway analysis, and genetic risk prediction models. Prerequisites: genetics; BIS 505a and b; STAT 541a or equivalent; or permission of the instructor.

CB&B 711a, 712b, 713b, Lab Rotations Hongyu Zhao

Three 2.5–3-month research rotations in faculty laboratories are required during the first year of graduate study. These rotations are arranged by each student with individual faculty members.

CB&B 740a, Clinical and Translational Informatics Richard Shiffman,

Michael Krauthammer

The course provides an introduction to clinical and translational informatics. Topics include (1) overview of biomedical informatics, (2) design, function, and evaluation of clinical information systems, (3) clinical decision making and practice guidelines, (4) clinical decision support systems, (5) informatics support of clinical research, (6) privacy and confidentiality of clinical data, (7) standards, (8) issues in defining the clinical phenotype, and (9) topics in translational bioinformatics. Permission of the instructor required.

CB&B 752b/CPSC 752b^U/MB&B 752b^U/MCDB 752b^U, Bioinformatics: Practical**Application of Simulation and Data Mining** Mark Gerstein

Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. Specific topics to be covered include sequence alignment, large-scale processing, next-generation sequencing data, comparative genomics, phylogenetics, biological database design, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, normalization of microarray data, mining of functional genomics data sets, and machine-learning approaches to data integration. Prerequisites: biochemistry and calculus, or permission of the instructor. MW 1–2:15

Additional courses focused on the biological sciences and on areas of informatics are selected by the student in consultation with CB&B faculty.

COMPUTER SCIENCE

A. K. Watson Hall, 203.432.1246

<http://cpsc.yale.edu>

M.S., M.Phil., Ph.D.

Chair

Joan Feigenbaum

Director of Graduate Studies

Vladimir Rokhlin (108 AKW, 203.432.1283, vladimir.rokhlin@yale.edu)

Professors Dana Angluin, James Aspnes, Dirk Bergeman (*Economics*), Julie Dorsey, Stanley Eisenstat, Joan Feigenbaum, Michael Fischer, David Gelernter, Mark Gerstein (*Molecular Biophysics & Biochemistry*), Drew McDermott, Vladimir Rokhlin, Holly Rushmeier, Brian Scassellati, Martin Schultz (*Emeritus*), Zhong Shao, Avi Silberschatz, Daniel Spielman, Yang Richard Yang, Steven Zucker

Associate Professor Daniel Abadi

Assistant Professors Ruzica Piskac, Frederick Shic (*Child Study Center*)

Senior Lecturer Stephen Slade

Lecturers Donya Quick, Ewa Syta [Sp], Kate Tsui [F]

Fields of Study

Artificial intelligence (vision, robotics, planning, computational neuroscience, knowledge representation, neural networks); programming languages (functional programming, parallel languages and architectures, programming environments, formal semantics, compilation techniques, modern computer architecture, type theory/systems, and meta-programming); systems (databases, operating systems, networks, software engineering); scientific computing (numerical linear algebra, numerical solution of partial differential equations, mathematical software, parallel algorithms); theory of computation (algorithms and data structures, complexity, distributed systems, learning, online algorithms, graph algorithms, geometric algorithms, fault tolerance, reliable communication, cryptography, security, and electronic commerce); and topics of discrete mathematics with application to computer science (combinatorics, graph theory, combinatorial optimization).

Research Facilities

The department operates a high-bandwidth, local-area computer network based mainly on distributed workstations and servers, with connections to worldwide networks. Workstations include Dell dual-processor PCs (running Linux or Windows/XP). Laboratory contains specialized equipment for graphics, vision, and robotics research. Various printers, including color printers, as well as image scanners, are also available. The primary educational facility consists of thirty-seven PC workstations supported by a large

Intel PC server. This facility is used for courses and unsponsored research by Computer Science majors and first-year graduate students. Access to computing, through both the workstations and remote login facilities, is available to everyone in the department.

Special Admissions Requirements

Applicants for admission should have strong preparation in mathematics, engineering, or science. They should be competent in programming but need no computer science beyond that basic level. The GRE General Test and a pertinent Subject Test are required.

Special Requirements for the Ph.D. Degree

There is no foreign language requirement. To be admitted to candidacy, a student must (1) pass ten courses (including CPSC 690 and CPSC 691) with at least two grades of Honors, the remainder at least High Pass, including three advanced courses in an area of specialization; (2) take six advanced courses in areas of general computer science; (3) successfully complete a research project in CPSC 690, 691, and submit a written report on it to the faculty; (4) pass a qualifying examination in an area of specialization; (5) be accepted as a thesis student by a regular department faculty member; (6) serve as a teaching assistant for two terms at the level of TF-10; and (7) submit a written dissertation prospectus, with a tentative title for the dissertation. To satisfy the distribution requirement (requirement 2 above), the student must take one course in programming languages or systems, one programming-intensive course, two theory courses, and two in application areas. In order to gain teaching experience, all graduate students are required to serve as teaching assistants for two terms during their first three years of study. All requirements for admission to candidacy must be completed prior to the end of the third year. In addition to all other requirements, students must successfully complete CPSC 991, Ethical Conduct of Research, prior to the end of their first year of study. This requirement must be met prior to registering for a second year of study.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. (en route to the Ph.D.) To qualify for the M.S., the student must pass eight courses at the 500 level or above from an approved list. An average grade of at least High Pass is required, with at least one grade of Honors.

Terminal Master's Degree Program Students may also be admitted to a terminal master's degree program directly. The requirements are the same as for the M.S. en route to the Ph.D. This program is normally completed in one year, but a part-time program may be spread over as many as four years.

A brochure providing additional information about the department, faculty, courses, and facilities is available from the Graduate Coordinator, Department of Computer Science, Yale University, PO Box 208285, New Haven CT 06520-8285; e-mail, cs-admissions@cs.yale.edu.

Courses

[CPSC 521b^U, **Compilers and Interpreters**]

CPSC 522a^U, Operating Systems Zhong Shao

The design and implementation of operating systems. Topics include synchronization, deadlocks, process management, storage management, file systems, security, protection, and networking.

CPSC 523b^U, Principles of Operating Systems Avi Silberschatz

A survey of the underlying principles of modern operating systems. Topics include process management, memory management, storage management, protection and security, distributed systems, and virtual machines. Emphasis on fundamental concepts rather than implementation.

CPSC 524b^U, Parallel Programming Techniques Andrew Sherman

Practical introduction to parallel programming, emphasizing techniques and algorithms suitable for scientific and engineering computations. Aspects of processor and machine architecture. Techniques such as multithreading, message passing, and data parallel computing using graphics processing units. Performance measurement, tuning, and debugging of parallel programs. Parallel file systems and I/O.

[CPSC 526a^U, **Building Decentralized Systems**]

CPSC 527b^U, Object-Oriented Programming Michael Fischer

Object-oriented programming as a means to efficient, reliable, modular, reusable code. Use of classes, derivation, templates, name-hiding, exceptions, polymorphic functions, and other features of C++.

[CPSC 528a^U, **Language-Based Security**]

[CPSC 530a^U, **Formal Semantics**]

[CPSC 531b^U, **Computer Music: Algorithmic and Heuristic Composition**]

CPSC 532b^U, Computer Music: Sound Representation and Synthesis Donya Quick

Study of the theoretical and practical fundamentals of computer-generated music, with a focus on low-level sound representation, acoustics and sound synthesis, scales and tuning systems, and programming languages for computer music generation. Theoretical concepts are supplemented with pragmatic issues expressed in a high-level programming language. Prerequisite: ability to read music.

CPSC 533b^U, Computer Networks Richard Yang

An introduction to the design, implementation, analysis, and evaluation of computer networks and their protocols. Topics include layered network architectures, applications, transport, congestion, routing, data link protocols, local area networks, performance analysis, multimedia networking, network security, and network management. Emphasis on protocols used in the Internet.

[CPSC 534a^U, **Mobile Computing and Wireless Networking**]

[CPSC 535b^U, Internet-Scale Applications]**[CPSC 536a^U/ENAS 960a^U, Networked Embedded Systems and Sensor Networks]****CPSC 537a^U, Introduction to Databases** Avi Silberschatz

An introduction to database systems. Data modeling. The relational model and the SQL query language. Relational database design, integrity constraints, functional dependencies, and natural forms. Object-oriented databases. Implementation of databases: file structures, indexing, query processing, transactions, concurrency control, recovery systems, and security.

CPSC 538b^U, Database System Implementation and Architectures Daniel Abadi

A study of systems programming techniques, with a focus on database systems. In the first half of the term, students analyze the design of a traditional DBMS and build components of a DBMS prototype, e.g., a catalog-manager, a buffer-manager, and a query execution engine. In the second half, students examine nontraditional architectures such as parallel databases, data warehouses, stream databases, and Web databases.

CPSC 539b^U, Software Engineering Ruzica Piskac

Introduction to building a large software system in a team. Learning how to collect requirements and write a specification. Project planning and system design. Increasing software reliability: debugging, automatic test generation. Introduction to type systems, static analysis, and model checking.

CPSC 540b^U, Numerical Computation Vladimir Rokhlin

Algorithms for numerical problems in the physical, biological, and social sciences: solution of linear and nonlinear systems of equations, interpolation and approximation of functions, numerical differentiation and integration, optimization.

CPSC 545a^U, Introduction to Data Mining Vladimir Rokhlin

A study of algorithms and systems that allow computers to find patterns and regularities in databases, to perform prediction and forecasting, and to improve their performance generally through interaction with data. MW 1–2:15

CPSC 554a^U, Software Analysis and Verification Ruzica Piskac

Introduction to concepts, tools, and techniques used in the formal verification of software. State-of-the-art tools used for program verification; detailed insights into algorithms and paradigms on which those tools are based, including model checking, abstract interpretation, decision procedures, and SMT solvers.

[CPSC 555a^U/ECON 563a, Economics and Computation]**CPSC 557b^U, Sensitive Information in a Wired World** Ewa Syta

Issues of ownership, control, privacy, and accuracy of the huge amount of sensitive information about people and organizations that is collected, stored, and used by today's ubiquitous information systems. Readings consist of research papers that explore both the power and the limitations of existing privacy-enhancing technologies such as encryption and "trusted platforms."

CPSC 558a^U, Automated Decision Systems Stephen Slade

People make dozens of decisions every day in their personal and professional lives. What would it mean for you to trust a computer to make those decisions for you? It is likely that many of those decisions are already informed, mediated, or even made by computer systems. Explicit examples include dating sites like match.com or recommendation systems such as Amazon or Netflix. Most Internet ads on sites like Google or Facebook are run by real-time-bidding (RTB) systems that conduct split-second auctions in the hopes of getting your attention. Driverless cars offer the promise of safer highways. Corporations and other enterprises invest in decision support systems to improve the quality of their products and services. This course considers the spectrum of automated decision models and tools, examining their costs and effectiveness. Examples come from a variety of fields including finance, risk management, credit-card fraud, robotics, medicine, and politics.

[CPSC 562a^U/AMTH 562a^U, Graphs and Networks]**CPSC 565a^U, Theory of Distributed Systems** James Aspnes

Models of asynchronous distributed computing systems. Fundamental concepts of concurrency and synchronization, communication, reliability, topological and geometric constraints, time and space complexity, and distributed algorithms.

CPSC 567a^U, Cryptography and Computer Security Michael Fischer

A survey of such private and public key cryptographic techniques as DES, RSA, and zero-knowledge proofs, and their application to problems of maintaining privacy and security in computer networks. Focus on technology, with consideration of such societal issues as balancing individual privacy concerns against the needs of law enforcement, vulnerability of societal institutions to electronic attack, export regulations and international competitiveness, and development of secure information systems.

CPSC 568b^U, Computational Complexity Joan Feigenbaum

Introduction to the theory of computational complexity. Basic complexity classes, including polynomial time, nondeterministic polynomial time, probabilistic polynomial time, polynomial space, logarithmic space, and nondeterministic logarithmic space. The roles of reductions, completeness, randomness, and interaction in the formal study of computation.

[CPSC 569a^U, Randomized Algorithms]**CPSC 570a^U, Artificial Intelligence** Drew McDermott

Introduction to artificial intelligence research, focusing on reasoning and perception. Topics include knowledge representation, predicate calculus, temporal reasoning, vision, robotics, planning, and learning. MWF 10:30–11:20

[CPSC 571a^U, Topics in Artificial Intelligence]**CPSC 572a^U, Intelligent Robotics** Kate Tsui

Introduction to the construction of intelligent, autonomous systems. Sensory-motor coordination and task-based perception. Implementation techniques for behavior selection and arbitration, including behavior-based design, evolutionary design, dynamical systems, and hybrid deliberative-reactive systems. Situated learning and adaptive behavior.

CPSC 573b^U, Intelligent Robotics Laboratory Brian Scassellati**CPSC 575a^U/ENAS 575a^U, Computational Vision and Biological Perception**

Steven Zucker

An overview of computational vision with a biological emphasis. Suitable as an introduction to biological perception for computer science and engineering students, as well as an introduction to computational vision for mathematics, psychology, and physiology students. MW 2:30–3:45

[CPSC 576b^U/AMTH 667b/ENAS 576b^U, Advanced Computational Vision]**CPSC 578a^U, Computer Graphics** Holly Rushmeier

Introduction to the basic concepts of two- and three-dimensional computer graphics. Topics include affine and projective transformations, clipping and windowing, visual perception, scene modeling and animation, algorithms for visible surface determination, reflection models, illumination algorithms, and color theory.

CPSC 579b^U, Advanced Topics in Computer Graphics Julie Dorsey

An in-depth study of advanced algorithms and systems for rendering, modeling, and animation in computer graphics. Topics vary and may include reflectance modeling, global illumination, subdivision surfaces, NURBS, physically based fluids systems, and character animation.

CPSC 662a/AMTH 561a, Spectral Graph Theory Daniel Spielman

An applied approach to spectral graph theory. The combinatorial meaning of the eigenvalues and eigenvectors of matrices associated with graphs. Applications to optimization, numerical linear algebra, error-correcting codes, computational biology, and the discovery of graph structure.

[CPSC 671a, Advanced Artificial Intelligence]**CPSC 679b, Computational Issues in 3-D Design and Fabrication** Holly Rushmeier

This course focuses on computational methods for designing and fabricating 3-D objects. The course considers the data structures and algorithms for the complete process, from specifying physical source material to the production of a new physical object. The process begins with obtaining the shapes of existing 3-D objects in digital form using active 3-D scanning or photogrammetry. The digital shape is then edited with a variety of local operators and global filters. The shape description is then prepared for input to a numerically controlled machine. Production by various means is considered, including fused deposition modeling (FDM), milling, and laser cutting. MW 4–5:15

CPSC 690a or b, Independent Project I

By arrangement with faculty.

CPSC 691a or b, Independent Project II

By arrangement with faculty.

CPSC 692a or b, Independent Project

Individual research for students in the M.S. program. Requires a faculty supervisor and the permission of the director of graduate studies.

[CPSC 721b, Advanced Programming Language Topics]**CPSC 752b^U/CB&B 752b/MB&B 752b^U/MCDB 752b^U, Bioinformatics: Practical****Application of Simulation and Data Mining** Mark Gerstein

Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. Specific topics to be covered include sequence alignment, large-scale processing, next-generation sequencing data, comparative genomics, phylogenetics, biological database design, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, normalization of microarray data, mining of functional genomics data sets, and machine-learning approaches to data integration. Prerequisites: biochemistry and calculus, or permission of the instructor. MW 1–2:15

CPSC 800a or b, Directed Readings

By arrangement with faculty.

CPSC 991a/MATH 991a, Ethical Conduct of Research Vladimir Rokhlin

EAST ASIAN LANGUAGES AND LITERATURES

308 Hall of Graduate Studies, 203.432.2860

<http://call.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Tina Lu

Director of Graduate Studies

Aaron Gerow

Professors Kang-i Sun Chang (*on leave* [Sp]), Aaron Gerow, Edward Kamens, Tina Lu, Jing Tsu

Assistant Professors William Fleming (*on leave* [F]), Michael Hunter, Seth Jacobowitz (*on leave*)

Senior Lecturer Pauline Lin

Senior Lectors Hsiu-hsien Chan, Min Chen, Seungja Choi, Koichi Hiroe, Angela Lee-Smith, Rongzhen Li, Ninghui Liang, Fan Liu, Yoshiko Maruyama, Ling Mu, Michiaki Murata, Hiroyo Nishimura, Masahiko Seto, Jianhua Shen, Mari Stever, Wei Su, Haiwen Wang, Yu-lin Wang Saussy, Peisong Xu, William Zhou

Lectors Fuyang Peng, Aoi Saito, Chuanmei Sun

Fields of Study

Fields for doctoral study are Chinese literature and Japanese literature. (See also the Combined Ph.D. Program in Film and Media Studies.) Although the primary emphasis is on these East Asian subjects, the department welcomes applicants who are seeking to integrate their interests in Chinese or Japanese literature with interdisciplinary studies in such fields as history, history of art, linguistics, religious studies, comparative literature, film and media studies, theater studies, literary theory and criticism, and the social sciences.

Special Admissions Requirements

The department requires entering students in Chinese or Japanese (and the Combined Program in Film and Media Studies) to have completed at least three years of study, or the equivalent, of either Chinese or Japanese. Students applying in Chinese are expected to have completed at least one year of literary Chinese. Students applying in premodern Japanese are expected to have completed at least one year of literary Japanese. This is a doctoral program; no students are admitted for terminal master's degrees.

Special Requirements for the Ph.D. Degree

During the first three years of study, students are required to take at least fourteen term courses. Usually students complete twelve term courses in the first and second years, and then take two tutorials or two seminars in the third year. Students concentrating in

Chinese or Japanese literature are encouraged to take at least one term course in Western literature or literary theory. By the end of the second year, all students must prove their proficiency in a language other than their primary language of study that is relevant to their course of study and is approved by the director of graduate studies (DGS). By the end of the third year, students specializing in premodern Japanese literature must pass a reading test in literary Chinese. At the end of the second full academic year, the student must take a written examination in the language of his or her specialization, including both its modern and premodern forms.

At the end of each academic year, until a student is admitted to candidacy, a faculty committee will review the student's progress. For the second-year review, the student must submit a revised seminar research paper, on a topic selected in consultation with the adviser, no later than April 1 of the fourth term. No later than the end of the sixth term the student will take the qualifying oral examination. The exam will cover three fields distinguished by period and/or genre in one or more East Asian national literatures or in other fields closely related to the student's developing specialization. These fields and accompanying reading lists will be selected in consultation with the examiners and the director of graduate studies in order to allow the student to demonstrate knowledge and command of a range of topics. After having successfully passed the qualifying oral examination, students will be required to submit a dissertation prospectus to the department for approval by October 1 of the seventh term in order to complete the process of admission to candidacy for the Ph.D.

Opportunities to obtain experience in teaching language and literature form an important part of this program. Students in East Asian Languages and Literatures normally teach in their third and fourth years in the Graduate School.

Combined Ph.D. Program

The Department of East Asian Languages and Literatures also offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. in East Asian Languages and Literatures and Film and Media Studies. For further details, see Film and Media Studies. Applicants to the combined program must indicate on their application that they are applying both to Film and Media Studies and to East Asian Languages and Literatures. All documentation within the application should include this information.

Master's Degrees

M.Phil. The successful completion of all predissertation requirements, including the qualifying examination, will make a student eligible for an M.Phil. degree.

M.A. (en route to the Ph.D.) The successful completion of twelve term courses and languages required in the first two years of study will make a student eligible for an M.A. degree.

Additional program materials are available at the department Web site, <http://eal.yale.edu>.

Courses

Courses in Chinese, Japanese, and Korean languages at the elementary, intermediate, and advanced levels are listed in *Yale College Programs of Study*.

CHNS 512b^U, Ancient Chinese Thought Michael Hunter

An introduction to the foundational works of ancient Chinese thought, from the ruling ideologies of the earliest historical dynasties through the diverse writings of the Warring States “masters” and including intellectual developments under the Qin and Han empires. TTH 11:35–12:50

CHNS 570a^U, Introduction to Literary Chinese I Michael Hunter

Reading and interpretation of texts in various styles of literary Chinese (*wenyan*), with attention to basic problems of syntax and literary style. Prerequisite: CHNS 151b or 153b or equivalent. TTH 9–10:15

CHNS 571b^U, Introduction to Literary Chinese II Pauline Lin

Continuation of CHNS 570a. Reading and interpretation of texts in various styles of literary Chinese (*wenyan*), with attention to basic problems of syntax and literary style. Prerequisite: CHNS 570a or equivalent. MW 11:35–12:50

EALL 503b^U, *The Tale of Genji* Edward Kamens

A reading of the central work of prose fiction in the Japanese classical tradition in its entirety (in English translation) along with some examples of predecessors, parodies, and adaptations (the latter include Noh plays and twentieth-century short stories). Topics of discussion include narrative form, poetics, gendered authorship and readership, and the processes and premises that have given *The Tale of Genji* its place in world literature. Attention is also given to the text’s special relationship to visual culture. TTH 2:30–3:45

EALL 511a^U, Women and Literature in Traditional China Kang-i Sun Chang

This course focuses on major women writers in traditional China, as well as representations of women by male authors. Topics include the power of women’s writing; women and material culture; women in exile; courtesans; Taoist and Buddhist nuns; widow poets; the cross-dressing women; the female body and its metaphors; foot binding and its implications; women’s notion of love and death; the aesthetic of illness; women and revolution; women’s poetry clubs; the function of memory in women’s literature; problems of gender and genre. All readings in translation; no knowledge of Chinese required. Some Chinese texts provided for students who read Chinese. TTH 1–2:15

EALL 571a^U/FILM 881a^U, Japanese Cinema after 1960 Aaron Gerow

The development of Japanese cinema after the breakdown of the studio system, through the revival of the late 1990s, to the present. MW 2:30–3:45, screenings M 7

EALL 580b^U/FILM 872b^U, East Asian Martial Arts Cinema Aaron Gerow

An investigation of the martial arts films of East Asia (Japan, China, Hong Kong, Korea, Taiwan), including the samurai film, kung-fu and karate film, and wuxia film, and the roles they play in constructing nationalism and transnationalism, gender, stardom, spirituality, and mediativity. MW 2:30–3:45, screenings T 7

EALL 600b^U, Sinological Methods Pauline Lin

A research course in Chinese studies, designed for students with background in modern and literary Chinese. Exploration and evaluation of the wealth of primary sources and research tools available in Chinese. For native speakers of Chinese, introduction to the secondary literature in English and instruction in writing professionally in English on topics about China. Topics include the compilation and development of Chinese bibliographies; bibliophiles' notes; editions, censorship, and textual variation and reliability; specialized dictionaries; maps and geographical gazetteers; genealogies and biographical sources; archaeological and visual materials; and major Chinese encyclopedias and compendia. TH 2:30–4:20

EALL 603a^U, Readings in Classical Chinese Poetry Kang-i Sun Chang

Focus on fundamentals of classical Chinese poetry and poetics. Topics include poetry and cultural history, intertextuality, poetics of lyricism, etc. Because readings are different each year, this course may be repeated for credit. Readings in Chinese, discussion in English. Prerequisite: CHNS 571b or equivalent, or permission of the instructor. W 1:30–3:20

EALL 618a, *The Dream of the Red Chamber* Tina Lu

Close reading of the eighteenth-century Chinese novel *The Dream of the Red Chamber* in the original, with focus on nineteenth-century commentaries. The class culminates in the group translation of at least two classical-language commentaries. T 2:30–4:30

EALL 651a^U, Advanced Readings: Modern Chinese Literature Jing Tsu

A rigorous introduction to literary criticism and analysis using texts in the original language. Focus on the contemporary period, drawing from fiction written in Chinese in different parts of the world, from mainland China to Taiwan and from Malaysia to Hong Kong. Texts in both simplified and traditional characters. Topic for 2015: Lu Xun. M 9:25–11:15

EALL 740b, Topics in Early Chinese Literature Michael Hunter

An examination of key texts and problems in the study of early Chinese literature. Primary sources vary from year to year but could include the Shijing, Chuci, Shiji, early sources of anecdotal literature, and the fu. Discussions and papers are in English. This course may be repeated for credit. W 9:25–11:15

EALL 772a/HIST 891a, Readings in the Intellectual History and Political Thought of the Qing Dynasty Annping Chin

The course focuses on the historical and political writings in China's last dynasty. The readings include the works of reformers, intellectual historians, and political theorists, from the beginning of the Qing (Huang Zongxi and Gu Yanwu), through the middle period (Dai Zhen and Zhang Xuecheng), to its conclusion (Wei Yuan, Yan Fu, Kang Youwei, and Liang Qichao). Readings in Chinese and English. M 3:30–5:20

EALL 803a/CPLT 545a, Sympathy and Its Limits Jing Tsu

It is said that the study of literature, unlike other disciplines, has the power to inspire and hone our capacity to feel for others. It trains us by putting us in hypothetical, affectively compelling but controlled worlds where we can experience, reflect, and analyze how we respond to those around us. This seminar tests that view by drawing on literary, social,

archival, and theoretical texts, as well as modern accounts of atrocities and disasters in Western and non-Western contexts. Readings include Adam Smith, Lu Xun, Charles Darwin, Carlo Ginzburg, Mo Yan, Samantha Powers, Tokushi Kasahara, Yang Jisheng, Hannah Arendt, and Raul Hilberg. M 1:30–3:20

EALL 900, Directed Readings

Offered by permission of instructor and DGS to meet special needs not met by regular courses.

EALL 990, Directed Research

Offered as needed with permission of instructor and DGS for student preparation of dissertation prospectus.

JAPN 570a^U, Introduction to Literary Japanese Edward Kamens

Introduction to the grammar and style of the premodern literary language (*bungotai*) through a variety of texts. Prerequisite: JAPN 151 or equivalent. MWF 9:25–10:15

JAPN 571b^U, Readings in Literary Japanese William Fleming

Close analytical reading of a selection of texts from the Nara through Tokugawa period: prose, poetry, and various genres. Introduction of *kanbun*. Prerequisite: JAPN 570a or equivalent. MW 9–10:15

JAPN 707a, Readings in *Genji monogatari* Edward Kamens

Close study of selected chapters and consultation in a variety of commentaries and critiques. Students carry out research projects on topics of their choice. Prerequisite: at least one year of study of literary (classical) Japanese or the equivalent. T 9:25–11:15

JAPN 708b, Early Modern Japanese Literature William Fleming

Close reading of a wide range of prose, poetry, and drama from the Edo period (1600–1868), supplemented with relevant secondary scholarship; introduction to the reading of original materials in cursive calligraphic style (*kuzushiji*). M 2:30–4:30

JAPN 720b, Studies in Premodern Japanese Literature Edward Kamens

A research seminar. Students pursue individual topics in pre-seventeenth-century literature and share readings and analyses for discussion on a rotating basis. Prerequisite: proficiency in reading literary Japanese. W 3:30–5:20

EAST ASIAN STUDIES

The MacMillan Center
320 Luce Hall, 203.432.3426
<http://ceas.yale.edu>
M.A.

Chair

Jing Tsu (jing.tsu@yale.edu)

Director of Graduate Studies

Peter Perdue (RKZ 242, 203.432.6145, peter.c.perdue@yale.edu)

Professors Daniel Botsman (*History; on leave [Sp]*), Kang-i Sun Chang (*East Asian Languages & Literatures; on leave [Sp]*), Deborah Davis (*Sociology; on leave*), Aaron Gerow (*East Asian Languages & Literatures; Film & Media Studies*), Valerie Hansen (*History*), Edward Kamens (*East Asian Languages & Literatures*), William Kelly (*Anthropology; on leave [Sp]*), Tina Lu (*East Asian Languages & Literatures*), Peter Perdue (*History*), Frances Rosenbluth (*Political Science*), Helen Siu (*Anthropology*), William Summers (*Therapeutic Radiology; History of Science & Medicine; on leave [Sp]*), Jing Tsu (*East Asian Languages & Literatures; Comparative Literature*), Anne Underhill (*Anthropology*), Mimi Hall Yiengpruksawan (*History of Art*)

Associate Professors Fabian Drixler (*History*), William Honeychurch (*Anthropology*), Karen Nakamura (*Anthropology*), Andrew Quintman (*Religious Studies; on leave*), Chloë Starr (*Divinity*)

Assistant Professors William Fleming (*East Asian Languages & Literatures; Theater Studies; on leave [F]*), Eric Greene (*Religious Studies*), Denise Ho (*History*), Michael Hunter (*East Asian Languages & Literatures*), Seth Jacobowitz (*East Asian Languages & Literatures; on leave*), Youn-mi Kim (*History of Art*), Eric Weese (*Economics*)

Senior Lecturers Annping Chin (*History*), Pauline Lin (*East Asian Languages & Literatures*)

Lecturers Kjell Ericson, Rebecca Fu, Woo Chang Kang, Dima Mironenko

Senior Lectors II Seungja Choi, Ling Mu

Senior Lectors Hsiu-hsien Chan, Min Chen, Koichi Hiroe, Angela Lee-Smith, Rongzhen Li, Ninghui Liang, Fan Liu, Yoshiko Maruyama, Michiaki Murata, Hiroyo Nishimura, Masahiko Seto, Jianhua Shen, Mari Stever, Wei Su, Haiwen Wang, Yu-lin Wang Saussy, Peisong Xu, William Zhou

Lectors Aoi Saito, Chuanmei Sun

Fields of Study

The Master of Arts (M.A.) program in East Asian Studies is a multidisciplinary program offering a concentrated course of study designed to provide a broad understanding of the people, history, culture, contemporary society, politics, and economy of China, Japan, or

a transnational region within East Asia. This program is designed for students preparing to go on to the doctorate in one of the disciplines of East Asian Studies (e.g., anthropology; economics; history; history of art; language and literature, including comparative literature, film studies, and theater studies; political science; sociology; etc.), as well as for those students seeking a terminal M.A. degree before entering the business world, the media, government service, or a professional school.

Course of Study for the M.A. Degree

The East Asian Studies graduate program is designed to be completed in either a one-year or a two-year track. The two-year track requires the preparation of a master's thesis and is therefore ideal for students who are keen to pursue focused, independent research under the guidance of a faculty member. It also provides students with an opportunity to pursue additional disciplinary and language training. Students who enter the two-year track with a strong command of one East Asian language will be encouraged to consider beginning a second (or third) language.

In general, students focus their course work on the study of China, Japan, or transnational East Asia. Some students may prefer to focus their course work on one or two disciplines, in addition to language study and courses focused on East Asia. Others may create a highly interdisciplinary program, taking courses in traditional disciplines such as history, literature, political science, art history, or anthropology, as well as in Yale's professional schools.

Applicants to the East Asian Studies graduate program must indicate on their application whether they are applying to the one-year or the two-year track.

Requirements for the M.A. Degree: One-Year Track

The program of study for completion of the degree on the one-year track consists of eight term courses that must include two terms of language study at or above Yale's third-year level (unless the language requirement has already been met through previous study or native fluency), plus six other courses selected from the University's offerings of advanced language study and seminars related to East Asia at the graduate level. For those who meet the language requirement at matriculation, two of the required eight courses may be advanced training in a particular discipline (e.g., economics, history, political theory, statistics, etc.) with no explicit focus on East Asia, but related to the student's professional goals. The course of study must be approved by the director of graduate studies (DGS).

SPECIAL REQUIREMENTS

Students must earn two Honors grades ("H") over the course of their two terms at Yale. Honors grades earned in any language course cannot be counted toward satisfying this requirement, except with the permission of the DGS.

Requirements for the M.A. Degree: Two-Year Track

The program of study for completion of the degree on the two-year track consists of sixteen term courses that must include four terms of language study, two terms of which must be at Yale's fourth-year level (unless the language requirement has already been met

through previous study or native fluency), plus twelve other courses selected from the University's offerings of advanced language study and seminars related to East Asia at the graduate level. Students who have achieved advanced proficiency in one East Asian language are strongly encouraged to pursue study of a second East Asian language, but for those who have met the language requirement in one language at matriculation, two of the required sixteen courses may be advanced training in a particular discipline (e.g., economics, history, political theory, statistics, etc.) with no explicit focus on East Asia, but related to the student's professional goals. The course of study must be approved by the director of graduate studies (DGS).

SPECIAL REQUIREMENTS

Students must earn four Honors grades ("H") over the course of their four terms at Yale. Honors grades earned in any language course cannot be counted toward satisfying this requirement, except with the permission of the DGS. A master's thesis is also required.

MASTER'S THESIS

A master's thesis is required of students enrolled in the two-year degree program. The master's thesis is based on research in a topic approved by the DGS and advised by a faculty member with specialized competence in the chosen topic. M.A. students must register for EAST 900, which may count toward the sixteen required courses. EAST 900 may not be taken for audit. Students may register for an additional independent study to prepare topics and begin research. The master's thesis must be prepared according to CEAS guidelines and is due in two copies in the student's second year on an early-April date as specified by CEAS.

Joint-Degree Programs

There are no joint-degree programs available to students enrolled in the East Asian Studies M.A. degree program. Students interested in pursuing additional degrees in the Yale professional schools should consider applying separately to those programs in order to complete such degrees before or after the East Asian Studies M.A. degree.

Program materials are available upon request to the Council on East Asian Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail, eastasian.studies@yale.edu; Web site, <http://ceas.yale.edu>. Applications are available online at <http://gsas.yale.edu/admission-graduate-school>; e-mail, graduate.admissions@yale.edu.

Courses

Please consult the course information available online at <http://ceas.yale.edu/academics/courses> and <http://students.yale.edu/oci> for a complete list of East Asian-related courses offered at Yale University.

EAST 562b^U/PLSC 789b^U, The Politics and Political Economy of East Asia

Woo Chang Kang, Frances Rosenbluth

This class is designed to help students understand political, economic, and diplomatic developments in East Asia with a focus on Japan, China, Korea, and Taiwan. We begin with the historical events that shaped the internal politics of each country and their

international relations. We explore the interrelationship between their politics and their paths of economic development. Finally, we consider their uneasy relationships as neighbors in East Asia.

EAST 571a/HIST 871a, The History of the People's Republic of China Denise Ho

This is a reading seminar that examines recent English-language scholarship on the People's Republic of China, focusing on the Mao period (1949–76). Considering the question of the PRC as history, the seminar compares present-day scholarship to earlier social science research and discusses the questions being asked and answered by historians today. Reading knowledge of Chinese is not required; open to undergraduates with permission of the instructor. M 1:30–3:20

EAST 900b, Master's Thesis Peter Perdue

Directed reading and research on a topic approved by the DGS and advised by a faculty member (by arrangement) with expertise or specialized competence in the chosen field. Readings and research are done in preparation for the required master's thesis.

EAST 910a, Independent Study

By arrangement with faculty and with approval of the DGS.

ECOLOGY AND EVOLUTIONARY BIOLOGY

Osborn Memorial Laboratories, 203.432.3837

<http://eeb.yale.edu>

M.S., Ph.D.

Chair

Paul Turner

Director of Graduate Studies

David Vasseur

Professors Leo Buss, Peter Crane (*Forestry & Environmental Studies*), Michael Donoghue, Alison Galvani (*Public Health*), Vivian Irish (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics; Psychiatry*), David Post, Jeffrey Powell (*on leave* [Sp]), Richard Prum (*on leave* [F]), Eric Sargis (*Anthropology; on leave* [F]), Oswald Schmitz (*Forestry & Environmental Studies*), David Skelly (*Forestry & Environmental Studies*), Stephen Stearns, Paul Turner, J. Rimas Vaisnys (*Electrical Engineering*), Günter Wagner (*on leave* [F])

Associate Professors Walter Jetz, Thomas Near

Assistant Professors Forrest Crawford (*Public Health*), Carla Staver, David Vasseur

Senior Lecturer Marta Martínez Wells

Lecturers Adalgisa Caccone, Mary Beth Decker, Linda Puth

Fields of Study

The Department of Ecology and Evolutionary Biology (E&EB) offers training programs in organismal biology, ecology, and evolutionary biology including molecular evolution, phylogeny, molecular population genetics, developmental evolution, and evolutionary theory.

Special Admissions Requirements

Applicants should have had training in one of the following fields: biology, mathematics, chemistry, physics, statistics, and/or geology. Candidates are selected, regardless of their major, based on overall preparation for a career in research in ecology and evolutionary biology. Some, planning for careers in applied fields, may have prepared with courses in public policy, economics, and agriculture.

Special Requirements for the Ph.D. Degree

Each entering student, in consultation with the director of graduate studies (DGS), develops a specific program of courses, seminars, laboratory research, and independent reading tailored to the student's interests, background, and goals. There are normally no foreign language requirements. All first-year students carry out two research rotations. Students have the option of a rotation over their first summer. Students must participate in (1) E&EB 500, Advanced Topics in Ecology and Evolutionary Biology; (2) E&EB

545b, a course on the responsible conduct of research; (3) weekly E&EB seminars; and (4) symposia of faculty and graduate student research. In addition, during their first two years of study, graduate students must enroll in a minimum of three additional graduate-level courses (numbered 500 and above); a grade of H must be earned in two of these. Teaching experience is regarded as an integral part of the graduate training program. All students are required to teach three courses, normally at a level 20, typically during their first two years of study.

By the middle of the fourth term of study, each student organizes a formal pre-prospectus consultative meeting with his/her advisory committee to discuss the planned dissertation research. Before the beginning of the fifth term, students present and defend their planned dissertation research at a prospectus meeting, at which the department determines the viability and appropriateness of the student's Ph.D. proposal. A successful prospectus meeting and completion of course requirements results in admission to candidacy for the Ph.D. The remaining requirements include completion, presentation, and successful defense of the dissertation, and submission of copies of the dissertation to the Graduate School and to the Center for Science and Social Science Information.

In cases where the dissertation committee decides that preliminary field work during the summer after the fourth term is necessary prior to the prospectus, the prospectus meeting can be delayed by one term. A request for a delay must come from the dissertation committee adviser and must be approved by the DGS. In these exceptional cases admission to candidacy may not be required for registration for the third year of graduate study.

Honors Requirement

Students must meet the Graduate School's requirement of Honors in two courses by the end of the fourth term of study. The E&EB department also requires an average grade of at least High Pass in course work during the first two years of study.

Master's Degree

M.S. (en route to the Ph.D.) Students must pass ten graduate-level courses. At least four courses must be taken for a grade, and students must earn Honors in two courses and maintain an overall average of High Pass. Required courses are:

E&EB 500a, Advanced Topics in Ecology and Evolutionary Biology

E&EB 501b, Advanced Topics in Ecology and Evolutionary Biology

E&EB 545, Responsible Conduct of Research

E&EB 901, Research Rotation I; and E&EB 902, Research Rotation II

A minimum of five additional graduate-level courses (four taken for a grade) are required.

Additional material providing information on the department, faculty, courses, and facilities is available from Karen Broderick, Office of the Director of Graduate Studies, Department of Ecology and Evolutionary Biology, Yale University, PO Box 208106, New Haven CT 06520-8106; e-mail, karen.broderick@yale.edu; tel., 203.432.3837; fax, 203.432.2374; Web site, <http://eeb.yale.edu>.

Courses

E&EB 500a and 501b, Advanced Topics in Ecology and Evolutionary Biology

Topics to be announced. Graded Satisfactory/Unsatisfactory. M 2:30–4:30

[E&EB 510a^U/STAT 501a^U, Introduction to Statistics: Life Sciences]

E&EB 515a^U, Conservation Biology Jeffrey Powell

An introduction to ecological and evolutionary principles underpinning efforts to conserve Earth's biodiversity. Efforts to halt the rapid increase in disappearance of both plants and animals. Discussion of sociological and economic issues. WF 10:30–11:20, 1 HTBA

E&EB 520a^U, General Ecology Carla Staver, David Vasseur

A broad consideration of the theory and practice of ecology, including the ecology of individuals, population dynamics and regulation, community structure, ecosystem function, and ecological interactions on broad spatial and temporal scales. Topics such as climate change, fisheries management, and infectious disease are placed in an ecological context. MWF 10:30–11:20

E&EB 523Lb^U, Laboratory for Evolution and Functional Traits

Marta Martínez Wells

Experimental approaches to organismal and population biology, including study of the diversity of life. TWTW 1:30–4:30

E&EB 525b^U, Evolutionary Biology Thomas Near, Paul Turner

An overview of evolutionary biology as the discipline uniting all of the life sciences. Evolution explains the origin of life and Earth's biodiversity, and how organisms acquire adaptations that improve survival and reproduction. This course uses reading and discussion of scientific papers to emphasize that evolutionary biology is a dynamic science, involving active research to better understand the mysteries of life. We discuss principles of population genetics, paleontology, and systematics; application of evolutionary thinking in disciplines such as developmental biology, ecology, microbiology, molecular biology, and human medicine. TTH 10:30–11:20, 1 HTBA

E&EB 526Lb^U, Laboratory for Evolutionary Biology Adalgisa Caccone

The companion laboratory to E&EB 525b. Study of patterns and processes of evolution, including collection and interpretation of molecular and morphological data in a phylogenetic context. Focus on methods of analysis of species-level and population-level variation in natural populations. TH 1:30–4:30

E&EB 530a^U, Field Ecology Linda Puth

A field-based introduction to ecological research. Experimental and descriptive approaches, comparative analysis, and modeling are explored through field and small-group projects. TTH 1–5

E&EB 535b^U, Evolution and Medicine Stephen Stearns

Introduction to the ways in which evolutionary science informs medical research and clinical practice. Diseases of civilization and their relation to humans' evolutionary past; the evolution of human defense mechanisms; antibiotic resistance and virulence

in pathogens; cancer as an evolutionary process. Students view course lectures online; class time focuses on discussion of lecture topics and research papers. T 7–8:50

E&EB 545b, Responsible Conduct of Research

Graded Satisfactory/Unsatisfactory. M 2:30–4:30

E&EB 546b^U, Plant Diversity and Evolution Michael Donoghue

Introduction to the major plant groups and their evolutionary relationships, with an emphasis on the diversification and global importance of flowering plants. MW 1–2:15

E&EB 547b^U, Laboratory for Plant Diversity and Evolution Michael Donoghue

Hands-on experience with the plant groups examined in the accompanying lectures. Local field trips. T 1–4

E&EB 550a^U, Biology of Terrestrial Arthropods Marta Martínez Wells

Evolutionary history and diversity of terrestrial arthropods (body plan, phylogenetic relations, fossil record); physiology and functional morphology (water relations, thermoregulation, energetics of flying and singing); reproduction (biology of reproduction, life cycles, metamorphosis, parental care); behavior (migration, communication, mating systems, evolution of sociality); ecology (parasitism, mutualism, predator-prey interactions, competition, plant-insect interactions). TTH 11:35–12:50

E&EB 551La^U, Laboratory for Biology of Terrestrial Arthropods

Marta Martínez Wells

Comparative anatomy, dissections, identification, and classifications of terrestrial arthropods; specimen collection; field trips. W 1:30–4:30

[E&EB 564b^U, Ichthyology]

[E&EB 565Lb^U, Laboratory for Ichthyology]

E&EB 575a, Biological Oceanography Mary Beth Decker

Exploration of a range of coastal and pelagic ecosystems. Relationships between biological systems and the physical processes that control the movements of water and productivity of marine systems. Anthropogenic impacts on oceans, such as the effects of fishing and climate change. Includes three Friday field trips. TTH 1–2:15

[E&EB 636b/SOCY 636b, Biosocial Science]

[E&EB 660b^U, Conservation Genetics]

E&EB 672b^U, Ornithology Richard Prum

An overview of avian biology and evolution, including the structure, function, behavior, and diversity of birds. The evolutionary origin of birds, avian phylogeny, anatomy, physiology, neurobiology, breeding systems, and biogeography. MWF 9:25–10:15

E&EB 673Lb^U, Laboratory for Ornithology Richard Prum

Laboratory and field studies of avian morphology, diversity, phylogeny, classification, identification, and behavior.

E&EB 900a–b, First-Year Introduction to Research and Rotations DGS

E&EB 930a, Seminar in Systematics**E&EB 950a or b, Second-Year Research**

By arrangement with faculty.

E&EB 960b^U/EMD 695b, Studies in Evolutionary Medicine I Stephen Stearns

The first term of a two-term course that begins in January. Students learn the major principles of evolutionary biology and apply them to issues in medical research and practice by presenting and discussing original papers from the current research literature. Such issues include lactose and alcohol tolerance; the hygiene hypothesis and autoimmune disease; human genetic variation in drug response and pathogen resistance; spontaneous abortions, immune genes, and mate choice; parental conflicts over reproductive investment mediated by genetic imprinting; life history trade-offs and the evolution of aging; the evolution of virulence and drug resistance in pathogens; the evolutionary genetics of humans and their pathogens; the ecology and evolution of disease; the evolutionary origin of diseases; and the emergence of new diseases. Students develop a research proposal based on one of their own questions in the spring term, spend the summer on a research project related to their research proposal, and write a paper based on the results of their research in the fall term. Credit and grades are awarded for each term. Only students who have engaged in summer research projects may enroll in the fall term. Admission is by competitive application only. Forms are available on the E&EB department Web site.

E&EB 961a^U/EMD 695a, Studies in Evolutionary Medicine II Paul Turner

Continuation of E&EB 960b. Students learn the major principles of evolutionary biology and apply them to issues in medical research and practice by presenting and discussing original papers from the current research literature. Such issues include lactose and alcohol tolerance; the hygiene hypothesis and autoimmune disease; human genetic variation in drug response and pathogen resistance; spontaneous abortions, immune genes, and mate choice; parental conflicts over reproductive investment mediated by genetic imprinting; life history trade-offs and the evolution of aging; the evolution of virulence and drug resistance in pathogens; the evolutionary genetics of humans and their pathogens; the ecology and evolution of disease; the evolutionary origin of diseases; and the emergence of new diseases. Students develop a research proposal based on one of their own questions in the spring term, spend the summer on a research project related to their research proposal, and write a paper based on the results of their research in the fall term. Credit and grades are awarded for each term. Only students who have engaged in summer research projects may enroll in the fall term. Prerequisite: E&EB 960b or permission of the instructor.

ECONOMICS

28 Hillhouse Avenue, 203.432.3575

<http://economics.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Dirk Bergemann (28 Hillhouse, 203.432.3571)

Director of Graduate Studies

Truman Bewley (30 Hillhouse, Rm. 30, 203.432.3719, truman.bewley@yale.edu)

Professors Joseph Altonji, Donald Andrews, Dirk Bergemann, Steven Berry, Truman Bewley, Xiaohong Chen, Zhiwu Chen (*Management*), Ray Fair, Howard Forman (*Public Health*), John Geanakoplos, Pinelope Goldberg, Timothy Guinnane, Philip Haile, Johannes Hörner, Jonathan Ingersoll (*Management*), Gerald Jaynes, Dean Karlan, Yuichi Kitamura, Alvin Klevorick, Samuel Kortum, Naomi Lamoreaux, Richard Levin, Giovanni Maggi, Costas Meghir, Robert Mendelsohn (*Forestry & Environmental Studies*), Giuseppe Moscarini, William Nordhaus, Peter Phillips, Benjamin Polak, Mark Rosenzweig, Larry Samuelson, Robert Shiller, Anthony Smith, Aleh Tsyvinski, Christopher Udry, Edward Vytlačil, Ebonya Washington

Associate Professors Konstantinos Arkolakis, Eduardo Faingold, Amanda Kowalski, Nancy Qian

Assistant Professors Timothy Armstrong, David Atkin, José-Antonio Espín-Sánchez, Mitsuru Igami, Daniel Keniston, Ilse Lindenlaub, Michael Peters, Nicholas Ryan, Joseph Shapiro, Eric Weese

Fields of Study

Fields include economic theory, including microeconomics, macroeconomics, mathematical economics; econometrics; economic history; labor economics; industrial organization; financial economics; behavioral finance; public economics; public finance; international trade; international finance; economic development; behavioral economics; law and economics.

Special Admissions Requirements

Please see <http://economics.yale.edu/graduate/application-info>.

Special Requirements for the Ph.D. Degree

The following requirements must be satisfied in addition to those prescribed by the Graduate School.

Prior to registration for the second year. (a) Students must have taken for credit and passed at least six economics graduate courses. (b) Students must pass written comprehensive examinations in micro- and macroeconomics. These examinations, which are given in May and late August of each year, must be taken in the spring term of the

first year. Each exam will be graded separately, and in the event of failure, students will retake only the part of the exam they did not pass. Students may take the comprehensive examination no more than twice.

Prior to registration for the third year. (a) Students must have taken at least fourteen term courses in Economics and have received a grade of at least Pass in each of them. With the permission of the director of graduate studies, courses in related fields and independent reading courses can be used to fulfill this requirement. Workshops may not be used to satisfy it. All workshops are graded on a Satisfactory/Unsatisfactory basis. (b) Students must have received an average of at least High Pass in the courses they have taken. The admissibility of courses for this requirement is the same as for the fourteen-course requirement mentioned above. Grades within the Economics department include pluses and minuses. A failure counts as a zero, a P– as a 1, a P as a 2, a P+ as a 3, and so on up to a 9 for H+. The arithmetic average of these numbers must be at least 4.5.

Admission to candidacy. Students must be admitted to candidacy prior to registration for the fourth year of study. Students are recommended to the Graduate School for admission to candidacy by the Department of Economics after having completed department requirements listed above, the Graduate School's prospectus requirement, and the following additional requirements: (a) Students must have completed two one-term prospectus workshops. In order for workshops to count toward the prospectus requirement, students must make a presentation in each workshop and present original work in one of them. If students can find no workshop whatsoever in their areas of interest, they may substitute independent study guided by a faculty member, provided the independent study leads to a dissertation prospectus that is accepted. (b) Students must receive a grade of High Pass– or better in ECON 551b (Econometrics II) or 552b (Econometrics III). More advanced courses may be substituted for these with special permission of the director of graduate studies. (c) Students must receive a grade of Satisfactory on an applied econometrics paper, which is evaluated by the faculty adviser of the paper and another faculty member. (d) Students must complete with a grade of at least High Pass– a term of economic history, drawn from a list of courses approved by the director of graduate studies and economic history instructors. (e) Students must pass an oral examination in two fields. At least one field must have substantial empirical and institutional content. The choice of fields must be approved by the director of graduate studies. In the event of failure, students may take the oral examination no more than twice.

Submitting the dissertation. A student's dissertation research is guided by a committee of two Graduate School faculty members, at least one of whom must be a member of the Economics department. One of the committee members is designated as chair. When a first draft of the dissertation is completed, the director of graduate studies appoints a third reader.

Programs in Law and Economics

The Economics department participates in the J.D./M.A. and J.D./Ph.D. programs, which are described under Policies and Regulations.

Master's Degrees

M.Phil. The M.Phil. degree is awarded to students in the Ph.D. program upon completion of fourteen term courses, with at least two grades of Honors. In addition, students must satisfy the qualifying requirements in economic theory, econometrics, economic history, and two special fields, as well as the oral examination.

M.A. (en route to the Ph.D.) The M.A. degree is awarded upon completion of eight term courses with an average grade of High Pass. Students must complete at least two of the three two-course sequences in microeconomics, macroeconomics, or econometrics for first-year graduate students.

The M.A. in International and Development Economics is described under International and Development Economics.

Program materials are available on our Web site: <http://economics.yale.edu>.

Courses

ECON 500a, General Economic Theory: Microeconomics Truman Bewley,
Eduardo Faingold

Introduction to optimization methods and partial equilibrium. Theories of utility and consumer behavior production and firm behavior. Introduction to uncertainty and the economics of information, and to noncompetitive market structures.

ECON 501b, General Economic Theory: Microeconomics Johannes Hörner,
Eduardo Faingold

General equilibrium and welfare economics. Allocation involving time. Public sector economics. Uncertainty and the economics of information. Introduction to social choice.

[ECON 502a, Mathematics for Economists]

ECON 510a, General Economic Theory: Macroeconomics Anthony Smith,
Michael Peters

Analysis of short-run determination of aggregate employment, income, prices, and interest rates in closed and open economies. Stabilization policies.

ECON 511b, General Economic Theory: Macroeconomics Giuseppe Moscarini
Theories of saving, investment, portfolio choice, and financial markets. Longer-run developments; economic growth, capital accumulation, income distribution.

ECON 520a, Advanced Microeconomic Theory I Johannes Hörner, Pauli Murto
A formal introduction to game theory and information economics. Alternative non-cooperative solution concepts are studied and applied to problems in oligopoly, bargaining, auctions, strategic social choice, and repeated games.

ECON 521b, Advanced Microeconomic Theory II Juuso Välimäki, Dirk Bergemann
Contracts and the economics of organization. Topics may include dynamic contracts (both explicit and implicit), career concerns, hierarchies, Bayesian mechanism design, renegotiation, and corporate control.

ECON 522a and 523b, Microeconomic Theory Lunch

A forum for advanced students to critically examine recent papers in the literature and present their own work.

[ECON 524a, Behavioral Applied Theory]**ECON 525a, Advanced Macroeconomics I** Fatih Guvenen

Heterogeneous agent economics, investment, scrapping and firing, nonquadratic adjustment costs, financial constraints, financial intermediation, psychology of decision making under risk, optimal risk management, financial markets, consumption behavior, monetary policy, term structure of interest rates.

ECON 526b, Advanced Macroeconomics II Giuseppe Moscarini, Anthony Smith

Macroeconomic equilibrium in the presence of uninsurable labor income risk. Implications for savings, asset prices, unemployment.

ECON 527a/LAW 20083/MGT 565a, Behavioral and Institutional Economics

Robert Shiller

Behavioral economics incorporates insights from other social sciences, such as psychology and sociology, into economic models and attempts to explain anomalies that defy standard economic analysis. Institutional economics is the study of the evolution of economic organizations, laws, contracts, and customs as part of a historical and continuing process of economic development. Behavioral economics and institutional economics are naturally treated together, since so much of the logic and design of economic institutions has to do with complexities of human behavior. This course emphasizes two main topics: behavioral macroeconomics and behavioral finance, though references are made to other branches of economics as well. Because macroeconomics is a major part of the course, ECON 527a is part of the graduate macroeconomics sequence (including ECON 510a, 511b, 525a, and 526b); these courses are not, however, prerequisites.

ECON 530a, General Equilibrium Foundations of Finance and Macroeconomics

John Geanakoplos

The course gives a careful mathematical description of the general equilibrium underpinnings of the main models of finance and the new macroeconomics of collateral and default. Part I is a review of Walrasian general equilibrium, including the mathematical techniques of fixed points and genericity, both taught from an elementary point of view. Part II covers general equilibrium with incomplete markets (GEI). Part III focuses on the special case of the capital asset pricing model (CAPM), including extensions to multi-commodity CAPM and multifactor CAPM. Part IV focuses on the Modigliani-Miller theorem and generic constrained inefficiency. Part V describes collateral equilibrium and the leverage cycle. Part VI covers default and punishment and adverse selection and moral hazard in general equilibrium. Part VII describes monetary equilibrium. W 4–7

[ECON 531b, Mathematical Economics II]**[ECON 535a and b, Prospectus Workshop in Mathematical Economics]****ECON 537a and 538b, Microeconomic Theory Workshop**

Presentations by research scholars and participating students.

ECON 540a and 541b, Student Workshop in Macroeconomics

A course that gives third- and fourth-year students doing research in macroeconomics an opportunity to prepare their prospectuses and to present their dissertation work. Each student is required to make at least two presentations per term. For third-year students and beyond, at least one of the presentations in the first term should be a mock job talk.

ECON 542a and 543b, Macroeconomics Workshop

A forum for presentation and discussion of state-of-the-art research in macroeconomics. Presentations by research scholars and participating students of papers in closed economy and open economy macroeconomics and monetary economics.

ECON 545a, Microeconomics Michael Boozer

A survey of the main features of current economic analysis and of the application of the theory to a number of important economic questions, covering microeconomics and demand theory, the theory of the firm, and market structures. For IDE students.

ECON 546b, Growth and Macroeconomics

This course presents a basic framework to understand macroeconomic behavior and the effects of macroeconomic policies. Topics include consumption and investment, labor market, short-run income determinations, unemployment, inflation, growth, and the effects of monetary and fiscal policies. The emphasis is on the relation between the underlying assumptions of macroeconomic framework and policy implications derived from it.

ECON 550a, Econometrics I Donald Andrews

Probability: concepts and axiomatic development. Data: tools of descriptive statistics and data reduction. Random variables and probability distributions; univariate distributions (continuous and discrete); multivariate distributions; functions of random variables and transformations; the notion of statistical inference; sampling concepts and distributions; asymptotic theory; point and interval estimation; hypothesis testing.

ECON 551b, Econometrics II Timothy Armstrong

Provides a basic knowledge of econometric theory, and an ability to carry out empirical work in economics. Topics include linear regression and extensions, including regression diagnostics, generalized least squares, statistical inference, dynamic models, instrumental variables and maximum likelihood procedures, simultaneous equations, nonlinear and qualitative-choice models. Examples from cross-section, time series, and panel data applications.

ECON 552b, Econometrics III Donald Andrews, Xiaohong Chen

The treatment of the subject is rigorous, attentive to modern developments, and proceeds to research level in several areas. Linear models from core curriculum. Topics include linear estimation theory, multiple and multivariate regressions, Kruskal's theorem and its applications, classical statistical testing by likelihood ratio, Lagrange multiplier and Wald procedures, bootstrap methods, specification tests, Stein-like estimation, instrumental variables, and an introduction to inferential methods in simultaneous stochastic equations.

ECON 553a, Econometrics IV: Time Series Econometrics Peter Phillips

A sequel to ECON 552, the course proceeds to research level in time series econometrics. Topics include an introduction to ergodic theory, Wold decomposition, spectral theory, martingales, martingale convergence theory, mixing processes, strong laws, and central limit theory for weak dependent sequences with applications to econometric models and model determination.

ECON 554b, Econometrics V Xiaohong Chen, Timothy Armstrong

The first half of this course is about nonlinear parametric models. Specification, estimation, and testing within the Likelihood and Generalized Method of Moments frameworks. First-order asymptotics for both smooth and non-smooth objective functions. Efficiency and robustness. A short account of high-order asymptotics for smooth problems. The second part is on nonparametric and semiparametric methods. Nonparametric estimation by kernels, series, splines, and other methods. Bias reduction and bandwidth selection. The course of dimensionality and additive models. Specification and estimation of semiparametric models. U-statistics and asymptotic properties. Efficiency and adaptation.

[ECON 555a, Applied Econometrics II: Microeconometrics]

ECON 556a, Topics in Empirical Economics and Public Policy Costas Meghir,
Philip Haile, Edward Vytlačil

[ECON 557a, Econometrics VI]**ECON 558a, Econometrics** Michael Boozer

Application of statistical analysis to economic data. Basic probability theory, linear regression, specification and estimation of economic models, time series analysis, and forecasting. The computer is used. For IDE students.

ECON 559b, Development Economics (IDE) Michael Boozer**ECON 561b^U, Computational Methods for Economics** Anthony Smith**[ECON 563a/CPSC 555a^U, Economics and Computation]****ECON 567a and 568b, Econometrics Workshop**

A forum for state-of-the-art research in econometrics. Its primary purpose is to disseminate the results and the technical machinery of ongoing research in theoretical and applied fields.

ECON 570a and 571b, Prospectus Workshop in Econometrics

A course for third- and fourth-year students doing research in econometrics to prepare their prospectus and present dissertation work.

ECON 580a, General Economic History: Western Europe Timothy Guinnane
José-Antonio Espín-Sánchez

A survey of some major events and issues in the economic development of Western Europe during the eighteenth and nineteenth centuries, stressing the causes, nature, and consequences of the industrial revolution in Britain and on the Continent, and the

implications of the historical record for modern conceptions of economic growth. Prerequisites: simultaneous enrollment in or successful completion of ECON 500a and ECON 510a; permission of the instructor.

ECON 581b, American Economic History Gavin Wright

This course examines both the long-term factors (such as industrialization and the development of markets) and the epochal events (such as the Revolution, Civil War, and Great Depression) that have shaped the development of the American economy. The objectives of this course are to familiarize students with the major topics and debates in American economic history. Prerequisites: concurrent enrollment in or successful completion of ECON 501b and ECON 510a.

[ECON 582a, General Economic History: Latin America]

[ECON 583a, Topics in Economic History]

[ECON 585b, Readings in Economic History]

ECON 588a and 589b, Economic History Workshop Timothy Guinnane

A forum for discussion and criticism of research in progress. Presenters include graduate students, Yale faculty, and visitors. Topics concerned with long-run trends in economic organization are suitable for the seminar. Special emphasis given to the use of statistics and of economic theory in historical research.

ECON 591a^U, Economics of Poverty Alleviation Dean Karlan

ECON 600a, Industrial Organization I Philip Haile, Mitsuru Igami

Begins by locating the study of industrial organization within the broader research traditions of economics and related social sciences. Alternative theories of decision making, of organizational behavior, and of market evolution are sketched and contrasted with standard neoclassical theories. Detailed examination of the determinants and consequences of industrial market structure.

ECON 601b, Industrial Organization II Steven Berry

Examination of alternative modes of public control of economic sectors with primary emphasis on antitrust and public utility regulation in the U.S. economy. Public policy issues in sectors of major detailed governmental involvement.

ECON 606a and 607b, Prospectus Workshop in Industrial Organization

For third-year students in microeconomics, intended to guide students in the early stages of theoretical and empirical dissertation research. Emphasis on regular writing assignments and oral presentations.

ECON 608a and 609b, Industrial Organization Seminar

For advanced graduate students in applied microeconomics, serving as a forum for presentation and discussion of work in progress of students, Yale faculty members, and invited speakers.

ECON 630a, Labor Economics Costas Meghir

Topics include static and dynamic approaches to demand, human capital and wage determination, wage income inequality, unemployment and minimum wages, matching and

job turnover, immigration and international trade, unions, implicit contract theory, and efficiency wage hypothesis.

ECON 631b, Labor Economics Joseph Altonji

Topics include static and dynamic models of labor supply, human capital wage function estimation, firm-specific training, compensating wage differentials, discrimination, household production, bargaining models of household behavior, intergenerational transfers, and mobility.

ECON 638a and 639b, Labor and Population Workshop

A forum primarily for graduate students to present their research plans and findings. Discussions encompass empirical microeconomic research relating to both high- and low-income countries.

ECON 640a/b, Prospectus Workshop in Labor Economics and Public Finance

Workshop for students doing research in labor economics and public finance.

ECON 670a/MGMT 740a, Financial Economics I Jonathan Ingersoll

Current issues in theoretical financial economics are addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area.

ECON 671b/MGMT 741b, Financial Economics II Alan Moreira

Continuation of ECON 670a/MGMT 740a.

ECON 672b/MGMT 745b, Behavioral Finance Nicholas Barberis

Much of modern financial economics works with models in which agents are rational, in that they maximize expected utility and use Bayes's law to update their beliefs. Behavioral finance is a large and active field that studies models in which some agents are less than fully rational. Such models have two building blocks: limits to arbitrage, which make it difficult for rational traders to undo the dislocations caused by less rational traders; and psychology, which catalogues the kinds of deviations from full rationality we might expect to see. We discuss these two topics and then consider a number of applications: asset pricing (the aggregate stock market and the cross-section of average returns); individual trading behavior; and corporate finance (security issuance, corporate investment, and mergers).

ECON 674b/MGMT 746b, Financial Crises Gary Gorton, Andrew Metrick

An elective doctoral course covering theoretical and empirical research on financial crises. The first half of the course focuses on general models of financial crises and historical episodes from the nineteenth and twentieth centuries. The second half of the course focuses on the recent financial crisis. Prerequisites: MGMT 740a and 741b (doctoral students in Economics may substitute the core microeconomics sequence), and permission of the instructor.

ECON 680a, Public Finance I Joseph Shapiro

ECON 681b, Public Finance II Joseph Shapiro

[ECON 702b, International Economics]

[ECON 709a, International Economics and Open Economy Macroeconomics]**ECON 720a, International Trade I** Konstantinos Arkolakis, Samuel Kortum

This course covers the theory of international trade, policy, and institutions. Discussion of Classical, Neo-classical, and more recent imperfect-Competition-Scale-Economies-based static models of trade. The course presents dynamic extensions of some of the models that explore the relations among trade, innovation, and growth. The analytics of trade policy issues, such as gains from trade, tariffs and quotas, customs unions and free trade areas, and the political economy of trade policy making, are discussed.

ECON 721b, International Trade II Konstantinos Arkolakis, Samuel Kortum

The course covers empirical topics in international trade with particular emphasis on current research areas. Topics include tests of international trade theories; studies of the relationship between international trade, labor markets, and income distribution; recent trade liberalization episodes in developing countries; empirical assessment of various trade policies, such as VERs and Anti-Dumping; productivity (and its relation to international trade liberalization); and exchange rates, market integration, and international trade. Methodologically, the course draws heavily on empirical models used in the fields of industrial organization and to a lesser degree labor economics; taking these courses is thus recommended though not required.

ECON 724b, International Finance Konstantinos Arkolakis**ECON 730a, Economic Development I** Christopher Udry, Daniel Keniston

Development theory at both aggregate and sectoral levels; analysis of growth, employment, poverty, and distribution of income in both closed and open developing economy contexts.

ECON 731b, Economic Development II Nicholas Ryan, Dean Karlan

Analysis of development experiences since World War II. Planning and policy making across countries and time. Models of development, growth, foreign trade, and investment. Trade, capital, and technology flows and increasing interdependence. The political economy of policy making and policy reform.

ECON 732b, Advanced Economic Development Daniel Keniston

Examines the models of classical and modern economists to explain the transition of developing economies into modern economic growth, as well as their relevance to income distribution, poverty alleviation, and human development.

[ECON 735b^U, Economics of Agriculture]**[ECON 736a^U, Economics of Technology]****ECON 737b^U, Economics of Natural Resources** Robert Mendelsohn

Linking of abstract economic concepts to concrete policy and management decisions. Application of theoretical tools of economics to global warming, pollution control, fisheries, forestry, recreation, and mining.

ECON 738a or b, Workshop on Environmental and Natural Resources

William Nordhaus, Robert Mendelsohn

ECON 749a and 750b, Trade and Development Workshop

A forum for graduate students and faculty with an interest in the economic problems of developing countries. Faculty, students, and a limited number of outside speakers discuss research in progress.

ECON 756a/b, Prospectus Workshop in Development

Workshop for students doing research in development to present and discuss work.

[ECON 776b^u, Economics of Population]

[ECON 788a, Political Competition]

ECON 790b, Political Economy I Ebonya Washington**ECON 791a/LAW 20248/PLSC 595a, Theories of Distributive Justice** John Roemer

This year, we spend the first half of the course (or so) reading and discussing Thomas Piketty's *Capital in the Twenty-First Century* (2014). We then survey the main egalitarian theories of distributive justice proposed by economists and political philosophers since J. Rawls, including A. Sen, R. Dworkin, G.A. Cohen, R. Arneson, and S. Scheffler. We subject these theories to economic and philosophical analysis. Prerequisite: intermediate microeconomics or PLSC 517a.

ECON 794b, Political Economy II Giovanni Maggi

[ECON 795a, Topics in Political Economy]

ECON 899a or b, Individual Reading and Research

By arrangement with faculty.

ELECTRICAL ENGINEERING

Dunham Laboratory, 203.432.4252

M.S., M.Phil., Ph.D.

Chair

Jung Han

Director of Graduate Studies

Hongxing Tang (hong.tang@yale.edu)

Professors Richard Barker (*Emeritus*), James Duncan, Jung Han, Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), Lawrence Staib, Hemant Tagare, Leandros Tassiulas, J. Rimas Vaisnys, Yang Richard Yang

Associate Professors Minjoo Lee, Richard Lethin (*Adjunct*), Hongxing Tang, Sekhar Tatikonda

Assistant Professors Wenjun Hu, Amin Karbasi, Jakub Szefer, Fengnian Xia

Fields of Study

Fields include biomedical sensory systems, communications and signal processing, neural networks, control systems, wireless networks, sensor networks, microelectromechanical and nanomechanical systems (MEMS and NEMS), nanoelectronic science and technology, optoelectronic materials and devices, semiconductor materials and devices, computer engineering, computer architecture, hardware security, and VLSI design and testing.

For admissions and degree requirements, and for course listings, see Engineering & Applied Science.

ENGINEERING & APPLIED SCIENCE

Dunham Laboratory, 203.432.4252

<http://seas.yale.edu>

M.S., M.Phil., Ph.D.

Dean

T. Kyle Vanderlick

Deputy Dean

Vincent Wilczynski

Programs of study are offered in the areas of applied mechanics, computer science, mechanical engineering and materials science, chemical and environmental engineering, electrical engineering, and biomedical engineering. All programs are under the School of Engineering & Applied Science.

Biomedical Engineering

Chair

Jay Humphrey

Director of Graduate Studies

Richard Carson (richard.carson@yale.edu)

Professors Richard Carson, Nicholas Christakis, James Duncan, Jay Humphrey, Fahmeed Hyder, Themis Kyriakides (*Pathology*), Andre Levchenko, Laura Niklason, Douglas Rothman, W. Mark Saltzman, Mark Schwartz, Fred Sigworth, Brian Smith, Lawrence Staib, Hemant Tagare, Paul Van Tassel, Steven Zucker (*Computer Science*)

Associate Professors Joerg Bewersdorf (*Cell Biology*), Robin de Graaf, Tarek Fahmy, Rong Fan, Evan Morris, Xenophon Papademetris, Corey Wilson

Assistant Professors Stuart Campbell, Michael Choma, Anjelica Gonzalez, Chi Liu, Kathryn Miller-Jensen, Michael Murrell, Steven Tommasini, Jiangbing Zhou

FIELDS OF STUDY

Fields include biological devices, biological signals and sensors, biomaterials, biomechanics, biophotonics, computer vision, digital image analysis and processing, drug delivery, modeling in mechanobiology, MRI, MRS, PET and modeling, the physics of image formation (MRI, optics, ultrasound, nuclear medicine, and X-ray), physiology and human factors engineering, systems biology, systems medicine, and tissue engineering and regenerative medicine.

Chemical & Environmental Engineering

Chair

Paul Van Tassel

Director of Graduate Studies

Menachem Elimelech (menachem.elimelech@yale.edu)

Professors Eric Altman, Michelle Bell, Gaboury Benoit, Ruth Blake, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Edward Kaplan, Yehia Khalil (*Adjunct*), Michael Loewenberg, Robert McGraw (*Adjunct*), Andrew Miranker, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), James Saiers, W. Mark Saltzman, Udo Schwarz, T. Kyle Vanderlick, Paul Van Tassel, Kurt Zilm

Associate Professors Eric Dufresne, Tarek Fahmy, Jaehong Kim, Chinedum Osuji, Jordan Peccia, André Taylor, Corey Wilson, Julie Zimmerman

Assistant Professors Drew Gentner, Desirée Plata

FIELDS OF STUDY

Fields include nanomaterials, soft matter, interfacial phenomena, biomolecular engineering, energy, water, and sustainability.

Computer Science

Chair

Joan Feigenbaum

Director of Graduate Studies

Vladimir Rokhlin (108 AKW, 203.432.1283, vladimir.rokhlin@yale.edu)

Professors Dana Angluin, James Aspnes, Dirk Bergeman (*Economics*), Julie Dorsey, Stanley Eisenstat, Joan Feigenbaum, Michael Fischer, David Gelernter, Mark Gerstein (*Molecular Biophysics & Biochemistry*), Paul Hudak, Drew McDermott, Vladimir Rokhlin, Holly Rushmeier, Brian Scassellati, Martin Schultz (*Emeritus*), Zhong Shao, Avi Silberschatz, Daniel Spielman, Yang Richard Yang, Steven Zucker

Associate Professor Daniel Abadi

Assistant Professors Ruzica Piskac, Frederick Shic (*Child Study Center*)

Senior Lecturer Stephen Slade

Lecturers Donya Quick, Ewa Syta [Sp], Kate Tsui [F]

FIELDS OF STUDY

Artificial intelligence (vision, robotics, planning, computational neuroscience, knowledge representation, neural networks); programming languages (functional programming, parallel languages and architectures, programming environments, formal semantics, compilation techniques, modern computer architecture, type theory/systems, and meta-programming); systems (databases, operating systems, networks, software engineering); scientific computing (numerical linear algebra, numerical solution of partial differential equations, mathematical software, parallel algorithms); theory of computation (algorithms and data structures, complexity, distributed systems, learning, online algorithms, graph algorithms, geometric algorithms, fault tolerance, reliable communication, cryptography, security, and electronic commerce); and topics of discrete mathematics with application to computer science (combinatorics, graph theory, combinatorial optimization).

Electrical Engineering

Chair

Jung Han

Director of Graduate Studies

Hongxing Tang (hong.tang@yale.edu)

Professors Richard Barker (*Emeritus*), James Duncan, Jung Han, Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), Lawrence Staib, Hemant Tagare, Leandros Tassioulas, J. Rimas Vaisnys, Yang Richard Yang

Associate Professors Minjoo Lee, Richard Lethin (*Adjunct*), Hongxing Tang, Sekhar Tatikonda

Assistant Professors Wenjun Hu, Amin Karbasi, Jakub Szefer, Fengnian Xia

FIELDS OF STUDY

Fields include biomedical sensory systems, communications and signal processing, neural networks, control systems, wireless networks, sensor networks, microelectromechanical and nanomechanical systems (MEMS and NEMS), nanoelectronic science and technology, optoelectronic materials and devices, semiconductor materials and devices, computer engineering, computer architecture, hardware security, and VLSI design and testing.

Mechanical Engineering & Materials Science

Chair

Udo Schwarz

Director of Graduate Studies

Jan Schroers (jan.schroers@yale.edu)

Professors Charles Ahn, Ira Bernstein (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Shun-Ichiro Karato, Marshall Long, Brian Scassellati, Jan Schroers, Udo Schwarz, Mitchell Smooke

Associate Professors Aaron Dollar, Eric Dufresne, Sohrab Ismail-Beigi, Corey O'Hern, Nicholas Ouellette

Assistant Professors Eric Brown, Judy Cha, Madhusudhan Venkadesan

Lecturers Beth Anne Bennett, Kailasnath Purushothaman, Joseph Zinter

FIELDS OF STUDY

Fluids and thermal sciences Dynamics and stability of drops and bubbles; dynamics of thin liquid films; macroscopic and particle-scale dynamics of emulsions, foams, and colloidal suspensions; electrospray theory and characterization; electrical propulsion applications; combustion and flames; computational methods for fluid dynamics and reacting flows; turbulence; particle tracking in fluid mechanics; laser diagnostics of reacting and nonreacting flows; and magnetohydrodynamics.

Soft matter/complex fluids Jamming and slow dynamics in gels, glasses, and granular materials; mechanical properties of soft and biological materials; and structure and dynamics of macromolecules. Several faculty in Mechanical Engineering are also affiliated with the Integrated Graduate Program in Physical and Engineering Biology (<http://peb.yale.edu>).

Materials science Studies of thin films; nanoscale effects on electronic properties of two-dimensional layered materials; amorphous metals and nanomaterials including nanocomposites, characterization of crystallization and other phase transformations; nanoimprinting; atomic-scale investigations of surface interactions and properties; classical and quantum nanomechanics; nanotribology; nanostructured energy applications; combinatorial materials science; and in situ transmission electron and scanning probe microscopy.

Robotics/mechatronics Machine and mechanism design; dynamics and control; robotic grasping and manipulation; human-machine interface; rehabilitation robotics; haptics; electromechanical energy conversion; biomechanics of human movement; and human-powered vehicles.

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to the Ph.D. program in Biomedical Engineering, Chemical & Environmental Engineering, and Mechanical Engineering & Materials Science may also apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Special Requirements for the Ph.D. Degree

The online publication *Qualification Procedure for the Ph.D. Degree in Engineering & Applied Science* describes in detail all requirements in Biomedical Engineering, Chemical & Environmental Engineering, Electrical Engineering, and Mechanical Engineering & Materials Science. The student is strongly encouraged to read it carefully; key requirements are briefly summarized below. See Computer Science's departmental entry in this bulletin for special requirements for the Ph.D. in Computer Science.

The student plans his/her course of study in consultation with faculty advisers (the student's advisory committee). A minimum of ten term courses is required, to be completed in the first two years. Well-prepared students may petition for course waivers based on courses taken in a previous graduate degree program. Similarly, students may place out of certain ENAS courses via an examination prepared by the course instructor. Placing out of the course will not reduce the total number of required courses. Core courses, as identified by each department/program, should be taken in the first year unless otherwise noted by the department. With the permission of the departmental director of graduate studies (DGS), students may substitute more advanced courses that cover the same topics. No more than two courses can be Special Investigations, and at least two must be outside the area of the dissertation. All students must complete a one-term course, ENAS 508b, Responsible Conduct of Research, in the first year of study.

Each term, the faculty review the overall performance of the student and report their findings to the DGS who, in consultation with the associate dean, determines whether the student may continue toward the Ph.D. degree. By the end of the second term, it is expected that a faculty member has agreed to accept the student as a research assistant. By December 5 of the third year, an area examination must be passed and a written prospectus submitted before dissertation research is begun. These events result in the student's admission to candidacy. Subsequently, the student will report orally each year to the full advisory committee on progress. When the research is nearing completion, but before the thesis writing has commenced, the full advisory committee will advise the student on the thesis plan. A final oral presentation of the dissertation research is required to be given during term time. There is no foreign language requirement.

Teaching experience is regarded as an integral part of the graduate training program at Yale University, and all Engineering graduate students are required to serve as a Teaching Fellow for one term, typically during year two. Teaching duties normally involve assisting in laboratories or discussion sections and grading papers and are not expected to require more than ten hours per week. Students are not permitted to teach during the first year of study.

If a student was admitted to the program having earned a score of less than 26 on the Speaking Section of the Internet-based TOEFL, the student will be required to take an English as a Second Language (ESL) course each semester at Yale until the Graduate School's Oral English Proficiency standard has been met. This must be achieved by the end of the third year in order for the student to remain in good standing.

Core Course Requirements for the Ph.D. Degree

Biomedical Engineering Physiological Systems (ENAS 550), Physical and Chemical Basis of Bioimaging and Biosensing (ENAS 510). One of these courses may be taken in the second year. In addition, there is a math requirement that must be met by taking Mathematical Methods I (ENAS 500) or Advanced Engineering Mathematics (ENAS 505) in the first year.

Chemical & Environmental Engineering (Chemical track) Mathematical Methods I (ENAS 500), Classical and Statistical Thermodynamics (ENAS 521), Energy, Mass, and Momentum Processes (ENAS 603), Chemical Reaction Engineering (ENAS 602).

Chemical & Environmental Engineering (Environmental track) Aquatic Chemistry (ENAS 640), Biological Processes in Environmental Engineering (ENAS 641), Environmental Physicochemical Processes (ENAS 642). In addition, there is a math requirement that must be met by taking one of the following courses in the first year: Mathematical Methods I (ENAS 500), Applied Spatial Statistics (F&ES 781), Multivariate Statistical Analysis in the Environmental Sciences (F&ES 758), Introductory Data Analysis (STAT 530), or Multivariate Statistical Methods for the Social Sciences (STAT 660).

Computer Science See Computer Science's departmental entry in this bulletin.

Electrical Engineering (Computer Engineering track) Introduction to VLSI System Design (ENAS 875), Computer Organization and Architecture (ENAS 967).

Electrical Engineering (Microelectronics track) Two of the following four courses: Photonics and Optical Electronics (ENAS 511), Heterojunction Devices (ENAS 718), Solid State Physics I (ENAS 850), Semiconductor Silicon Devices and Technology (ENAS 986).

Electrical Engineering (System and Signals track) Linear Systems (ENAS 902), Stochastic Processes (ENAS 502).

Mechanical Engineering & Materials Science Students must demonstrate competence in one of four areas: Fluid and Thermal Sciences, Soft Matter/Complex Fluids, Materials Science, or Robotics/Mechatronics. As a minimum requirement, students must take at least one of the following courses in the first year of study: Intelligent Robotics (CPSC 573), Classical and Statistical Thermodynamics (ENAS 521), Biological Physics (ENAS 541), Polymer Physics (ENAS 606), Synthesis of Nanomaterials (ENAS 615), Statistical Physics II (PHYS 628), Theoretical Fluid Dynamics (ENAS 704), Fundamentals of Combustion (ENAS 708), Solidification and Phase Transformations (ENAS 752), Introduction to Robot Analysis (ENAS 777), Forces on the Nanoscale (ENAS 787), Soft Condensed Matter Physics (ENAS 848), Solid State Physics I (ENAS 850), Solid State Physics II (ENAS 851), Linear Systems (ENAS 902) – if not used to satisfy the math requirement – and Systems and Control (ENAS 936). In addition, there is a math requirement that must be met by taking Mathematical Methods I (ENAS 500), Mathematical Methods of Physics (PHYS 506), or Linear Systems (ENAS 902), depending on the research area.

Honors Requirement

Students must meet the Honors requirement in at least two term courses (excluding Special Investigations) by the end of the second term of full-time study. An extension of one term may be granted at the discretion of the DGS.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. (en route to the Ph.D.) To qualify for the M.S., the student must pass eight term courses; no more than two may be Special Investigations. An average grade of at least High Pass is required, with at least one grade of Honors.

Terminal Master's Degree Program Students may also be admitted directly to a terminal master's degree program. The requirements are the same as for the M.S. en route to the Ph.D., although there are no core course requirements for students in this program. This program is normally completed in one year, but a part-time program may be spread over as many as four years. Some courses are available in the evening, to suit the needs of students from local industry.

Program materials are available upon request to the Office of Graduate Studies, School of Engineering & Applied Science, Yale University, PO Box 208267, New Haven CT 06520-8267; e-mail, engineering@yale.edu; Web site, <http://seas.yale.edu>.

Courses

The list of courses may be slightly modified by the time term begins. Please check the Web site <http://students.yale.edu/oci> for the most updated course listing.

ENAS 500a/APHY 500a, Mathematical Methods I Paul Van Tassel

A beginning, graduate-level introduction to ordinary and partial differential equations, vector analysis, linear algebra, and complex functions. Laplace transform, series expansion, Fourier transform, and matrix methods are given particular attention. Applications to problems frequently encountered in engineering practice are stressed throughout.
TTH 9–10:15

[ENAS 501b, Mathematical Methods II]

ENAS 502b^U, Stochastic Processes Amin Karbasi

A study of stochastic processes and estimation, including fundamentals of detection and estimation. Vector space representation of random variables, Bayesian and Neyman-Pearson hypothesis testing, Bayesian and nonrandom parameter estimation, minimum-variance unbiased estimators, and the Cramer-Rao bound. Stochastic processes. Linear prediction and Kalman filtering. Poisson counting process and renewal processes, Markov chains, branching processes, birth-death processes, and semi-Markov processes. Applications from communications, networking, and stochastic control. MW 1–2:15

ENAS 503b/AMTH 605b/STAT 667b, Probabilistic Networks, Algorithms, and Applications

This course examines probabilistic and computational methods for the statistical modeling of complex data. The emphasis is on the unifying framework provided by graphical models, a formalism that merges aspects of graph theory and probability theory. Graphical models: Markov random fields, Bayesian networks, and factor graphs. Algorithms: filtering, smoothing, belief-propagation, sum-product, and junction tree. Variational techniques: mean-field and convex relaxations. Markov processes on graphs: MCMC, factored HMMs, and Glauber dynamics. Some statistical physics techniques: cavity and replica methods. Applications to error-correcting codes, computer vision, bio-informatics, and combinatorial optimization. MW 2:30–3:45

[ENAS 505a, Advanced Engineering Mathematics]

[ENAS 506b, Ethics and Professional Development for Biomedical Engineers and Scientists]

ENAS 508b/APHY 508b, Responsible Conduct of Research

Required of first-year students. Presentation and discussion of topics and best practices relevant to responsible conduct of research including academic fraud and misconduct, conflict of interest and conflict of commitment, data acquisition and human subjects, use and care of animals, publication practices and responsible authorship, mentor/trainee responsibilities and peer review, and collaborative science.

ENAS 509a^U, Electronic Materials: Fundamentals and Applications Jung Han

Survey and review of fundamental issues associated with modern microelectronic and optoelectronic materials. Topics include band theory, electronic transport, surface

kinetics, diffusion, materials defects, elasticity in thin films, epitaxy, and Si integrated circuits. TTH 9–10:15

ENAS 510a^U, Physical and Chemical Basis of Bioimaging and Biosensing

Douglas Rothman, Fahmeed Hyder, Fred Sigworth, Richard Carson
Basic principles and technologies for imaging and sensing the chemical, electrical, and structural properties of living tissues and biological macromolecules. Topics include magnetic resonance spectroscopy, MRI, positron emission tomography, and molecular imaging with MRI and fluorescent probes. TTH 1–2:15

ENAS 511a^U, Physics and Devices of Optical Communication Hongxing Tang

A survey of the enabling components and devices that constitute modern optical communication systems. Focus on the physics and principles of each functional unit, its current technological status, design issues relevant to overall performance, and future directions. Permission of the instructor required. MW 2:30–3:45

ENAS 513a^U, Introduction to Analysis

Foundations of real analysis, including metric spaces and point set topology, infinite series, and function spaces. TTH 1–2:15

ENAS 514b^U, Real Analysis Philip Gressman

The Lebesgue integral, Fourier series, applications to differential equations. TTH 1–2:15

ENAS 517b/MB&B 517b3/MCDB 517b3/PHYS 517b3, Methods and Logic in

Interdisciplinary Research Lynne Regan, Julien Berro, Enrique De La Cruz,
Eric Dufresne, Thierry Emonet, Paul Forscher, Jonathon Howard, Megan King,
Simon Mochrie, Corey O'Hern, Thomas Pollard, Yongli Zhang, and staff

This half-term PEB class is intended to introduce students to integrated approaches to research. Each week, the first of two sessions is student-led, while the second session is led by faculty with complementary expertise and discusses papers that use different approaches to the same topic (for example, physical and biological or experiment and theory). Counts as 0.5 credit toward graduate course requirements. MW 5–7

ENAS 518a/MB&B 635a^U, Mathematical Methods in Biophysics Yong Xiong,

Julien Berro

Applied mathematical methods relevant to analysis and interpretation of biophysical and biochemical data are covered. Students apply these methods (statistics and error analysis, differential equations, linear algebra, and Fourier transforms) to analyze data from research groups in MB&B. Prerequisites: MATH 120 (or equivalent) and MB&B 600a (or equivalent), or permission of the instructors. MWF 10:30–11:20

ENAS 521b, Classical and Statistical Thermodynamics Chinedum Osuji

A unified approach to bulk-phase equilibrium thermodynamics, bulk-phase irreversible thermodynamics, and interfacial thermodynamics in the framework of classical thermodynamics, and an introduction to statistical thermodynamics. Both the activity coefficient and the equations of state are used in the description of bulk phases. Emphasis on classical thermodynamics of multicomponents, including concepts of stability and criticality, curvature effect, and gravity effect. The choice of Gibbs free energy function covers applications to a broad range of problems in chemical, environmental, biomedical, and

petroleum engineering. The introduction includes theory of Gibbs canonical ensembles and the partition functions, fluctuations; Boltzmann statistics; Fermi-Dirac and Bose-Einstein statistics. Application to ideal monatomic and diatomic gases is covered.

ENAS 525a^U, Optimization I Eric Denardo

A problem-based introduction to linear programs and their generalizations. Includes theory, algorithms, uses and connections to economic reasoning. Optimality conditions for linear and nonlinear programs. Solution methods for linear, integer, and nonlinear programs. Solution concepts for games. Computation of Nash equilibria and Brouwer fixed points. TTH 1–2:15

ENAS 530b^U, Optimization Techniques Sekhar Tatikonda

Fundamental theory and algorithms of optimization, emphasizing convex optimization. The geometry of convex sets, basic convex analysis, the principle of optimality, duality. Numerical algorithms: steepest descent, Newton's method, interior point methods, dynamic programming, unimodal search. Applications from engineering and the sciences. MW 2:30–3:45

ENAS 534a^U, Biomaterials Anjelica Gonzalez

Introduction to materials, classes of materials from atomic structure to physical properties. Major classes of materials: metals, ceramics and glasses, and polymers, addressing their specific characteristics, properties, and biological applications. Throughout the presentation of the synthesis, characterization, and properties of the classes of materials, a connection is made to the selection of materials for use in specific biological applications by matching the material's properties to those necessary for success in the application. Case studies address the successes and failures of particular materials from each of the classes in biological applications. MW 11:35–12:50

ENAS 535b^U/PATH 630b, Biomaterial-Tissue Interactions Themis Kyriakides

The course addresses the interactions between tissues and biomaterials, with an emphasis on the importance of molecular- and cellular-level events in dictating the performance and longevity of clinically relevant devices. In addition, specific areas such as biomaterials for tissue engineering and the importance of stem/progenitor cells, and biomaterial-mediated gene and drug delivery are addressed. TTH 9–10:15

ENAS 541b/MB&B 523b/PHYS 523b, Biological Physics Corey O'Hern

An introduction to the physics of several important biological phenomena including transport in the cell cytoplasm, protein folding, DNA packaging, and thermodynamics of protein binding and aggregation. The material and approach are positioned at the interface of the physical and biological sciences, and involve significant computation. This course teaches the basics of computer programming necessary for quantitative studies of biological systems. We start with the foundations of programming in MATLAB. During the course, students perform sophisticated data analyses, view and analyze protein structures, and perform Monte Carlo and molecular dynamics simulations. No prior programming experience is needed. TTH 1–2:15

[ENAS 549b, Biomedical Data Analysis]

ENAS 550a^U/C&MP 550a^U/MCDB 550a^U/PHAR 550a, Physiological Systems

Emile Boulpaep, W. Mark Saltzman

The course develops a foundation in human physiology by examining the homeostasis of vital parameters within the body, and the biophysical properties of cells, tissues, and organs. Basic concepts in cell and membrane physiology are synthesized through exploring the function of skeletal, smooth, and cardiac muscle. The physical basis of blood flow, mechanisms of vascular exchange, cardiac performance, and regulation of overall circulatory function are discussed. Respiratory physiology explores the mechanics of ventilation, gas diffusion, and acid-base balance. Renal physiology examines the formation and composition of urine and the regulation of electrolyte, fluid, and acid-base balance. Organs of the digestive system are discussed from the perspective of substrate metabolism and energy balance. Hormonal regulation is applied to metabolic control and to calcium, water, and electrolyte balance. The biology of nerve cells is addressed with emphasis on synaptic transmission and simple neuronal circuits within the central nervous system. The special senses are considered in the framework of sensory transduction. Weekly discussion sections provide a forum for in-depth exploration of topics. Graduate students evaluate research findings through literature review and weekly meetings with the instructor. MWF 9:25–10:15

ENAS 551a^U, Biotransport and Kinetics Kathryn Miller-Jensen

Creation and critical analysis of models of biological transport and reaction processes. Topics include mass and heat transport, biochemical interactions and reactions, and thermodynamics. Examples from diverse applications, including drug delivery, biomedical imaging, and tissue engineering. TTH 11:35–12:50

ENAS 553a, Immuno-Engineering Tarek Fahmy

An advanced class that introduces immunology principles and methods to engineering students. The course focuses on biophysical principles and biomaterial applications in understanding and engineering immunity. The course is divided into three parts. The first part introduces the immune system: organs, cells, and molecules. The second part introduces biophysical characterization and quantitative modeling in understanding immune system interactions. The third part focuses on intervention, modulation, and techniques for studying the immune system with emphasis on applications of biomaterials for intervention and diagnostics. MW 2:30–3:45

[ENAS 554b^U, Continuum Biomechanics]**ENAS 555b^U, Vascular Mechanics** Jay Humphrey

This course is designed to enable students to apply methods of continuum biomechanics to study diverse vascular conditions and treatments, including aging, atherosclerosis, aneurysms, effects of hypertension, design of tissue-engineered constructs, and vein grafts from an engineering perspective. Emphasis is placed on ensuring that the mechanics is driven by advances in the vascular mechanobiology. TTH 2:30–3:45

[ENAS 557b^U, Musculoskeletal Biomechanics]

ENAS 558a^U, Introduction to Biomechanics Jay Humphrey

An introduction to the biomechanics used in biosolid mechanics, biofluid mechanics, biothermomechanics, and biochemomechanics. Diverse aspects of biomedical engineering, from basic mechanobiology to characterization of materials behaviors and the design of medical devices and surgical interventions. MW 11:35–12:50

ENAS 561a/AMTH 765a/CB&B 562a/MB&B 562a^U/MCDB 562a^U/PHYS 562a,**Dynamical Systems in Biology** Damon Clark, Jonathon Howard

This course covers advanced topics in computational biology. How do cells compute, how do they count and tell time, how do they oscillate and generate spatial patterns? Topics include time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form; mechanics of cell shape and motion; spatially heterogeneous processes; diffusion. Prerequisite: MCDB 561b or equivalent, or a 200-level biology course, or permission of the instructor. TTH 2:30–3:45

[ENAS 563b^U, Fault Tolerant Computer Systems]**ENAS 564b^U, Tissue Engineering** Laura Niklason

Introduction to the major aspects of tissue engineering, including materials selection and information on synthetic and natural scaffolds; cell biology considerations including cues for replication, differentiation, adhesion, and senescence; bioreactor design at laboratory and commercial scale and bioreactor design considerations; and tissue- and organ-level physiology with a focus on design criteria for engineered tissue replacements. Course involves team laboratory project to engineer a connective tissue. Class sessions include lectures and hands-on laboratory work. MW 9:25–10:15, W 2:30–4:30

ENAS 566a^U, Engineering of Drug Delivery W. Mark Saltzman

Drug delivery is a field of biomedical engineering that aims to develop approaches and technologies for getting pharmaceutical agents into particular cells and tissues in the body for a biological effect, while minimizing unwanted toxic or side effects. The course describes two interrelated fields of study: (1) mathematical descriptions of the biological barriers to drug delivery (diffusion, permeation through membranes, lifetime of circulation); and (2) engineering design to improve drug delivery. Prerequisite: ENAS 551a. MW 9–10:15

ENAS 567b^U, Systems Biology of Cell Signaling Andre Levchenko

This course designed for graduate and advanced undergraduate students is focused on systems biology approaches to the fundamental processes underlying the sensory capability of individual cells and cell-cell communication in health and disease. The course is designed to provide deep treatment of both the biological underpinnings and mathematical modeling of the complex events involved in signal transduction. As such, it can be attractive to students of biology, bioengineering, biophysics, computational biology, and applied math. The class is part of the planned larger track in systems biology, being one of its final, more specialized courses. In spite of this, each lecture has friendly introduction to the specific topic of interest, aiming to provide sufficient refreshment of the necessary knowledge. The topics have been selected to represent both cutting-edge directions in systems analysis of signaling processes and exciting settings to explore, making learning

complex notions more enjoyable. Prerequisites: basic knowledge of biochemistry and cell biology, as well as programming experience and basic notions from probability theory and differential equations. MW 4–5:15

ENAS 570b^U/C&MP 560b^U/MCDB 560b^U/PHAR 560b, Cellular and Molecular

Physiology: Molecular Machines in Human Disease Emile Boulpaep,
Fred Sigworth

The course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiological levels. Students learn about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed on the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiological behaviors of cells and tissues are also stressed. Molecular motors are introduced and their mechanical relationship to cell function is explored. Students read papers from the scientific literature that establish the connections between mutations in genes encoding membrane proteins and a wide variety of human genetic diseases. MWF 9:25–10:15

ENAS 575a^U/CPSC 575a^U, Computational Vision and Biological Perception

Steven Zucker

An overview of computational vision with a biological emphasis. Suitable as an introduction to biological perception for computer science and engineering students, as well as an introduction to computational vision for mathematics, psychology, and physiology students. MW 2:30–3:45

[ENAS 576b^U/AMTH 667b/CPSC 576b^U, Advanced Computational Vision]

ENAS 580a, Clinical Research in Biomedical Engineering W. Mark Saltzman,
James Duncan

The course is designed to provide graduate students in Biomedical Engineering with a broad perspective of research topics in their field, with a particular focus on topics directed toward clinically oriented research. Students attend a series of lectures by speakers from both inside and outside the Yale BME research community covering the areas of biomaterials/tissue engineering, drug delivery systems, biomechanics, and bioimaging. The week after each lecture, students gather to address questions posed by the lecturing faculty and the course organizers, with discussion led by the students themselves. In addition, each student picks a topic related to one of the lectures given during the term and submits an extended written analysis. T 4–5:50

ENAS 585a^U, Fundamentals of Neuroimaging Fahmeed Hyder, Douglas Rothman

The neuroenergetic and neurochemical basis of several dominant neuroimaging methods, including fMRI. Topics range from technical aspects of different methods to interpretation of the neuroimaging results. Controversies and/or challenges for application of fMRI and related methods in medicine are identified. W 3:30–5:30

[ENAS 600a^U, Computer-Aided Engineering]

[ENAS 601a, Materials Chemistry]**ENAS 602b, Chemical Reaction Engineering** Eric Altman

Applications of physical-chemical and chemical-engineering principles to the design of chemical process reactors. Ideal reactors treated in detail in the first half of the course, practical homogeneous and catalytic reactors in the second. TTH 1–2:15

ENAS 603a, Energy, Mass, and Momentum Processes Michael Loewenberg

Application of continuum mechanics approach to the understanding and prediction of fluid flow systems that may be chemically reactive, turbulent, or multiphase.

[ENAS 605b, Colloidal Chemical Engineering]**[ENAS 606b, Polymer Physics]****[ENAS 608b, Surface and Surface Processes]****ENAS 609b, Nanotechnology for Energy** Lisa Pfefferle

This is a comprehensive course with content at the intersection of nanoscale science, engineering, and technology, including application areas and nanofabrication technique. Topics include nanoscaled photovoltaic cells, hydrogen storage, fuel cells, and nanoelectronics; layer-by-layer assembly; organic-inorganic mesostructures; colloidal crystals, organic monolayers, proteins, DNA and abalone shells; synthesis of carbon nanotubes, nanowire, and nanocrystals; microelectromechanical systems (MEMs) devices; photolithography, electron beam lithography, and scanning probe lithography; lithium-based batteries; and nanomanufacturing (roll to roll, nanoimprint lithography, inkjet printing).

ENAS 610a^U, Biomolecular Engineering Corey Wilson

A survey of the principles and scope of biomolecular engineering. Discussion of concepts at the interface of applied mathematics, biology, biophysical chemistry, and chemical engineering that are used to develop novel molecular tools, materials, and approaches based on biological building blocks and machinery. Modeling the physicochemical properties that confer function in biological systems; low- and high-resolution protein engineering; the design of synthetic interactomes.

ENAS 611a^U, Separation Processes Lisa Pfefferle

Theory and design of separation processes for multicomputer and/or multiphase mixtures via equilibrium and rate phenomena. Included are single-stage and cascaded absorption, adsorption, extraction, distillation, filtration, and crystallization processes.

[ENAS 612a^U, Biomolecular Engineering Laboratory]**[ENAS 614b, Surface and Thin-Film Characterization]****[ENAS 615a, Synthesis of Nanomaterials]****[ENAS 616b, Multiscale Modeling and Design in Biology]****[ENAS 618a, Principles and Practice of Heterogeneous Catalysis]**

ENAS 626a^U, Chemical Engineering Process Control Eric Altman

Transient regime modeling and simulations of chemical processes. Conventional and state-space methods of analysis and control design. Applications of modern control methods in chemical engineering. Course work includes a design project.

[ENAS 628b^U, Sensors and Biosensors]

[ENAS 638a, Water Chemistry]

[ENAS 639a, Management of Water Resources and Environmental Systems]

ENAS 640b/F&ES 707b^U, Aquatic Chemistry Gaboury Benoit

A detailed examination of the principles governing chemical reactions in water. Emphasis is on developing the ability to predict the aqueous chemistry of natural and perturbed systems based on a knowledge of their biogeochemical setting. Focus is on inorganic chemistry, and topics include elementary thermodynamics, acid-base equilibria, alkalinity, speciation, solubility, mineral stability, redox chemistry, and surface complexation reactions. Illustrative examples are taken from the aquatic chemistry of estuaries, lakes, rivers, wetlands, soils, aquifers, and the atmosphere. A standard software package used to predict chemical equilibria may also be presented.

ENAS 641a^U, Biological Processes in Environmental Engineering Jordan Peccia

Fundamental aspects of microbiology and biochemistry, including stoichiometry, kinetics, and energetics of biochemical reactions, microbial growth, and microbial ecology, as they pertain to biological processes for the transformation of environmental contaminants; principles for analysis and design of aerobic and anaerobic processes, including suspended- and attached-growth systems, for treatment of conventional and hazardous pollutants in municipal and industrial wastewaters and in groundwater.

ENAS 642b, Environmental Physicochemical Processes Menachem Elimelech

Fundamental and applied concepts of physical and chemical ("physicochemical") processes relevant to water quality control. Topics include chemical reaction engineering, overview of water and wastewater treatment plants, colloid chemistry for solid-liquid separation processes, physical and chemical aspects of coagulation, coagulation in natural waters, filtration in engineered and natural systems, adsorption, membrane processes, disinfection and oxidation, disinfection by-products. TTH 2:30–3:45

ENAS 643b, Transport and Fate of Organic Chemicals in the Environment

Desirée Plata

Fundamental chemical and physical processes controlling the distribution, transport, and transformation of anthropogenic organic chemicals in aqueous environments including soils, sediments, and groundwater. The course provides basic knowledge about the following: the use of chemical and physical principles to quantify the thermodynamics and kinetics of individual processes; the use of chemical structure to understand these processes at the molecular level; and a framework for evaluation of the relative importance of these processes so that the fate of a particular chemical in a particular environment may be predicted.

[ENAS 644b, Environmental Chemical Kinetics]**ENAS 645b/F&ES 884b, Industrial Ecology** Thomas Graedel

Industrial ecology studies (1) the flows of materials and energy in industrial and consumer activities, (2) the effects of these flows on the environment, and (3) the influences of economic, political, regulatory, and social factors on the flow, use, and transformation of resources. The goals of the course are to define and describe industrial ecology; to demonstrate the relationships among production, consumption, sustainability, and industrial ecology in diverse settings, from firms to cities to international trade flows; to show how industrial ecology serves as a framework for the consideration of environmental and sustainability-related aspects of science, technology, and policy; and to define and describe tools, applications, and implications of industrial ecology. MW 1–2:15

[ENAS 646b/F&ES 714b^U, Environmental Hydrology]**ENAS 648a^U, Environmental Transport Processes** Menachem Elimelech

Analysis of transport phenomena governing the fate of chemical and biological contaminants in environmental systems. Emphasis on quantifying contaminant transport rates and distributions in natural and engineered environments. Topics include distribution of chemicals between phases; diffusive and convective transport; interfacial mass transfer; contaminant transport in groundwater, lakes, and rivers; analysis of transport phenomena involving particulate and microbial contaminants.

ENAS 649a/MGT 611a, Policy Modeling Edward Kaplan

Building on earlier course work in quantitative analysis and statistics, Policy Modeling provides an operational framework for exploring the costs and benefits of public policy decisions. The techniques employed include “back of the envelope” probabilistic models, Markov processes, queuing theory, and linear/integer programming. With an eye toward making better decisions, these techniques are applied to a number of important policy problems. In addition to lectures, assigned articles and text readings, and short problem sets, students are responsible for completing a take-home midterm exam and a number of cases. In some instances, it is possible to take a real problem from formulation to solution, and compare the student’s own analysis to what actually happened. Prerequisites: Decision Analysis and Game Theory, Data Analysis and Statistics, or a demonstrated proficiency in quantitative methods.

[ENAS 655a^U, Environmental Risk Assessment]**[ENAS 658a, MEMS Design]****ENAS 660b^U/F&ES 885b, Green Engineering and Sustainability** Julie Zimmerman

This hands-on course highlights the key approaches to advancing sustainability through engineering design. The class begins with discussions on sustainability, metrics, general design processes, and challenges to sustainability. The current approach to design, manufacturing, and disposal is discussed in the context of examples and case studies from various sectors. This provides a basis for what and how to consider when designing products, processes, and systems to contribute to furthering sustainability. The fundamental engineering design topics to be addressed include toxicity and benign alternatives,

pollution prevention and source reduction, separations and disassembly, material and energy efficiencies and flows, systems analysis, biomimicry, and life cycle design, management, and analysis. Students tackle current engineering and product design challenges in a series of class exercises and a final design project. MW 1–2:15

ENAS 673b^U, Air Quality and Energy Drew Gentner

The production and use of energy are among the most important sources of air pollution worldwide. It is impossible to effectively address the impacts and regulation of air quality without understanding the impacts and behavior of emissions from energy sources. Through an assessment of emissions and physical/chemical processes, the course explores advanced topics (at the graduate level) on the behavior of pollutants from energy systems in the atmosphere. Topics include traditional and emerging energy technology, climate change, atmospheric aerosols, tropospheric ozone, as well as transport/modeling/mitigation. TTH 11:35–12:50

[ENAS 703a^U, Introduction to Nanomaterials and Nanotechnology]

ENAS 704a, Theoretical Fluid Dynamics Juan de la Mora

Derivation of the equations of fluid motion from basic principles. Potential theory, viscous flow, flow with vorticity. Topics in hydrodynamics, gas dynamics, stability, and turbulence. TTH 11:35–12:50

[ENAS 705b/MB&B 715b/PHYS 705b, Numerical Simulations of Liquids]

[ENAS 708a, Fundamentals of Combustion]

[ENAS 711b^U, Biomedical Microtechnology and Nanotechnology]

[ENAS 718a^U, Heterojunction Devices]

ENAS 747a^U, Applied Numerical Methods I Beth Anne Bennett

The derivation, analysis, and implementation of various numerical methods. Topics include root-finding methods, numerical solution of systems of linear and nonlinear equations, eigenvalue/eigenvector approximation, polynomial-based interpolation, and numerical integration. Additional topics such as computational cost, error analysis, and convergence are addressed in a variety of contexts. TTH 11:35–12:50

ENAS 748b^U, Applied Numerical Methods II Beth Anne Bennett

The derivation, analysis, and implementation of numerical methods for the solution of ordinary and partial differential equations, both linear and nonlinear. Additional topics such as computational cost, error estimation, and stability analysis are studied in several contexts throughout the course. ENAS 747a is not a prerequisite. TTH 11:35–12:50

[ENAS 752a, Solidification and Phase Transformations]

[ENAS 758b^U, Multiscale Models of Biomechanical Systems]

[ENAS 761a/G&G 525a, Introduction to Continuum Mechanics]

[ENAS 777, Introduction to Robot Analysis]

ENAS 787b, Forces on the Nanoscale Udo Schwarz

Modern materials science often exploits the fact that atoms located at surfaces or in thin layers behave differently from bulk atoms to achieve new or greatly altered material properties. The course provides an in-depth discussion of intermolecular and surface forces, which determine the mechanical and chemical properties of surfaces. In the first part, we discuss the fundamental principles and concepts of forces between atoms and molecules. Part two generalizes these concepts to surface forces. Part three then gives a variety of examples. The course is of interest to students studying thin-film growth, surface coatings, mechanical and chemical properties of surfaces, soft matter including biomembranes, and colloidal suspensions.

[ENAS 802a^U, Nano and Microsystem Technology]

ENAS 805b^U, Biotechnology and the Developing World Anjelica Gonzalez

This interactive course explores how advances in biotechnology enhance the quality of life in the developing world. Implementing relevant technologies in developing countries is not without important challenges; technical, practical, social, and ethical aspects of the growth of biotechnology are explored. Readings from *Biomedical Engineering for Global Health* as well as recent primary literature; case studies, in-class exercises, and current events presentations. Guest lecturers include biotechnology researchers, public policy ethicists, preventive research physicians, public-private partnership specialists, and engineers currently implementing health-related technologies in developing countries. TTH 1–2:15

ENAS 806b^U, Photovoltaic Energy Minjoo Lee

Electricity from photovoltaic solar cells is receiving increasing attention due to growing world demand for clean power sources. This course primarily emphasizes device physics of photovoltaics; statistics of charge carriers in and out of equilibrium; design of solar cells; and optical, electrical, and structural properties of semiconductors relevant to photovoltaics. Two laboratory sessions and a final project aid students in understanding both the applications and limitations of photovoltaic technology. The main objectives of this course are to equip students with the necessary background and analytical skills to understand and assess established and emerging photovoltaic technologies; to familiarize students with the diverse range of photovoltaic materials; and to connect materials properties to aspects of cell design, processing, and performance.

[ENAS 812b/NSCI 612b, Molecular Transport and Intervention in the Brain]

[ENAS 821b^U, Physics of Medical Imaging]

ENAS 825b, Physics of Magnetic Resonance Spectroscopy in Vivo Graeme Mason, Robin de Graaf

The physics of chemical measurements performed with nuclear magnetic resonance spectroscopy, with special emphasis on applications to measurement studies in living tissue. Concepts that are common to magnetic resonance imaging are introduced. Topics include safety, equipment design, techniques of spectroscopic data analysis, and metabolic modeling of dynamic spectroscopic measurements. MW 11:35–12:50

ENAS 830b, Biomedical Optical Imaging Michael Choma

This course is an introduction to biomedical imaging using light. It covers different mechanisms of image formation as well as the physical properties of light that enable these different mechanisms. There is a particular emphasis on confocal microscopy and optical coherence tomography. The course also discusses the clinical use of biomedical optical imaging. Prerequisites: prior course work in medical imaging and/or optics is preferable. Please contact the instructor with questions. M 9:25–11:15

[ENAS 836a^U, Biophotonics and Optical Microscopy]**ENAS 848a/PHYS 528a, Soft Condensed Matter Physics** Eric Brown

An introduction to the physics and phenomenology of soft condensed matter: classical systems with mesoscale structure where thermal fluctuations and interfacial forces play essential roles. Discussion of applications to materials science/engineering, nanotechnology, and molecular/cellular biology. Essential concepts from statistical thermodynamics, classical mechanics, and electricity and magnetism are reviewed/developed as needed.

ENAS 850a^U and 851b^U/APHY 548a^U and 549b^U/PHYS 548a^U and 549b^U, Solid State Physics I and II Victor Henrich [F], Michel Devoret [Sp]

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonons, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. Fall: 2.5 HTBA; Spring: TTH 2:30–3:45

ENAS 866a^U, CMOS Transistors and Beyond Tso-Ping Ma

This course covers the science and technology of current and future CMOS devices, including transistor physics, device processing, and characterization. In addition to weekly lectures, students are expected to make an in-depth study of a relevant topic (to be determined jointly with the instructor), write a term paper, and make an associated oral presentation to the class. T 3:30–5:30

[ENAS 875a^U, Introduction to VLSI System Design]**ENAS 880a/NSCI 523a, Imaging Drugs in the Brain** Evan Morris, Kelly Cosgrove, Michelle Hampson

Seminar course to explore the uses of PET, SPECT, and fMRI to study the mechanisms of action and long-term effects of drugs (legal and illegal) on brain function. Basic research is the main focus, augmented by two class periods allotted to uses of imaging in drug development by Pharma. Syllabus is comprised of review articles, book chapters, and journal articles. Some class periods begin with a short lecture to cover methodological concepts, followed by discussion of reading material. Topics include basic understanding of imaging technology (physics, biochemistry, and mathematics) as it relates to imaging of drugs, receptors, neurotransmitters; understanding the primary outcomes of imaging experiments; imaging experiment design; recent findings related to drug abuse; common neurophysiological pathways of addictive drugs (how to image reward); and uses of imaging in drug development (what do drug companies want to measure?). T 3:30–5:20

ENAS 900b, Distributed Computation and Decision Making A. Stephen Morse

Within the field of network science there has long been interest in distributed computation and distributed decision-making problems of many types. Among these are consensus and flocking problems, the multi-robot rendezvous problem, distributed averaging, distributed solutions to linear algebraic equations, social networking problems, localization of sensors in a multisensor network, and the distributed management of robotic formations. The aim of this course is to explain what these problems are and to discuss their solutions. Related concepts from spectral graph theory, rigid graph theory, non-homogeneous Markov chain theory, stability theory, and linear system theory are covered. Prerequisite: although most of the mathematics needed are covered in the lectures, students taking this course should have a working understanding of basic linear algebra.

ENAS 902a^U, Linear Systems A. Stephen Morse

Background linear algebra; finite-dimensional, linear-continuous, and discrete dynamical systems; state equations, pulse and impulse response matrices, weighting patterns, transfer matrices. Stability, Lyapunov's equation, controllability, observability, system reduction, minimal realizations, equivalent systems, McMillan degree, Markov matrices. Recommended for all students interested in feedback control, signal and image processing, robotics, econometrics, and social and biological networks. MW 1–2:15

ENAS 907a^U, Computers for Cognition Richard Lethin

Introduction to the development of computer architectures specialized for cognitive processing, both offline “thinking machines” as well as embedded devices. History of machines starting with early conceptions in defense systems to contemporary initiatives. Instruction sets, memory systems, parallel processing, analog architectures, probabilistic architectures, graph computing architectures, machine-learning architectures. Application and algorithm characteristics. TH 1:30–3:20

[ENAS 912a^U, Biomedical Image Processing and Analysis]**[ENAS 913b, Probability and Estimation Theory for Image Analysis]****[ENAS 915b, Tracer Kinetics and Modeling]****[ENAS 920b, Programming for Image Analysis]****[ENAS 921a, Advanced Topics in Computer Engineering]****ENAS 930b^U, Energy Semiconductor Fundamentals** Jung Han

Topics to include semiconductor physics, optical properties, electrical transport properties, thermal properties, and piezoelectric properties. TTH 9–10:15

ENAS 936a^U, Systems and Control Kumpati Narendra

Design of feedback control systems with applications to engineering, biological, and economic systems. Topics include state-space representation, stability, controllability, and observability of discrete-time systems; system identification; optimal control of systems with multiple outputs. TTH 11:35–12:50

ENAS 938b^U, Neural Networks for Pattern Recognition, Identification, and Control

Kumpati Narendra

Following a brief introduction to the theory of artificial neural networks and linear adaptive control, the course discusses in detail adaptive identification and control problems in nonlinear dynamical systems. Students work on individual projects, and the final grade depends on their performance in the midterm, problem sets, and the final project report. Prerequisite: ENAS 936a or permission of the instructor. TTH 11:35–12:50

ENAS 944b^U, Digital Communications Systems Wenjun Hu

An introduction to the rapidly expanding field of mobile and fixed, voice and data communications systems. A review of analog and digital signals and their time and frequency domain representations. Topics include modulation methods, including amplitude; frequency and time division multiplexing for continuous and discrete/digital signals; an overview of modern voice and data communications networks; and an overview of information theory, including entropy, the quantification of information, data rates, coding, and compression. Examples and demonstrations are drawn from radio, telephone, television, computer, cellular, and satellite communications networks. MW 9–10:15

ENAS 951b^U, Wireless Communications Wenjun Hu

This course aims to weave together fundamental theory of wireless communications, its application, and the design and implementation of wireless network architectures. The concepts are illustrated using examples such as WiFi and LTE. Particular emphasis is placed on the interplay between concepts and their implementation in real systems. Students can expect to learn background knowledge of some everyday wireless technologies and how to design systems based on the fundamental communications concepts. MW 9–10:15

ENAS 954b^U/STAT 664b^U, Information Theory Andrew Barron

Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithmic complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, redundancy, mutual information, channel capacity. Basic theorems of data compression, data summarization, and channel coding. Applications in statistics. TTH 4–5:15

[ENAS 960a^U/CPSC 536a^U, Networked Embedded Systems and Sensor Networks]**ENAS 962a, Theoretical Challenges in Network Science** Amin Karbasi

This is an interdisciplinary course with a focus on the emerging science of complex networks and their mathematical models. Students learn about the recent research on the structure and analysis of such networks, and on models that abstract their basic properties. Topics include random graphs and their properties, probabilistic techniques for link analysis, centralized and decentralized search algorithms, random walks, diffusion and epidemic processes, and spectral methods. TTH 1–2:15

ENAS 963b, Network Algorithms and Stochastic Optimization Leandros Tassioulas

This course focuses on resource allocation models as well as associated algorithms and design and optimization methodologies that capture the intricacies of complex networking systems in communications computing as well as transportation, manufacturing, and

energy systems. Max-weight scheduling, back-pressure routing, wireless opportunistic scheduling, time-varying topology network control, and energy-efficient management are sample topics to be considered, in addition to Lyapunov stability and optimization, stochastic ordering, and notions of fairness in network resource consumption. TTH 9–10:15

[ENAS 964b, Communication Networks]

ENAS 967a^U, Computer Organization and Architecture Jakub Szefer

Introduction to computer architecture, including computer organization, microprocessors, caches and memory hierarchies, I/O, and storage. Issues involving performance, energy, and security; processor benchmarking. Selected readings from current academic literature. TTH 2:30–3:45

ENAS 986b^U, Semiconductor Silicon Devices and Technology Tso-Ping Ma

Introduction to integrated circuit technology, theory of solid state devices, and principles of device design and fabrication. Laboratory involves the fabrication and analysis of semiconductor devices, including Ohmic contacts, Schottky diodes, p-n junctions, MOS capacitors, MOSFETS, and integrated circuits. MW 9–10:15

ENAS 990a and b, Special Investigations

Faculty-supervised individual projects with emphasis on research, laboratory, or theory. Students must define the scope of the proposed project with the faculty member who has agreed to act as supervisor, and submit a brief abstract to the director of graduate studies for approval.

ENAS 991b/MB&B 591b/MCDB 591b/PHYS 991b, Integrated Workshop

Lynne Regan, Joerg Bewersdorf, Stuart Campbell, Kathryn Miller-Jensen,
Simon Mochrie, Corey O'Hern

This required course for students in PEB involves hands-on laboratory modules with students working in pairs. A biology student is paired with a physics or engineering student; a computation/theory student is paired with an experimental student. The modules are devised so that a range of skills is acquired, and students learn from each other. Modules are hosted in faculty laboratories.

ENGLISH LANGUAGE AND LITERATURE

Linsly-Chittenden Hall, 203.432.2233

<http://english.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Langdon Hammer

Director of Graduate Studies

Caleb Smith (106a LC, 203.432.2226, graduate.english@yale.edu)

Professors Elizabeth Alexander, Leslie Brisman, David Bromwich, Ardis Butterfield (*on leave* [F]), Jill Campbell (*on leave* [F]), Janice Carlisle (*on leave* [Sp]), Michael Denning, Wai Chee Dimock (*on leave* [F]), Roberta Frank, Paul Fry (*on leave* [F]), Jacqueline Goldsby, Langdon Hammer, Margaret Homans, Amy Hungerford, David Scott Kastan (*on leave* [F]), Jonathan Kramnick, Lawrence Manley, Stefanie Markovits, Alastair Minnis, Stephanie Newell, Linda Peterson, Caryl Phillips (*on leave* [Sp]), David Quint (*on leave* [Sp]), Joseph Roach, Marc Robinson (*on leave* [Sp]), John Rogers (*on leave* [F]), Caleb Smith, Robert Stepto (*on leave* [F]), Katie Trumpener, Michael Warner, Ruth Bernard Yeazell

Associate Professors Jessica Brantley (*on leave*), Catherine Nicholson (*on leave*), Anthony Reed (*on leave*), Brian Walsh, R. John Williams (*on leave*)

Assistant Professors Ian Cornelius, Marta Figlerowicz (*on leave*), Benjamin Glaser (*on leave*), Justin Neuman, Jill Richards

Fields of Study

Fields include English language and literature from Old English to the present, American literature, and Anglophone world literature.

Special Admissions Requirements

Application should be accompanied by scores from the GRE and the GRE “Literature in English” subject test, a personal statement of purpose, and a writing sample of up to twenty pages.

Special Requirements for the Ph.D. Degree

In order to fulfill the basic requirements for the program, a student must:

1. Complete twelve courses—six courses with at least one grade of Honors and a maximum of one grade of Pass by July 15 following the first year; at least twelve courses with grades of Honors in at least four of these courses and not more than one Pass by July 15 following the second year. One of these twelve courses must be The Teaching of English (ENGL 990). Courses selected must include one medieval, one early-modern, one eighteenth- and/or nineteenth-century, one twentieth- and/or twenty-first-century.

2. Satisfy the language requirement by the end of the second year. Two languages appropriate to the student's field: strong reading knowledge of one language, to be demonstrated either by (a) passing an advanced literature course at Yale (graduate or upper-level undergraduate), (b) passing a one-hour departmental exam without the use of a dictionary, or (c) passing both English 500 and English 501; and reading knowledge of a second language, to be demonstrated by passing a one-hour departmental exam with a dictionary.
3. Pass the oral examination before or as early as possible in the fifth term of residence. The exam consists of questions on five topics, developed by the student in consultation with examiners and subject to approval by the DGS.
4. Submit a dissertation prospectus, normally by January 15 of the third year.
5. Teach a minimum of two terms.
6. Submit a dissertation.

Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the Ph.D. Admission to candidacy must take place by the end of the third year of study.

Combined Ph.D. Programs

ENGLISH AND AFRICAN AMERICAN STUDIES

The Department of English Language and Literature also offers, in conjunction with the Department of African American Studies, a combined Ph.D. degree in English Language and Literature and African American Studies. For further details, see African American Studies.

ENGLISH AND FILM AND MEDIA STUDIES

The Department of English Language and Literature also offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. degree in English Language and Literature and Film and Media Studies. For further details, see Film and Media Studies.

ENGLISH AND RENAISSANCE STUDIES

The Department of English Language and Literature also offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in English Language and Literature and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in English are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program may receive the M.A. upon completion of seven courses with at least one grade of Honors and a maximum of one grade of Pass, and the passing of two of the languages by departmental examinations.

Terminal Master's Degree Program Students enrolled in the master's degree program must complete either seven term courses or six term courses and a special project within the English department (one or two of these courses may be taken in other departments with approval of the DGS). There must be at least one grade of Honors, and there may not be more than one grade of Pass. Students must also pass examinations in two languages, ancient or modern. Full-time students normally complete the program in one year.

Courses

For expanded course descriptions, please visit the English department Web site: <http://english.yale.edu/courses>.

ENGL 500a/LING 500a, Introduction to Old English Language and Literature

Roberta Frank

The essentials of the language, some prose readings, and close study of several celebrated Old English poems. TTH 9–10:15

ENGL 501b/LING 501b, *Beowulf* and the Northern Heroic Tradition

Roberta Frank

A close reading of *Beowulf*, with some attention to shorter heroic poems. W 9:25–11:15

ENGL 546a, Chaucer's *Canterbury Tales* and Three Earlier Poems: Discourses of

Dissent Alastair Minnis

A study of *The Book of the Duchess*, *The House of Fame*, and *The Legend of Good Women*, in addition to a substantial selection of *Canterbury Tales*. These texts are related to the "discourses of dissent" current in Chaucer's day, an age of extreme political, social, and intellectual turmoil. TH 1:30–3:20

ENGL 549b, *Boethius's Consolation of Philosophy* and Its Afterlife

Ian Cornelius

Boethius's *Consolation of Philosophy* and its tradition, with an emphasis on medieval and early modern England. A study of the commentary tradition, major translations, adaptations, and associated literary works. *The Old English Boethius* (ascribed to King Alfred), Alain de Lille's *Complaint of Nature*, commentaries of William of Conches and Nicholas Trevet, Jean de Meun's *Romance of the Rose*, Geoffrey Chaucer's *Troilus and Criseyde*, John Walton's verse translation, Robert Henryson's *Orpheus and Eurydice*, Thomas More's *Dialogue of Comfort*, and the translation of Queen Elizabeth I. Major topics include textual history, theory and practice of translation, literary form, and moral philosophy. M 3:30–5:20

ENGL 606a, History and Historical Drama in the Age of Shakespeare

Lawrence Manley

A study of the representation of history on the English stage in the reigns of Elizabeth I and James I. Plays by Shakespeare, Marlowe, Peele, Heywood, Ford, and others in relation to both nondramatic forms of historical writing and contemporary affairs. W 3:30–5:20

ENGL 672b/CPLT 672b, *Milton*

John Rogers

This course studies Milton's poetry and some of his controversial prose. We investigate the relation of the poetry to its historical contexts, focusing on the literary, religious,

social, and political forces that shaped Milton's verse. We survey and assess some of the dominant issues in contemporary Milton studies, examining the types of readings that psychoanalytic, feminist, Marxist, and historicist critics have produced. A brief oral report and a term paper (as well as a prospectus and preliminary bibliography for the term paper) required. T 9:25–11:15

ENGL 721b, Burke, England, and the French Revolution David Bromwich

A partial survey of the political writings of Burke in the context of the theory of empire and of revolution. We emphasize his writings on India and France, which reveal a common theme: innovation—sudden change in a way of life—always depends on violence, whether its agents are internal or external to the society. We touch on a wider subject: the birth of modern ideology, from the demand for systematic excuses to justify empire and revolution. M 9:25–11:15

ENGL 730b, Literature and Ecology in the Eighteenth Century Jonathan Kramnick

This is a course on three varieties of ecological representation during the long eighteenth century: countryside, city, and imperial periphery. We look at the role of several major literary genres—georgic, loco-descriptive, satire, the novel, the essay, epic, travel writing—in constituting a sense of place and environment, through developing ideas of landscape, wilderness, or the garden, of stranger sociability and urban publicity, and of the exotic or oceanic or savage. We pay particular attention to the relation between form and phenomenology in the depiction of ecological surround. Writers include Dryden, Wycherley, Rochester, Behn, Addison, Gay, Defoe, Ward, Swift, Haywood, Fielding, Pope, Cook, Boswell, and Burney, read alongside theory and history from Raymond Williams to the Anthropocene. W 3:30–5:20

ENGL 810b^U, Victorian Poetry Leslie Brisman

The major Victorian poets, Tennyson and Browning, in the context of the romanticism they inherited and transformed. A selection of other Victorians whose genius or popularity warrants attention, including Morris, the Rossettis, Hardy, Swinburne, Hopkins, and Barrett Browning. MW 11:35–12:50

ENGL 828a, Nineteenth-Century Long Narrative Poetry Stefanie Markovits

A consideration of the long narrative poems of the nineteenth century, from *The Prelude* and *Don Juan* to works by Clough, Tennyson, Elizabeth Barrett Browning, and Robert Browning. We look at how these poems engage with competing genres and modes—including epic, the novel, drama, and lyric—in order to tell a story. M 3:30–5:20

ENGL 830b/HSAR 678b, Portraiture and Character from Hogarth to Woolf

Ruth Bernard Yeazell

Case studies in the visual and verbal representation of persons in Anglo-American painting and fiction, with particular attention to novels that themselves include portraits or address relations between the two media. Novelists tentatively to include Henry Fielding, Jane Austen, Henry James, Edith Wharton, Oscar Wilde, and Virginia Woolf. Painters to include William Hogarth, Joshua Reynolds, Thomas Gainsborough, Thomas Lawrence, James McNeill Whistler, John Singer Sargent, and Vanessa Bell. Selected readings in recent theories of fictional character and in the history and theory of portraiture. Whenever possible, we draw on paintings in Yale's collections. TH 1:30–3:20

ENGL 833b^U/AMST 723b^U, The Nonhuman in Literature and Culture since 1800

Wai Chee Dimock

Nonhuman life forms in fiction and poetry from the nineteenth century to the twenty-first, including plants and animals, “legal persons” such as corporations, large-scale phenomena such as the market and the Internet, war and environmental catastrophes, as well as intelligent machines and extraterrestrial aliens. Authors include Herman Melville, Emily Dickinson, Upton Sinclair, Elizabeth Bishop, Louise Erdrich, Richard Powers, Don DeLillo, Cormac McCarthy, Philip K. Dick, Ursula Le Guin, Octavia Butler, Dave Eggers. Theorists include Giorgio Agamben, Jane Bennett, Jacques Derrida, Donna Haraway, N. Katherine Hayles, Fredric Jameson, Brian Massumi, Timothy Morton. W 1:30–3:20

ENGL 847a/AMST 710a, Colonial and National: American Literature to 1830

Michael Warner

An introduction to both the primary texts and the current scholarship in the field, including transatlantic and hemispheric perspectives; the public sphere; evangelicalism and the secular; the rise of African American public intellectuals; varieties of pastoral in contexts of settler colonialism; cultural geographies of literary capitals and the backcountry; nationalism; polite letters and popular genres; Native American literacies; the early American novel; and the modern social imaginary. Writers and preachers studied include Cotton Mather, Jonathan Edwards, Benjamin Franklin, Samson Occom, Ukawsaw Gronniosaw, Phillis Wheatley, John Marrant, Thomas Jefferson, Thomas Paine, Judith Sargent Murray, Timothy Dwight, and Charles Brown. The course ends with the generation of Washington Irving, William Cullen Bryant, James Fenimore Cooper, and Catharine Sedgwick. TH 9:25–11:15

ENGL 897a/AMST 897a, Networked Solitude Amy Hungerford

This seminar examines the American understanding of solitude in the context of social and nonhuman worlds. Topics include environment and solitude, celibacy, urban solitude, religiously or politically motivated social withdrawal, punitive isolation, physical solitude within virtual connectedness, and contagious loneliness. We examine how the practices of reading and writing, both prose and lyric, from the nineteenth century to the present, configure these forms of socially networked solitude. Including readings from Emerson, Thoreau, Dickinson, Poe, Sherwood Anderson, Ellison, Reisman, Thomas Merton, Jack Kerouac, Paul Bowles, Annie Dillard, Rebecca Solnit, Marilynne Robinson, Colson Whitehead, and Michael Clune. Additional readings include J.S. Mill and recent lyric theory; Simmel, Goffman, and Riesman; and readings on punitive and religious solitudes. M 1:30–3:20

ENGL 927b/AMST 662b, Prison Studies and Prison Literature Caleb Smith

Since the late 1960s, the U.S. prison system has expanded with unprecedented speed to become the largest in the world. Prisons, once seen as marginal zones of resocialization or containment for an unassimilable few, now appear central to the American political and social orders; we find ourselves in the presence of what critics have called “mass incarceration,” the “penal state,” and a “prison society” organized around a “new Jim Crow.” This seminar considers two intellectual traditions that have emerged in opposition to the new system—an interdisciplinary field of critical prison studies and a canon of prison literature. Approaching the prison from multiple perspectives, we read works

in history (Foucault, Rothman); law (Feeley and Simon, Alexander); social science (Gilmore, Wacquant); and cultural studies (Rodriguez, Davis); as well as literary works by incarcerated and formerly incarcerated writers (Reed, Jackson, Baca). Key problems for discussion include disciplinary subject-formation and dehumanization, unfree labor and racialization, biopolitics and neoliberal governmentality, and the politics and poetics of literary testimony. T 1:30–3:20

ENGL 930a/AMST 685a, Disability: Representation, History, Ethics James Berger
This course provides an introduction to some key topics in contemporary disability studies. Students read sources on the history of the disability rights movement in the United States, and texts on modes of theorizing disability and how these theorizations intersect with and sometimes contest the movement's political assertions. Encounters with artistic and other cultural representations of disability have been central to disability studies, so students read or view significant literary and cinematic accounts of disability. Finally, the class contends with important recent ethical issues pertaining to disability: questions of eugenics, genetic screening, euthanasia, the ethics of care, and disability in a global perspective. T 1:30–3:20

ENGL 937b/AFAM 850b, African Urban Cultures: Mediations of the City

Stephanie Newell

This course approaches the study of African cities and urbanization through the medium of diverse texts, including fiction, nonfiction, popular culture, film, and the arts, as well as scholarly work on African cities. Through these cultural “texts,” attention is given to everyday conceptualizations of the body and the environment, as well as to theoretical engagements with the African city. We study urban relationships as depicted in literature and popular media in relation to Africa's long history of intercultural encounters, including materials dating back to the 1880s and the 1930s. T 9:25–11:15

ENGL 939a/AFAM 610a/AMST 725a, Making the African American Literary

Anthology Elizabeth Alexander

In this research seminar, students work on the compilation of the Library of America's historical anthology of African American poetry from the eighteenth century to the present. Debates about the canon inside and outside the academy have sharpened awareness of writers and works excluded from standard literary histories, and new archival discoveries have broadened our knowledge of material on black poetry at research centers such as the Schomburg Center, Boston University's Gotlieb Archival Research Center, Yale's Beinecke Library, and Emory University (Lucille Clifton papers), and also in privately held collections. Each student is responsible for extensive research on particular poets, periods, and/or eras in a series of short projects, and we work together on assembling the three-hundred-year anthology. Each student then designs an integrative archival project; because the anthology will have a visual component, students may also work with rare photographs, broadsides, recordings, and other ephemera. W 9:25–11:15

ENGL 945b/AFAM 613b/AMST 733b, Black Literature and U.S. Liberalism

Jacqueline Goldsby

An examination of mid-twentieth-century African American literature and the rise of anti-Communist liberalism in American politics and life. We consider how black-authored

fiction, drama, and poetry retheorized liberalism's tenets of agency, subjectivity, property, autonomy, sociality, and governmentality. Rather than accept the persuasive and oft-argued position that black literature published during these decades was "integrationist" and therefore politically suspect, this course interrogates the aesthetic and political ends that the "black liberal imagination" served during these critical decades and into our present-day cultural moment. W 9:25–11:15

ENGL 951b^U/AFAM 563b^U/AMST 651b^U, Ralph Ellison in Context Robert Stepto

This seminar pursues close readings of Ralph Ellison's essays, short fiction, and novels. The "in context" component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African America Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. Texts include Ellison's *Collected Essays*, *Flying Home and Other Stories*, *Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison's Invisible Man*; and A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. M 1:30–3:20

ENGL 952b^U/AFAM 743b^U/AMST 654b^U, American Artists and the African American Book Robert Stepto

Visual art in African American books since 1900. Artists include Winold Reiss, Aaron Douglas, E.S. Campbell, Tom Feelings, and the FSA photographers of the 1930s and '40s. Topics include Harlem Renaissance book art, photography and literature, and children's books. Research in collections of the Beinecke Library and the Yale Art Gallery is encouraged. W 1:30–3:20

ENGL 962a/AMST 677a/CPLT 914a, Modern Drama and Mass Culture

Joseph Roach

Taking account of the genealogy of modern drama in eighteenth-century performance, this seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events from *Oroonoko* (1695) to *Oroonoko*, a new adaptation by Biyi Bandele (1999), and from *The Beggar's Opera* (1728) to *The Threepenny Opera* (1928). Topics include the transformation of classical genres into the *drame*, the commercialization of leisure through the mass-marketing of vicarious experience, and the emerging culture of celebrity. Critical readings include selections from the Frankfurt School, Walter Benjamin, Bertolt Brecht, Raymond Williams, Roland Barthes, and Jean Baudrillard. Plays are drawn from popular comedies, Sheridan to Shaw (*Pygmalion* and *My Fair Lady*), and long-running bourgeois dramas, beginning with Lillo's *The London Merchant*. Readings are supplemented by selected materials on theatrical production, acting, and management. W 9:25–11:15

ENGL 989a, Theory of the Lyric Today Langdon Hammer

This course investigates contemporary debates about the nature of lyric poetry, setting recent statements by Mutlu Blasing, Jonathan Culler, Virginia Jackson, Simon Jarvis, and Gillian White in a post-Romantic tradition in which lyric poetry, dramatic monologue, and avant-garde collage compete with and comment on each other. We read representative essays from the New Criticism, Deconstruction, Russian Formalism, and the Language movement, alongside modernist poetry by Wallace Stevens, T.S. Eliot, Ezra

Pound, Marianne Moore, and Hart Crane, and new poetry by John Ashbery, Claudia Rankine, Srikanth Reddy, and Susan Howe. TH 1:30–3:20

ENGL 990a, The Teaching of English Alfred Guy

An introduction to the teaching of literature and writing with attention to the history of the profession and current issues in higher education. Weekly seminars address a series of issues about teaching: guiding classroom discussion; introducing students to various literary genres; formulating aims and assignments; grading and commenting on written work; lecturing and serving as a teaching assistant; preparing syllabuses and lesson plans. W 1:30–3:20

ENGL 992a, Advanced Pedagogy Janice Carlisle

Training for graduate students teaching introductory expository writing. Students plan a course of their own design on a topic of their own choosing, and they then put theories of writing instruction into practice by teaching a writing seminar. Prerequisite: open only to graduate students teaching ENGL 114.

ENGL 995a/b, Directed Reading

Designed to help fill gaps in students' programs when there are corresponding gaps in the department's offerings. By arrangement with faculty and with the approval of the DGS.

EUROPEAN AND RUSSIAN STUDIES

The MacMillan Center
332 Luce Hall, 203.432.3423
www.yale.edu/macmillan/europeanstudies
M.A.

Chair

Francesca Trivellato (*History*)

Director of Graduate Studies

Bruce Gordon (*Divinity; History; Religious Studies*; 334 Luce, 203.432.3423)

Professors Bruce Ackerman (*Law*), Julia Adams (*Sociology*), Rolena Adorno (*Spanish & Portuguese*), Vladimir Alexandrov (*Slavic Languages & Literatures*), Dudley Andrew (*Film & Media Studies*), Seyla Benhabib (*Political Science; on leave [Sp]*), Dirk Bergemann (*Economics*), R. Howard Bloch (*French*), Paul Bracken (*Management*), David Bromwich (*English*), Paul Bushkovitch (*History*), David Cameron (*Political Science*), Francesco Casetti (*Humanities; Film & Media Studies*), Katerina Clark (*Slavic Languages & Literatures*), Mirjan Damaška (*Emeritus, Law*), Carolyn Dean (*History*), Carlos Eire (*History*), Paul Franks (*Philosophy; on leave [Sp]*), Paul Freedman (*History*), Bryan Garsten (*Political Science*), John Geanakoplos (*Economics*), Harvey Goldblatt (*Slavic Languages & Literatures*), Bruce Gordon (*Divinity; History; Religious Studies*), Philip Gorski (*Sociology*), Timothy Guinnane (*Economics*), Benjamin Harshav (*Comparative Literature*), Stathis Kalyvas (*Political Science*), David Scott Kastan (*English; on leave [F]*), Paul Kennedy (*History*), John MacKay (*Slavic Languages & Literatures*), Lawrence Manley (*English*), Ivan Marcus (*History; on leave [Sp]*), Millicent Marcus (*Italian*), Stefanie Markovits (*English*), Robert Nelson (*History of Art*), Paul North (*German*), Steven Pincus (*History*), David Quint (*English; on leave [Sp]*), Susan Rose-Ackerman (*Law*), Nicholas Sambanis (*Political Science; on leave [Sp]*), Maurice Samuels (*French; on leave*), Frank Snowden (*History; on leave [F]*), Timothy Snyder (*History*), Alec Stone Sweet (*Law*), Peter Swenson (*Political Science*), Francesca Trivellato (*History*), Katie Trumpener (*Comparative Literature*), Miroslav Volf (*Divinity*), Kirk Wetters (*German*), James Whitman (*History*), Jay Winter (*History*), Keith Wrightson (*History; on leave [Sp]*)

Associate Professors Karuna Mantena (*Political Science*), Douglas Rogers (*Anthropology*), Marci Shore (*History*), Peter Stamatov (*Sociology*)

Assistant Professors Marijeta Bozovic (*Slavic Languages & Literatures*), Molly Brunson (*Slavic Languages & Literatures*), Bella Grigoryan (*Slavic Languages & Literatures*), Sigrun Kahl (*Political Science; Sociology*), Isaac Nakhimovsky (*History*)

Senior Lectors Irina Dolgova (*Slavic Languages & Literatures*), Krystyna Illakowicz (*Slavic Languages & Literatures*), Maria Kaliambou (*Hellenic Studies*), Rita Lipson (*Slavic Languages & Literatures*), Constantine Muravnik (*Slavic Languages & Literatures*), George Syrimis (*Hellenic Studies*), Julia Titus (*Slavic Languages & Literatures*), Karen von Kunes (*Slavic Languages & Literatures*)

The European Studies Council promotes research programs about Europe's culture, history, and current affairs. The geographical scope of the council's activities extends from Ireland to Italy, and from Portugal to the lands of the former Soviet Union. The council's definition of Europe transcends conventional divisions between Western, Central, and Eastern Europe, and includes the Balkans and Russia. The U.S. Department of Education has repeatedly designated the council a National Resource Center and a FLAS Center under its HEA Title VI program. Further information on the council and the Graduate Certificate of Concentration in European Studies is provided under Non-Degree-Granting Programs, Councils, and Research Institutes in this bulletin.

The council administers an M.A. program in European and Russian Studies. This M.A. program is unusual in its embrace of the entire spectrum of European nations and cultures. Its requirements allow students to choose a particular national or thematic focus, geared to their individual interests and language skills, but also ensure that students acquaint themselves with the traditions and issues associated with the other parts of Europe. Students specializing in Russia and Eastern Europe, for example, will concentrate their efforts in that area, but will also take courses that address Europe-wide problems or the countries of Central or Western Europe. The program is suited both to students who wish to pursue further academic studies and to students whose interests are policy-oriented.

Fields of Study

European languages and literatures; economics; history; political science; law; music; sociology and other social sciences.

Special Requirements for the M.A. Degree

When applying to the program, students will specify as an area of primary concentration either (1) Russia and Eastern Europe, or (2) Central and Western Europe. All students must complete sixteen term courses (or their equivalent) in the various fields related to European and Russian studies. E&RS 900, Europe: Who, What, When, Where?, is required in addition to the sixteen courses and should be taken in the first year of the program. E&RS 900 is taken as Satisfactory/Unsatisfactory and may not be taken for audit.

Students are required to take at least one course in at least three of the four fields relevant to the program, that is, history (including history of art, history of science, and history of music), literature, social sciences, and law. Students can fulfill this three-field requirement by taking Europe-related courses from across the University. One of the sixteen term courses may be taken for audit. With special approval under certain circumstances, a course graded Satisfactory/Unsatisfactory may count as one of the sixteen required courses. For students focusing on Russia and Eastern Europe, two of the sixteen required courses (excluding language courses) must concern the nations of Central and Western Europe. Conversely, for those focusing on Central and Western Europe, two courses must concern Russia and Eastern Europe.

For the purposes of this program, language courses in European languages count toward the sixteen required courses, even though they have undergraduate course

numbers and undergraduate grade modes. If a student takes a language course to fulfill the 16-credit degree requirement, the language course may not be taken for audit. Students with previous language preparation may in certain cases receive documentation of their language proficiency on the basis of this work. By the time the degree is completed, all students must demonstrate at least L4 proficiency in two European languages other than English. Those wishing to focus on Russia and Eastern Europe will need to demonstrate knowledge of Russian or an Eastern European language; those focusing on Central and Western Europe will need to demonstrate knowledge of one of the appropriate languages. In all cases, students are required to demonstrate proficiency in two European languages by the end of the third term at Yale. The only exception to this rule is completion of the appropriate full sequence of Yale language classes, certified by the Yale instructor or the director of graduate studies. Students who wish to take Yale department examinations in French, German, Italian, Spanish, or other West European languages should register for a complete examination (with reading, oral, and grammar portions) with the appropriate Yale department. Students with Russian competence must receive the grade of 1+ or higher on the ACTFL/ETS Rating Scale as administered by the Slavic Languages and Literatures department at Yale, including reading, oral, and grammar portions. Students with competence in an East European language (such as Polish, Czech, Ukrainian, Hungarian, and others by special arrangement) or other European languages must take Yale department-administered examinations.

In all cases, students will comply with the Policies and Regulations of the Yale Graduate School of Arts and Sciences, especially regarding degree requirements and academic standing.

Through agreements negotiated by the MacMillan Center, the European Studies Council offers joint master's degrees with the Law School, the School of Management, the School of Forestry & Environmental Studies, and the School of Public Health. Application for admission must be made to both the Graduate School and the applicable professional school, with notation made on each application that this is to be considered for the joint-degree program. Refer to www.yale.edu/macmillan/joint.htm and contact the European Studies director of graduate studies (DGS) for up-to-date information.

The Master's Thesis

A master's thesis is required. The master's thesis is based on research in a topic approved by the DGS and advised by a faculty member with specialized competence in the chosen topic. M.A. students must register for E&RS 950, which may count toward the sixteen required courses. E&RS 950 may not be taken for audit. Students may register for an additional independent study to prepare topics and begin research. The master's thesis must be prepared according to department guidelines and is due in two copies in the student's second year on an early-April date as specified by the council.

Program materials are available upon request to the European Studies Council, Yale University, PO Box 208206, New Haven CT 06520-8206.

Courses

E&RS 648a/AMST 782a/GLBL 811a/HIST 788a, 1968: Social Movements in

Comparative Perspective and Their Legacies Becky Conekin

In this seminar we explore post-WWII social movements and their legacies primarily across Western and Eastern Europe, North America, and Mexico. Analysis of other countries or regions in class discussions and final research papers is encouraged, based on student interest. Examining both the actuality and symbolic character of these movements in contemporary history, we analyze the political, social, and cultural meanings of protest and their impact on class, generational, gender, and racial relations. In addition, we discuss different national histories and discourses about identity, while exploring the varied geographies of the Cold War. We then move to a more thematic approach focusing on, for example, civil rights, antiwar and student protests, and countercultural politics. We conclude with a look at the social movements that developed out of the 1960s, such as second-wave feminism and gay and lesbian rights. The course offers students historical insights into the civil rights and student movements of the turbulent sixties that will shed light on current youth organizing and protest around the world. W 1:30–3:20

E&RS 900a, Europe: Who, What, When, Where? Bruce Gordon

An interdisciplinary seminar designed to provide broad exposure to key topics in modern European studies. Special attention is given to Eastern and Western Europe as well as the humanities and social science disciplines. The seminar is framed by some key theoretical questions, including: What are Europe's boundaries? When and where is "Europe"? Is there a narrative to European history? If so, what is it? What makes a European? The seminar also focuses on developing academic writing skills and examining research methodologies. Seminar meetings are combined with the Europe in/and the World Colloquia and feature speakers from the Yale faculty and from other academic institutions. The course is required of all first-year European and Russian Studies M.A. students but is open to all graduate and professional students. W 3:30–5:20

E&RS 940a or b, Independent Study

By arrangement with faculty.

E&RS 950a or b, Master's Thesis

By arrangement with faculty.

EXPERIMENTAL PATHOLOGY

140 Brady Memorial Laboratory, 203.785.3624
<http://medicine.yale.edu/pathology/education/graduateprogram>
 M.S., M.Phil., Ph.D.

Chair

Jon Morrow

Director of Graduate Studies

Themis Kyriakides (10 Amistad St., Rm. 301C, 203.737.2214)

Professors Richard Bucala (*Internal Medicine*), David Chhieng, Young Choi, José Costa (*Internal Medicine/Oncology*), Gary Friedlaender (*Orthopaedics & Rehabilitation*), Patrick Gallagher (*Pediatrics*), Earl Glusac (*Dermatology*), Robert Homer, S. David Hudnall, Pei Hui, Peter Humphrey, Dhanpat Jain (*Internal Medicine*), Michael Kashgarian (*Emeritus, Molecular, Cellular & Developmental Biology*), Jung Kim (*Emeritus*), Diane Krause (*Laboratory Medicine*), Gary Kupfer (*Pediatrics*), Themis Kyriakides, Joseph Madri, Vincent Marchesi (*Director, Boyer Center for Molecular Medicine; Cell Biology*), Jennifer McNiff (*Dermatology*), Wang Min, Mark Mooseker (*Molecular, Cellular & Developmental Biology; on leave [F]*), Jon Morrow (*Molecular, Cellular & Developmental Biology*), Jordan Pober (*Immunobiology; Dermatology*), Manju Prasad, David Rimm, Marie Robert (*Internal Medicine*), John Rose, Gerald Shadel (*Genetics*), John Sinard (*Ophthalmology & Visual Science*), Jeffrey Sklar (*Laboratory Medicine*), David Stern, Fattaneh Tavassoli (*Obstetrics, Gynecology & Reproductive Sciences*), A. Brian West, Wendall Yarbrough (*Surgery/Otolaryngology*)

Associate Professors Adebowale Adeniran, Marcus Bosenberg (*Dermatology*), Demetrios Braddock, Janet Brandsma (*Adjunct; Comparative Medicine*), Guoping Cai, Sandy Chang (*Laboratory Medicine*), Shawn Cowper (*Dermatology*), Liming Hao, Malini Harigopal, Steven Kleinstein, Yuval Kluger, Christine Ko (*Dermatology*), Diane Kowalski (*Surgery/Otolaryngology*), Michael Krauthammer, Gary Kupfer (*Pediatrics*), Rossitza Lazova (*Dermatology*), Kisha Mitchell-Richards, Gilbert Moeckel, Raffaella Morotti, Vinita Parkash, Antonio Subtil-Deoliveira (*Dermatology*), Alexander Vortmeyer, Zenta Walther, Qin Yan

Assistant Professors Ranjit Bindra (*Therapeutic Radiology*), Veerle Bossuyt, Natalia Buza, Keith Choate (*Dermatology*), Paul Cohen, Susan Fernandez, Karin Finberg, Anjela Galan (*Dermatology*), Joanna Gibson, Bonnie Gould Rothberg (*Yale Cancer Center; Medicine*), Shilpa Hattangadi (*Pediatrics*), Michael Hurwitz (*Yale Cancer Center; Medicine*), Anita Huttner, Ryan Jensen (*Therapeutic Radiology*), Anita Kamath, Samuel Katz, Angelique Levi, Don Nguyen, Marguerite Pinto, Katerina Politi (*Yale Cancer Center*), Yibing Qyang (*Internal Medicine*), Yajaira Suarez (*Comparative Medicine*), Narendra Wajapeyee, Mina Xu, Xuchen Zhang

Fields of Study

Fields include molecular and cellular basis of diseases, including cancer; biology, biochemistry, genetics, and pathology of molecules, cells, tissues, and organ systems,

including plasma membrane dynamics, mitochondrial dysfunction, signal transduction, and response to stimuli of connective tissue; assembly of viruses and their interactions with animal cells; somatic cell genetics and birth defects; biology of endothelial cells; and computational and high-throughput approaches to understanding disease pathology.

Special Admissions Requirements

A strong background in basic sciences is recommended for applicants to the program, including biology, chemistry through organic and physical chemistry, mathematics through calculus, biochemistry, genetics, or immunology. GRE General Test or MCAT is required.

To enter the Ph.D. program, students apply to an interest-based track, usually the Molecular Medicine, Pharmacology, and Physiology track within the interdepartmental graduate program of Biological and Biomedical Sciences (BBS; see the entry on BBS, under Non-Degree-Granting Programs, Councils, and Research Institutes).

Special Requirements for the Ph.D. Degree

Course requirements Experimental Pathology students must pass PATH 650b, Cellular and Molecular Biology of Cancer, and PATH 690a, Molecular Mechanisms of Disease. Passes in three additional graduate-level, one-term courses are required, which can include courses in biochemistry, genetics, immunology, cell biology, and pathology, to be chosen in consultation with the director of graduate studies (DGS), according to the student's background and interest. All requirements of the Graduate School of Arts and Sciences, including the Honors requirement, must be met. In year one, students must also take a seminar course (one in each term) and do three laboratory rotations. Prior to registering for a second year of study, students must successfully complete PATH 660, The Responsible Conduct of Research. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

Honors requirement Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study. Students must also maintain an overall High Pass average. Student progress toward these goals is reviewed at the end of the second term.

Qualifying examination The qualifying examination of the Experimental Pathology graduate program comprises: (1) two literature reading periods, (2) a research proposal broadly based on the proposed thesis research project, and (3) an oral exam in which the student is examined by the qualifying exam committee on the research proposal, the reading periods, and general knowledge of experimental pathology. This exam is usually taken in the second term of the second year and is described below.

1. The qualifying examination committee, consisting of three faculty members, will be chosen to examine the student. At least one of the committee members must have a primary appointment in the Department of Pathology and the thesis adviser is not on the exam committee. The student will read with two committee members and write the research proposal with initial guidance from the third committee member. At the oral exam itself, one member of the committee will be selected as the chairperson

- responsible for documenting the results of the exam for submission to the DGS. Members of the exam committee should have expertise in areas chosen for reading. The exam committee and topics must be approved by the DGS.
2. Prior to the examination, the student will prepare a research proposal of approximately ten pages in the general area of the thesis project. The proposal will consist of the following sections: Specific Aims, Background and Significance, Experimental Plan, and Literature Cited. The proposal should describe three years of work in the topic area by a single postdoctoral fellow (i.e., similar to an NIH postdoctoral fellowship application).
 3. All oral exams will follow the same general format. The oral examination will focus on the student's ability to present and defend the research proposal. The student should come to the exam with a short (30–40 minute) presentation of the thesis-related proposal, with visual aids. The actual presentation will take longer since exam committee faculty will interrupt with questions. The committee can also ask questions on topics covered during the reading period and general topics in experimental pathology that will have been covered in courses. The final evaluation by the exam committee faculty takes into account the student's performance on the examination and performance in lab (based on the adviser's evaluation, solicited by the DGS). A written summary of the qualifying examination evaluation will be prepared by the examination committee chairperson and submitted to the DGS. If the student does not pass the exam, the committee has the option of recommending an additional course of reading and/or written work. The DGS has final discretion in approving or modifying the recommendations of the committee.

Prospectus Upon successful completion of the qualifying examination, the student will constitute a dissertation committee including at minimum three members in addition to the dissertation/thesis adviser. At least two of the committee members must be Pathology department faculty. The membership of the committee must be approved by the DGS. The student will prepare a written thesis prospectus, consisting of a summary of background information in the field of interest, the specific questions to be answered, a rationale for choosing those questions, and a research plan for addressing those questions. Upon completing the course requirement with at least two terms of Honors, passing the qualifying examination, and submitting a thesis prospectus, students will be admitted to candidacy. This should take place by the end of the third year, and preferably in the second year. Students must then submit a written thesis describing the research and present a thesis research seminar.

Additional requirements There is no foreign language requirement. In accordance with the BBS program, Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Students are not expected to teach during their first year. Teaching assignments in fulfillment of the requirement must be approved in advance by the DGS.

M.D./Ph.D. Students

M.D./Ph.D. students must satisfy the requirements listed above for the Ph.D. with the following modifications: Two laboratory rotations are required. Assisting in teaching of one course is required. Four courses are required for the Ph.D., including PATH 650b,

Cellular and Molecular Biology of Cancer, and PATH 690a, Molecular Mechanisms of Disease. In addition, students are required to register for School of Medicine courses in OCS (Online Course Selection), <https://students.yale.edu/ocs>.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Awarded only to students who are continuing for the Ph.D. Students are not admitted for this degree.

M.S. Students are not admitted for this degree. On a case-by-case basis and subject to faculty vote, students who are not continuing for the Ph.D. may be considered for this degree if they have successfully completed the course requirements for the Ph.D. degree (three laboratory rotations, PATH 650b, PATH 660, PATH 690a, three elective courses, and two seminar courses), and received a grade of Honors in at least one core course (i.e., excluding rotations and seminar courses).

Program materials are available upon request to the Director of Graduate Studies, Department of Experimental Pathology, Yale University, PO Box 208023, New Haven CT 06520-8023; Web site, <http://medicine.yale.edu/pathology/education/graduateprogram>.

Courses

PATH 600, Pathological Basis of Human Disease Robert Homer and staff

Fundamental principles underlying the pathological alterations in function and structure that constitute the reaction of the organism to injury. Pathology of diseases involving neoplasia and special organs and systems. Correlation of the clinical and anatomical manifestations is emphasized. For Public Health graduate students and MSTP students who are required to take PATH 100 for graduate credit. Note: PATH 600 is geared toward medical students but may be taken by graduate students with the permission of the instructor.

PATH 620a and b, Laboratory Rotations in Experimental Pathology

Themis Kyriakides

Laboratory rotations for first-year graduate students.

PATH 630b/ENAS 535b^U, Biomaterial-Tissue Interactions Themis Kyriakides

The course addresses the interactions between tissues and biomaterials, with an emphasis on the importance of molecular- and cellular-level events in dictating the performance and longevity of clinically relevant devices. In addition, specific areas such as biomaterials for tissue engineering and the importance of stem/progenitor cells, and biomaterial-mediated gene and drug delivery are addressed. TTH 9–10:15

PATH 650b, Cellular and Molecular Biology of Cancer David Stern, Qin Yan

A comprehensive survey of cancer research from the cellular to the clinical level. The relation of cancer to intracellular and intercellular regulation of cell proliferation is emphasized, as are animal models for cancer research. Background in molecular genetics and cell biology is assumed. Open to advanced undergraduates with permission of the organizers.

MWF 1–2

PATH 660/C&MP 650/PHAR 580, The Responsible Conduct of Research

Barbara Ehrlich, Demetrios Braddock

Organized to foster discussion, the course is taught by faculty in the Pharmacology, Pathology, and Physiology departments and two or three senior graduate students. Each session is based on case studies from primary literature, reviews, and two texts: Francis Macrina's *Scientific Integrity* and Kathy Barker's *At the Bench*. Each week, students are required to submit a reaction paper discussing the reading assignment. Students take turns leading the class discussion; a final short paper on a hot topic in bioethics is required. TH 11–12:15

PATH 670b, Biological Mechanisms of Reaction to Injury S. David Hudnall,

Joanna Gibson, Joseph Madri, Jon Morrow, Jeffrey Sklar

An introduction to human biology and disease as a manifestation of reaction to injury. Topics include organ structure and function, cell injury, circulatory and inflammatory responses, disordered physiology, and neoplasia. TTH 11:35–12:50

PATH 680a/C&MP 630a/PHAR 502a, Seminar in Molecular Medicine,**Pharmacology, and Physiology** Don Nguyen, Titus Boggon

Readings and discussion on a diverse range of current topics in molecular medicine, pharmacology, and physiology. The class emphasizes analysis of primary research literature and development of presentation and writing skills. Contemporary articles are assigned on a related topic every week, and a student leads discussions with input from faculty who are experts in the topic area. The overall goal is to cover a specific topic of medical relevance (e.g., cancer, neurodegeneration) from the perspective of three primary disciplines (i.e., physiology: normal function; pathology: abnormal function; and pharmacology: intervention).

PATH 690a, Molecular Mechanisms of Disease Narendra Wajapeyee

This course covers aspects of the fundamental molecular and cellular mechanisms underlying various human diseases. Many of the disorders discussed represent major forms of infectious, degenerative, vascular, neoplastic, and inflammatory disease. Additionally, certain rarer diseases that illustrate good models for investigation and/or application of basic biologic principles are covered in the course. The objective is to highlight advances in experimental and molecular medicine as they relate to understanding the pathogenesis of disease and the formulation of therapies. TTH 2–3:30

FILM AND MEDIA STUDIES

53 Wall Street, Rm. 216, 203.436.4668

<http://filmstudies.yale.edu>

M.Phil., Ph.D.

Chair

Francesco Casetti

Director of Graduate Studies

Dudley Andrew (53 Wall St., Rm. 219, dudley.andrew@yale.edu)

Professors Dudley Andrew,* Francesco Casetti,* Katerina Clark,* J.D. Connor,* Aaron Gerow,* John MacKay,* Millicent Marcus,* Charles Musser (*on leave* [Sp]),* Brigitte Peucker (*on leave* [F]),* Katie Trumpener,* Laura Wexler*

Associate Professors Karen Nakamura, R. John Williams (*on leave*)

Senior Lecturer Ronald Gregg*

Affiliated Faculty Carol Armstrong, David Bromwich, Rüdiger Campe, Hazel Carby, Michael Denning, Moira Fradinger (*on leave* [Sp]), Inderpal Grewal, Kobena Mercer, Christopher L. Miller, Joseph Roach

*Member of the Graduate Committee

Fields of Study

Film and Media Studies is an interdisciplinary field drawing on the study of the history of art, national cultures and literatures, literary theory, philosophy, anthropology, feminist and queer studies, race and representation, and other areas. To study film at Yale, every doctoral student must be accepted into a combined program involving another discipline. Film and Media Studies offers a combined Ph.D. with African American Studies, American Studies, Comparative Literature, East Asian Languages and Literatures, English, French, German, History of Art, Italian, and Slavic Languages and Literatures. In addition to acquiring a firm grounding in the methods and core material of both film studies and another discipline, the candidate is advised to coordinate a plan of study involving comprehensive knowledge of one or more areas of specialization. Such areas include:

1. Historiography, including archival history, history of technology, silent film.
2. Aesthetics: theories of the image, adaptation, film/philosophy, avant-garde film.
3. European film: British-Irish, French, German and Nordic, Italian, Slavic.
4. American culture: Hollywood, independent film, African American cinema.
5. World film: global image exchange; cinema in Asia, Latin America, and Africa.
6. Documentary as an aesthetic, cultural, and ideological practice.
7. Cinema in its relations with other arts and other media.
8. Screen cultures, screened images, post-cinema, theory and history of media.

Through course work, examinations, and the dissertation, the candidate links a film specialty with material and methods coming from the participating discipline. Directors of graduate studies from both programs monitor the candidate's plans and progress.

Special Admissions Requirements

Combined-program applicants should familiarize themselves fully not only with the Film and Media Studies entrance requirements but with those of the other graduate program as well. Since combined-program applicants must be admitted by both Film and Media Studies and the other department, candidates should make sure that the material they submit with the application clearly addresses the requirements and mission of both graduate programs.

The application for Film and Media Studies is administered by the Office of Graduate Admissions. All applications are to be completed online and can be accessed by visiting its Web site at <http://gsas.yale.edu/admission-graduate-school>. In the “Programs of Study” section of the application, the applicant should do the following: choose Film and Media Studies in Step 1 and the combined department in Step 3. All applications including writing samples are read by the admissions committees in both units.

Special Requirements for the Ph.D. Degree

Every student selected for the combined program is subject to the supervision of the Film and Media Studies program and the relevant participating department. A written protocol between each department and Film and Media Studies outlines the requirements and schedule to be borne in mind as a plan of study is worked out in consultation with the director of graduate studies of Film and Media Studies and the director of graduate studies of the participating department. In all cases, students are required to take two core seminars in Film and Media Studies (FILM 601 and FILM 603) as well as at least four additional Film and Media Studies seminars. Course requirements vary for participating departments but comprise a total of sixteen courses (fourteen for American Studies, fifteen for History of Art). A student advances to candidacy by completing qualifying examinations and a dissertation prospectus.

1. Qualifying examinations follow the regulations of the participating department with at least one member of the Film and Media Studies Graduate Committee participating.
2. The dissertation prospectus is presented to a faculty committee or the entire faculty of the participating department. The prospectus is also circulated to the entire Film and Media Studies Graduate Committee for their information and ratification.
3. A defense of method occurs when the dissertation is nearing completion, one or two terms before submission. The purpose of this defense is to provide guidance and feedback at a critical stage, in order to enhance the dissertation conclusion and final form overall. At least three faculty readers meet with the student; the DGS of Film and Media Studies and the DGS of the participating department are also invited to participate. At least one examiner of the dissertation must be a member of the Film and Media Studies Graduate Committee and one must be from the participating department.

The faculty in Film and Media Studies considers participation in the Teaching Fellows Program to be essential to the professional preparation of graduate students. Students normally teach in years three and four. Every student is expected to serve two assignments as a teaching fellow, preferably in film courses such as Introduction to Film; Film Theory; World Cinema; Theory of Media.

Master's Degree

M.Phil. See Degree Requirements under Policies and Regulations.

Courses

FILM 601a/CPLT 917a, Films and Their Study Aaron Gerow

The course sets in place some undergirding for graduate students who want to anchor their film interest to something like the “professional discourse” of this field. A coordinated set of topics in film theory is interrupted first by the often discordant voice of history and second by the obtuseness of the films examined each week. As the title of this seminar is meant to convey, films themselves take the lead in our discussions.

TTH 11:35–12:50

FILM 604b, The Film Archive Brian Meacham

The history, theory, and working activities of a film archive. The materiality of film, the types of film elements held in film archives, and the policies and procedures of collection development, cataloging, access, exhibition, conservation, and preservation. Film archives in light of the transition to digital in production, consumption, and distribution of films. Students learn film inspection and take a film print through the archival process from acquisition to public screening.

FILM 612a, Technical Images: Transformations of Visuality in the Digital Era

Francesco Casetti

The seminar explores the new forms of vision elicited by the so-called technical images, as first defined by Vilém Flusser at the dawn of the digital revolution. The first part of the seminar is devoted to a close reading of the authors who have been more sensitive in capturing the ongoing transformation of images. The second part discusses the main character of new viscosity, like fragmentation, tactility, performativity. The seminar ends with a mention of a possible “archaeology” of new forms of visions. T 9:25–11:15

FILM 615b, Mediascapes: Toward a Media Ecology Francesco Casetti

The possibility of accessing media everywhere and all the time gives us the illusion of being emancipated from any temporal or spatial constraint. And yet, if it is true that images, sounds, and words circulate (apparently) without any restriction, it is also true that they always “land” somewhere. We experience them in an environment—at home, in a public square, on a train, in a classroom, even in the “personal bubble” in which we shelter. Messages, as well as the media that deliver them, are always located. This seminar explores the subtle relations between media and their surroundings: in particular, the way in which they develop a reciprocal influence, merge, and co-evolve (including the capacity of the media to become environments in themselves). The concept of mediascape reflects these processes and dynamics. T 9:25–11:15

FILM 729b^U/CPLT 716b^U/GMAN 730b^U, New Waves: East/West Germany in Cold

War Europe Katie Trumpener

Before 1961, Berlin was the best place in Europe to follow both Eastern and Western Europe's emerging cinematic New Waves. And first in East, then in West Germany, young filmmakers developed distinctive approaches to political and documentary filmmaking, to the Nazi past and the Cold War, to class, gender, and social transformation.

This course juxtaposes the two German New Waves, focusing on aesthetic ferment, institutional barriers, and transformation. Features, documentaries, and experimental films by Gerhard Klein, Konrad Wolf, Alexander Kluge, Herbert Vesely, Edgar Reitz, Jean-Marie Straub and Danièle Huillet, Jürgen Böttcher, Heiner Carow, Frank Beyer, Wim Wenders, Rainer Werner Fassbinder, Helke Sander, Helke Misselwitz, read against other Eastern and Western New Wave films (i.e., by Lindsay Anderson, Karel Reisz, Andrzej Munk, Alain Resnais, Mikhail Kalatozov, Milos Forman). T 1:30–3:20

FILM 735a^U/736b^U/AMST 832a^U/833b^U, Documentary Film Workshop

Charles Musser

This workshop in audiovisual scholarship explores ways to present research through the moving image. Students work within a Public Humanities framework to make a documentary that draws on their disciplinary fields of study. Designed to fulfill requirements for the M.A. in Public Humanities. W 12:30–3:20, screenings T 7

FILM 755a^U/CPLT 935a^U, French Cinema through the New Wave Dudley Andrew

This seminar uses a sample of twenty films (with clips from many others) to survey four decades of the tradition of French cinema crowned by the privileged moment of the New Wave. Graduate students are asked to challenge the idea of “national cinema” by reporting on some non-canonical or marginal film before midterm. Keeping the culture industry in view, we question the extent to which such a consistently robust cinema has been bound to—or remained partly independent of—a nation that from 1930 to 1970 underwent a depression, a socialist experiment, an occupation, a liberation, and the humiliations of decolonization abroad and social unrest (May ’68) at home. In addition to the midterm contribution, graduate students write a substantial term paper. MW 11:35–12:50, screenings T 7

FILM 778b/RUSS 695b, Russian Literature and Film in the 1920s and 1930s

Katerina Clark

This course presents a historical overview, incorporating some of the main landmarks of the 1920s and 1930s including works by Pilnyak, Bakhtin, the Formalists, Platonov, Mayakovsky, Bulgakov, Zoshchenko, Eisenstein, Protazanov, Pudovkin, the Vasilyev “brothers,” and G. Aleksandrov. TH 3:30–5:20

FILM 806a/HSAR 709a, Introduction to Sound Studies J.D. Connor

How does sound become an object for history? for philosophy? for art? In recent decades an explosion of scholarly work has made sound studies an essential part of cultural and aesthetic history. We examine crucial dimensions of the critical field: the phenomenology and structure of the soundscape, models of technological history, philosophies of sound in the arts, the study of “listening cultures,” sound and film, and taping. TH 3:30–5:20, screenings T 7:30

FILM 808b/HSAR 713b, The Movement of Images: Modern Cinema and the

Museum Thomas Elsaesser

Over the past two decades, the cinema has redefined itself in several ways: as a photographic medium, as popular entertainment, and as a significant public sphere. But it has also entered the museum and gallery spaces: classic directors like Renoir and Hitchcock are granted museum retrospectives, and contemporary filmmakers receive commissions

for new work, or curate shows that cast a fresh light on film, its prehistories, alternative histories, and post-histories. This might signal that the cinema has finally come of age as the art form of the twentieth century, and thus has earned the right to enter into the traditional institutions of patronage, artistic heritage, and cultural patrimony. Or does this move into the museum merely confirm the “death” of cinema, and is it even predicated on the cinema’s demise, making it ready to be preserved and embalmed? How complementary or contradictory are the “black box” and the “white cube” in such a new arrangement of space, spectator, and *dispositif*? The course looks at some of the major exhibitions and retrospectives devoted to “the moving image” from the mid-1990s to the present and asks what theoretical shifts, perspective corrections, and critical readjustments accompany these displacements, on the side of cinema studies as well as on the part of art history.

FILM 830a/CPLT 916a/ITAL 590a, Literature into Film Millicent Marcus

We study a series of written works and their cinematic adaptations, considering first the texts in autonomous, literary terms, and then their transformation into audiovisual spectacles. In most cases we screen the film on Tuesday evening and do a comparative study in the Thursday class period, making extensive use of video clips to do close visual analysis of scenes in the light of their corresponding textual sources. Rather than develop a general theory of adaptation, we construct methodological approaches on an ad hoc basis, taking each instance of adaptation as a case study amenable to a variety of methodologies—psychoanalytic, feminist, ideological, generic, semiotic, and so forth. The class is conducted as a seminar, and active student participation is expected. There are two papers—one shorter one of a critical nature at midterm and a final research paper (approximately 15–20 pages). Films examined include (tentatively) Pasolini’s *Medea* and *Decameron*, the Tavianis’ *Padre padrone*, Visconti’s *Death in Venice*, Rosi’s *Three Brothers*, Salvatores’s *I’m Not Afraid*, and De Sica’s *Two Women*. Writing assignments comprise 75 percent of the final grade and class participation 25 percent. TH 3:30–5:20, screenings T 7–10

FILM 840a/CPLT 840a/GMAN 652a/HSAR 687a/RUSS 712a, Moscow/Berlin:

Leftist Avant-Gardes and Interwar Modernism Katerina Clark, Katie Trumpener
From 1918 to the mid-1930s, Moscow and Berlin were central gathering points for left-wing modernists. Each city developed its own modes of modernism, yet in sustained dialogue, given massive Russian emigration to Berlin after 1918, the Weimar obsession with early Soviet aesthetics (and cinema), intellectuals traveling in both directions, and the large-scale emigration of German leftists to the Soviet Union after 1933. And in the late 1940s and ’50s, Soviet intellectuals (and German emigrants returning from Moscow) shaped a “late modernism” in East Berlin. Centered on literature and film, the course also considers a wide array of art forms (including painting, photography, architecture, music, and aesthetic theory). Works by modernists such as Eisenstein, Pudovkin, Vertov, Nabokov, Shklovsky, El Lissitzky, Rodchenko, Malevich, Tretiakov, Lukács, Moholy-Nagy, Benjamin, Brecht, Richter, Beckmann, Grosz, Heartfield, Höch, Lang, Döblin, Ruttman, Mies van der Rohe, Eisler, Busch, Konrad Wolf, Peter Weiss. T 1:30–3:20

FILM 872b/EALL 580b^U, East Asian Martial Arts Cinema Aaron Gerow

An investigation of the martial arts films of East Asia (Japan, China, Hong Kong, Korea, Taiwan), including the samurai film, kung-fu and karate film, and wuxia film, and the roles they play in constructing nationalism and transnationalism, gender, stardom, spirituality, and mediality. MW 2:30–3:45, screenings T 7

FILM 881a^U/EALL 571a^U, Japanese Cinema after 1960 Aaron Gerow

The development of Japanese cinema after the breakdown of the studio system, through the revival of the late 1990s, to the present. MW 2:30–3:45, screenings M 7

FILM 900, Directed Reading

FILM 901, Individual Research

FORESTRY & ENVIRONMENTAL STUDIES

Kroon Hall, 203.432.5100
<http://environment.yale.edu>
M.S., M.Phil., Ph.D.

Dean

Sir Peter Crane

Director of Doctoral Studies

Karen Seto (380 Edwards St., Rm. 102, 203.432.9784, karen.seto@yale.edu)

Professors Mark Ashton, Michelle Bell, Gaboury Benoit, Graeme Berlyn, Benjamin Cashore, Sir Peter Crane, Michael Dove, Daniel Esty, Timothy Gregoire, Matthew Kotchen, Xuhui Lee, Robert Mendelsohn, Chadwick Oliver, Peter Raymond, James Saiers, Oswald Schmitz, Karen Seto, David Skelly, John Wargo, Julie Zimmerman

Associate Professors Robert Bailis, Mark Bradford, Marian Chertow

Assistant Professors Craig Brodersen, Liza Comita, Justin Farrell, Alexander Felson, Eli Fenichel, Kenneth Gillingham, Karen Hébert, Nadine Unger

Fields of Study

Fields include agroforestry; biodiversity conservation; biostatistics and biometry; climate science; community ecology; ecosystems ecology; ecosystems management; environmental anthropology; environmental biophysics and meteorology; environmental chemistry; environmental ethics; environmental governance; environmental health risk assessment; environmental history; environmental law and politics; environmental and resource policy; forest ecology; hydrology; industrial ecology; industrial environmental management; plant physiology and anatomy; pollution management; population ecology; resource economics; energy and the environment, silviculture, social ecology; stand development, tropical ecology and conservation; urban planning; water resource management; environmental management and social ecology in developing countries; urban ecology.

Special Admissions Requirements

Applicants should hold a bachelor's or master's degree in a field related to natural resources, such as forestry, or in a relevant discipline of the natural or social sciences, such as biology, chemistry, economics, or mathematics. The GRE General Test is required but Subject Tests are optional.

Special Requirements for the Ph.D. Degree

Students are required to take Doctoral Student Seminar and Responsible Conduct of Research (F&ES 900a) in the first year of their program. Aside from this requirement, there is no required curriculum of credit courses and no formal language requirement. Courses of study are individually designated through consultation between degree

candidates and their advisers and dissertation committees. The amount of course work required will depend on the previous training of the student, but the normal requirement for a student with no previous graduate training is three or four courses per term for four terms. The program of each student will be evaluated at the end of the first year of residence. At least two term grades of Honors are required in the first two years of study; however, it is anticipated that grades of Honors or High Pass will be achieved in two-thirds of all courses taken. A written and oral qualifying examination is required upon completion of the course requirements. Students are expected to take the examination by the end of their second year, although this can be extended to the third year in cases with appropriate extenuating circumstances. At the time of the qualifying examination, the student must present a prospectus of the research work proposed for the dissertation. Successful completion of the qualifying examination and submission of the prospectus will result in admission to candidacy. Upon completion of the dissertation, the candidate must make unbound copies of the dissertation available to the faculty and appear for an oral examination at a time and place designated by the director of doctoral studies. Copies of the approved dissertation must be submitted to the Graduate School. Depending upon the nature of the dissertation topic, completion of the Ph.D. degree normally requires four years.

Teaching and research experiences are regarded as integral parts of the graduate training program in Forestry & Environmental Studies. All students are required to serve as teaching fellows (10 hours per week) for four terms. The nature of the teaching assignment is determined in cooperation with the student's major adviser and the director of doctoral studies. With the permission of the director of doctoral studies, the total teaching requirement may be reduced for students who are awarded fellowships supported by outside funding. Regardless of outside funding, all doctoral students must serve as teaching fellows for a minimum of two terms.

Master's Degrees

M.Phil. (en route to the Ph.D.) Students may petition for this degree after they have passed the qualifying exam and advanced to candidacy. Applications for this master's degree are not accepted.

M.S. (en route to the Ph.D.) This degree is normally granted only to students who are withdrawing from the Ph.D. program. Applications for this master's degree are not accepted. Requirements that must be met for award of the M.S. are (1) successful completion of two years of course work in residence with two grades of Honors; (2) a written prospectus; (3) fulfillment of one term of the teaching requirement.

For information on the terminal master's degrees offered by the Yale School of Forestry & Environmental Studies (the Master of Forestry, Master of Forest Science, Master of Environmental Management, and Master of Environmental Science degrees), visit the School's Web site, www.yale.edu/environment, or contact Admissions Director, Yale School of Forestry & Environmental Studies, 195 Prospect Street, New Haven CT 06511.

Courses

For course descriptions, see the School of Forestry & Environmental Studies bulletin, available online in both html and pdf versions at www.yale.edu/bulletin.

FOUNDATIONS

[F&ES 500a^U, Landscape Ecology]

F&ES 505a, Economics of the Environment

F&ES 510a, Introduction to Statistics in the Environmental Sciences

F&ES 510Ea, Introduction to Statistics in the Environmental Sciences

F&ES 515a, Physical Sciences for Environmental Management

F&ES 520a/ANTH 581a, Society and Environment: Introduction to Theory and Method

[F&ES 525a, The Politics and Practice of Environmental and Resource Policy]

F&ES 530a, Ecosystems and Landscapes

PROFESSIONAL SKILLS COURSES

F&ES 575a, PSC: Foundations of Environmental Leadership and Management

F&ES 576a, PSC: Collaboration and Conflict Resolution Skills for Environmental Professionals

F&ES 577b, PSC: Environmental Communicator

F&ES 578b, PSC: Financial Concepts for Environmental Managers

INTEGRATIVE FRAMEWORKS

[F&ES 600b, Linkages of Sustainability]

F&ES 610a, Science to Solutions

F&ES 620b, Integrative Assessment

CAPSTONE

F&ES 950a, Life Cycle Assessment Practicum

F&ES 953a,b, Business and the Environment Consulting Clinic

F&ES 954a, Management Plans for Protected Areas

F&ES 955a,b, Seminar in Research Analysis and Communication in Forest Ecology

[F&ES 963b, Payments for Ecosystem Services]

F&ES 964b, Large-Scale Conservation: Integrating Science, Management, and Policy

F&ES 965b/ANTH 598b, Advanced Readings: Social Science of Development and Conservation

[F&ES 966a, The Entrepreneurial Approach to Environmental Problem Solving]

[F&ES 969b, Rapid Assessments in Forest Conservation]

F&ES 970a,b/LAW 30164, Environmental Protection Clinic

F&ES 971b, Land Use Clinic

F&ES 972a,b/LAW 30165, Advanced Environmental Protection Clinic

F&ES 976b, Cities in Hot Water: Urban Climate Mitigation and Adaptation

ECOLOGY**Community and Ecosystem Ecology**

F&ES 681a, Ethnobotany

F&ES 717b, Tropical Field Ecology

[F&ES 731b, Tropical Field Botany]

[F&ES 733b, Synthesizing Environmental Science for Policy]

F&ES 734b, Biological Oceanography

F&ES 741b, Introduction to Indigenous Silviculture

F&ES 752a, Ecology and Conservation of Tropical Forests

F&ES 768a, Pests, Pathogens, and Parasites in Natural and Managed Systems

Wildlife Ecology and Conservation Biology

[F&ES 736b, Ecology Seminar]

[F&ES 738a^u, Aquatic Ecology]

[F&ES 739b, Species and Ecosystem Conservation: An Integrated, Interdisciplinary Approach]

[F&ES 740b, Dynamics of Ecological Systems]

F&ES 744b, Conservation Science

Environmental Education and Communication

F&ES 745a, Environmental Writing

F&ES 746b, Archetypes and the Environment

F&ES 747a, Global Communication Skills

F&ES 750a, Writing the World

F&ES 796a, Toward Science Communications with Impact

F&ES 900a, Doctoral Student Seminar and Responsible Conduct of Research

FORESTRY**Forest Biology**

[F&ES 650b, Fire: Science and Policy]

[F&ES 651b, Forest Ecosystem Health]

F&ES 654a/MCDB 660a, Structure, Function, and Development of Trees and Other Vascular Plants

[F&ES 655b, Research Methods of the Anatomy and Physiology of Trees]

F&ES 656b, Physiology of Trees and Forests

F&ES 671a, Natural History and Taxonomy of Trees

F&ES 682a, Multifunctional Carbon-Sequestering Agroforestry

Forest Management

F&ES 657b, Managing Resources

[F&ES 658a, Global Resources, International Resource Exchanges, and the Environment]

F&ES 659b, Principles in Applied Ecology: The Practice of Silviculture

F&ES 660a, Forest Dynamics: Growth and Development of Forest Stands

[F&ES 661b, Analysis and Development of Silvicultural Prescriptions]

F&ES 663b, Invasive Species: Ecology, Policy, and Management

F&ES 668b, Field Trips in Forest Resource Management and Silviculture
 F&ES 669b, Forest Management Operations
 F&ES 670b, Southern Forest and Forestry Field Trip
 F&ES 680a, Forest and Ecosystem Finance
 F&ES 683b, Seminar in Tropical Forest Restoration in Human-Dominated Landscapes

PHYSICAL SCIENCES

Atmospheric Sciences

F&ES 700b, Alpine, Arctic, and Boreal Ecosystems Seminar
 F&ES 701b, Climate Change Policy and Science Seminar
 [F&ES 702b, Climate Change Seminar]
 F&ES 703b, Climate and Society
 F&ES 704a, Workshop on Remote Sensing with Drones
 [F&ES 705b, Climate and Air Pollution]
 [F&ES 722a, Boundary Layer Meteorology]
 [F&ES 771a, Climate Modeling]

Environmental Chemistry

[F&ES 706a^U, Organic Pollutants in the Environment]
 F&ES 707b^U/ENAS 640b, Aquatic Chemistry
 [F&ES 708a, Biogeochemistry and Pollution]
 F&ES 711a^U, Atmospheric Chemistry
 [F&ES 715b, Advanced Reading in Biogeochemistry]

Soil Science

[F&ES 709a, Soil Science]

Water Resources

F&ES 690a, Plant Hydraulics
 F&ES 710b, Coastal Governance
 F&ES 712b, Water Resource Management
 F&ES 713a, Coastal Ecosystems
 [F&ES 714b^U/ENAS 646b, Environmental Hydrology]
 F&ES 719a, River Processes and Restoration
 [F&ES 724b, Watershed Cycles and Processes]
 F&ES 729b, Caribbean Coastal Development: Cesium and CZM

QUANTITATIVE AND RESEARCH METHODS

F&ES 550a, Natural Science Research Methods
 F&ES 551a, Mixed Methods for Social Science Research: Qualitative, Network Science, and Digital Text
 F&ES 552b, Master's Student Research Colloquium
 [F&ES 725b, Remote Sensing of Land Cover and Land Use Change]
 F&ES 726b/ARCG 762b^U/EMD 548b/G&G 562b^U, Observing Earth from Space
 F&ES 751b, Sampling Methodology and Practice
 F&ES 753a, Regression Modeling of Ecological and Environmental Data
 F&ES 754a, Geospatial Software Design

F&ES 755b, Modeling Geographic Space
 F&ES 756a, Modeling Geographic Objects
 [F&ES 757b, Statistical Design of Experiments]
 F&ES 758b, Multivariate Statistical Analysis in the Environmental Sciences
 F&ES 762a, Applied Math for Environmental Studies (AMES)
 [F&ES 780b, Seminar in Forest Inventory]
 F&ES 781b/STAT 674b, Applied Spatial Statistics
 F&ES 794b, Confronting Models with Data

SOCIAL SCIENCES

Economics

F&ES 795b, Nature as Capital: Merging Ecological and Economic Models
 [F&ES 800b, Energy Economics and Policy Analysis]
 [F&ES 802b, Valuing the Environment]
 F&ES 803b, Green Markets: Voluntary and Information Approaches to Environmental Management
 F&ES 804b, Economics of Natural Resource Management
 F&ES 805a,b, Seminar in Environmental and Natural Resource Economics
 [F&ES 904a, Doctoral Seminar in Environmental Economics]
 [F&ES 905b, Doctoral Seminar in Environmental and Energy Economics]

Environmental Policy

F&ES 718a, IPCC AR5 Assessment: The Physical Science Basis
 F&ES 759b/MGT 697b/PLSC 727b^U, Capitalism: Success, Crisis, and Reform
 F&ES 775a, Sustainable Sites
 F&ES 799a, Sustainable Development Goals and Implementation
 F&ES 807a/MGT 688a, Corporate Environmental Management and Strategy
 [F&ES 808b/LAW 21107/REL 926b, Law, Environment, and Religion: A Communion of Subjects]
 F&ES 814a/MGT 563a, Energy Systems Analysis
 F&ES 815a, The New Corporate Social Responsibility: Public Problems, Private Solutions, and Strategic Responses
 F&ES 816b, Electric Utilities: An Industry in Transition
 F&ES 817a, Urban, Suburban, and Regional Planning Practice
 F&ES 818a/MGT 561a, Energy Technology Innovation
 F&ES 819b, Strategies for Land Conservation
 F&ES 820b, Land Use Law and Environmental Planning
 F&ES 821b, Private Investment and the Environment: Legal Foundations and Tools
 [F&ES 824b/LAW 21033, Environmental Law and Policy]
 F&ES 825b, International Environmental Law
 F&ES 826a, Foundations of Natural Resource Policy and Management
 F&ES 828b, Comparative Environmental Law in Global Legal Systems
 [F&ES 829b^U, International Environmental Policy and Governance]
 F&ES 835a, Seminar on Land Use Planning
 F&ES 837b, Seminar on Leadership in Natural Resources and the Environment
 F&ES 840b, Climate Change and Green Energy

[F&ES 841b/LAW 21720, A Critical History of U.S. Energy Law and Policy]

F&ES 843b/AMST 839b/HIST 743b/HSBM 744b, Readings in Environmental History

[F&ES 849b, Natural Resource Policy Practicum]

F&ES 850b, International Organizations and Conferences

F&ES 851b, Environmental Diplomacy Practicum

F&ES 853b, The Political Economy of Global Energy Policy

F&ES 855a, Climate Change Mitigation in Urban Areas

F&ES 860b, Understanding Environmental Campaigns and Policy Making: Strategies and Tactics

[F&ES 866b/LAW 21566, The Law of Climate Change]

Social and Political Ecology

F&ES 738Eb, Himalayan Diversities: Environment, Livelihood, and Culture

F&ES 760b, Conservation in Practice: An International Perspective

[F&ES 763b, Translating the Science of Wildlife Conservation into Practice]

F&ES 764b, The American West: A Case Study in Social Structure, Culture, and Politics

F&ES 767b, Building a Conservation Toolkit: From Project Design to Evaluation

F&ES 772a, Social Justice in the Sustainable Food System

F&ES 774a/NELC 774a^U, Agriculture: Origins, Evolution, Crises

F&ES 783Ea,b, Introduction to Religions and Ecology

[F&ES 784Ea, Western Religions and Ecology]

[F&ES 785Eb, East Asian Religions and Ecology]

F&ES 787E, Thomas Berry: Life and Thought

F&ES 789E, Journey of the Universe

F&ES 793b/ANTH 773b^U/ARCG 773b^U/NELC 588b^U, Abrupt Climate Change and Societal Collapse

F&ES 831b, Society and Natural Resources

F&ES 836a/ANTH 541a/HIST 965a/PLSC 779a, Agrarian Societies: Culture, Society, History, and Development

F&ES 839a/ANTH 597a, Social Science of Development and Conservation

F&ES 846b, Perspectives on Environmental Injustices

F&ES 854b, Institutions and the Environment

[F&ES 857b, Urbanization, Global Change, and Sustainability]

F&ES 869b/ANTH 572b, Disaster, Degradation, Dystopia: Social Science Approaches to Environmental Perturbation and Change

F&ES 877b/ANTH 561b, Anthropology of the Global Economy for Development and Conservation

[F&ES 878a, Anthropology of Climate Change]

F&ES 882a/ANTH 582a, The Black Box of Implementation: Households, Communities, Gender

F&ES 892a/ARCH 4021a, Introduction to Planning and Development

HEALTH AND ENVIRONMENT

[F&ES 727a, The Future of Food]

F&ES 736Eb, Environmental Ethics

F&ES 765b, Technological and Social Innovation in Global Food Systems

F&ES 889a, Environmental Risk Assessment (ERA)

F&ES 893b/EHS 511b, Applied Risk Assessment

F&ES 896a/EHS 503a, Introduction to Toxicology

F&ES 897b/EHS 508b, Assessing Exposures to Environmental Stressors

[F&ES 898a/EHS 585a, The Environment and Human Health]

F&ES 899b, Sustainable Development in Post-Disaster Context: Haiti

INDUSTRIAL ECOLOGY, ENVIRONMENTAL PLANNING, AND TECHNOLOGY

[F&ES 782a/ARCH 4216a, Globalization Space: International Infrastructure and
Extrastatecraft]

F&ES 788b, Applied Urban Ecology

[F&ES 881a, FT: Field Experience in Industrial Operations]

F&ES 883b, Advanced Industrial Ecology Seminar

F&ES 884b/ENAS 645b, Industrial Ecology

F&ES 885b/ENAS 660b^U, Green Engineering and Sustainability

F&ES 888a/ARCH 4226a, Ecological Urban Design

F&ES 894a, Green Building: Issues and Perspectives

FRENCH

82-90 Wall Street, 3d floor, 203.432.4900

<http://french.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Alice Kaplan

Director of Graduate Studies

Christopher L. Miller (82-90 Wall St., Rm. 325, 203.432.4466)

Professors R. Howard Bloch, Ardis Butterfield (*English; on leave* [F]), Carolyn Dean (*History*), Edwin Duval, Marie-Hélène Girard (*Visiting*), Alice Kaplan, Christopher L. Miller, Maurice Samuels (*on leave*)

Assistant Professors Morgane Cadieu, Thomas Connolly (*on leave*), Christopher Semk

Lecturer Natasha Lee

Affiliated Faculty Dudley Andrew (*Film & Media Studies*), Carol Armstrong (*History of Art*), John Merriman (*History*)

Fields of Study

Fields include French literature, criticism, theory, and culture from the early Middle Ages to the present, and the French-language literatures of Africa, the Caribbean, and the Maghreb.

Special Admissions Requirements

A thorough command of French is expected, as well as a good preparation in all fields of French literature. Applicants should submit a twenty-page writing sample in French. This can consist of one twenty-page paper or several shorter papers that total twenty pages.

Special Requirements for the Ph.D. Degree

(1) Candidates must demonstrate proficiency in two languages (in addition to English and French). Proficiency is defined as the successful completion of one year of study at the college level or reading proficiency at the graduate level. Students must fulfill one language requirement no later than the beginning of their third term of study. The second language requirement must be satisfied before the prospectus can be approved. (2) During the first two years of study, students normally take sixteen term courses. These must include Old French and at least two graduate-level term courses outside the department. They may include one term of an approved language course taken as a means of fulfilling one of the language requirements, and as many as four graduate-level term courses outside the department. A grade of Honors must be obtained in at least four of the sixteen courses, two or more of which must be in courses offered by the department.

(3) A qualifying oral examination takes place during the sixth term. The examination is designed to demonstrate students' mastery of the French language, their knowledge and command of selected topics in literature, and their capacity to present and discuss texts and issues. (4) After having successfully passed the qualifying oral examination, students are required to submit a dissertation prospectus for approval, normally no later than the end of the term following the oral examination.

In order to be admitted to candidacy for the Ph.D., students must complete all predisertation requirements, including the prospectus. Students must be admitted to candidacy by the end of the seventh term.

Teaching is considered an integral part of the preparation for the Ph.D. degree, and all students are required to teach for at least one year. Opportunities to teach undergraduate courses normally become available to candidates in their third year, after consideration of the needs of the department and of the students' capacity both to teach and to fulfill their final requirements. Prior to teaching, students take a language-teaching methodology course.

Combined Ph.D. Program

The French department also offers three combined Ph.D.s: one in French and African American Studies (in conjunction with the Department of African American Studies), one in French and Renaissance Studies (in conjunction with the Renaissance Studies Program), and one in French and Film and Media Studies (in conjunction with the Film and Media Studies Program). Students in all of these combined degree programs are subject to all the requirements for a Ph.D. in French. In addition, they must fulfill certain requirements particular to the conjoined program.

The combined Ph.D. in French and African American Studies is most appropriate for students who intend to concentrate in and write a dissertation on the literature of the francophone Caribbean. Students must complete two core courses in African American Studies and a third-year colloquium. Students in the combined degree program should fulfill the French department's language requirements by gaining proficiency in either a Creole language of the Caribbean or Spanish, as well as by demonstrating competence in a second foreign language that is directly relevant to the study of the Caribbean. The students' oral examinations normally include two topics of African American content. The dissertation prospectus must be approved by the director of graduate studies both in the French department and in African American Studies, and final approval of the dissertation must come from both departments. For further details see African American Studies.

Students in the combined Ph.D. program in French and Renaissance Studies will take nine courses in French and seven in Renaissance Studies. Students must learn Latin and Italian. The oral examination will consist of seven topics: four in French and three in Renaissance Studies. Both the dissertation prospectus and the final dissertation must be approved by the French department and the program in Renaissance Studies. For further details see Renaissance Studies.

For students in the combined Ph.D. program in French and Film and Media Studies, the oral examination will normally include one topic on film theory and one on French film. Both the dissertation prospectus and the final dissertation must be approved by the

French department and the program in Film and Media Studies. In addition, Film and Media Studies requires a dissertation defense. For further details see Film and Media Studies.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in French are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program may petition for the M.A. degree after a minimum of one year of study in residence, upon completion of one of the language requirements and eight courses, of which at least six are in French. Two grades of Honors in French graduate courses are required.

Program materials are available on the department's Web site at <http://french.yale.edu/academics/graduate-program>.

Courses

FREN 610a, Old French R. Howard Bloch

An introduction to the Old French language, medieval book culture, and the prose romance via study of manuscript Yale Beinecke 229, *The Death of King Arthur*, along with a book of grammar and an Old French dictionary. Primary and secondary materials are available on DVD. Work consists of a weekly in-class translation and a final exam comprised of a sight translation passage, a familiar passage from Yale 229, and a take-home essay. No previous study of Old French necessary, although a knowledge of French is essential. Conducted in English. W 1:30–3:20

FREN 812b, The Old French Fable and Fabliaux R. Howard Bloch

A study of Marie de France's 103 animal tales and some of the anonymous "Ysopets" as well as of the 170 comic verse tales whose veins of satire, parody, comedy of language, situation, character, and farce are at the root of the European comic tradition. We read the fables and the fabliaux against the background of twelfth- and thirteenth-century social, religious, and literary culture. Fables to be read in the bilingual (Old French and English) edition of Harriet Spiegel and fabliaux in the recently published bilingual edition, with translations by Ned Dubin. Conducted in English. W 9:25–11:15

FREN 821b, Montaigne and d'Aubigné Edwin Duval

A study of Montaigne's *Essais* and d'Aubigné's *Tragiques*, two unprecedented and unclassifiable works begun in the 1570s and augmented over decades, diametrically opposed in every respect yet equally faithful to the spirit and culture of a waning Renaissance in the time of the Wars of Religion. Conducted in French. W 1:30–3:20

FREN 859b, Theater Controversy Christopher Semk

This course is a study of seventeenth-century theater, with particular attention to the controversies and scandals that shaped the theory and practice of "classical" theater. Today, the canonicity of Corneille, Molière, and Racine tends to obscure the many "querelles" (du Cid, de Théodore, du Tartuffe, d'Alceste,...) in which playwrights, theorists, clergy,

and secular authorities vied for influence over the development of theater. We examine such topics as the relationship between acting and oratory, the Aristotelian unities, religious anti-theatrical polemics, the representation of the passions, and the moral utility of theater. Readings include works by Corneille, Chapelain, Scudéry, Rotrou, Molière, Racine, Quinault, D'Aubignac, Nicole, and Lamy. Conducted in French. M 9:25–11:15

FREN 863a, Identity and Difference in Eighteenth-Century France Natasha Lee

In the decades before the French Revolution, debates about identity and difference, diversity and equality, and the shifting categories of sex, race, and class announced the stakes of the democracy to come. This course asks how political, scientific, and religious discourses marked individuals as “others” in the eighteenth century. What strategies of resistance did individuals, in turn, employ to define themselves? The Enlightenment’s colonial and postcolonial legacy is also explored. Authors to be studied include Montesquieu, Voltaire, Rousseau, Diderot, Olympe de Gouges, and Raynal. Conducted in French. M 3:30–5:20

FREN 930a/CPLT 734a, Fact and Fiction in the Archives Alice Kaplan

The turn to archival research in French literary studies; theoretical and personal essays on the archive (Derrida, Davis, Farge, Coeuré); and fiction that includes archival digging as part of a larger investment in memory. We are interested in archival research both as a writer’s practice and as a critic’s scholarly activity. The focus this year is on Occupied France. Includes practical work with newspapers and archives, both paper and digital. Conducted in English. T 1:30–3:20

FREN 935a/AFAM 712a, Aimé Césaire: One Hundred Years Christopher L. Miller

Observing the recent centenary of Aimé Césaire’s birth, this seminar examines the totality of the poet-statesman’s work. Each student takes responsibility for a work or topic and leads the class for one session. Conducted in English; reading knowledge of French required. TH 1:30–3:20

FREN 958b/WGSS 783b, Social Mobility in Contemporary French Literature

Morgane Cadieu

Mobility in the French social landscape and representations of class in contemporary French literature. The question of social change through gender, sexuality, and race; the representation of work and the workplace; the interaction between social class and literary style. Works by Ernaux, Genet, Duras, Eribon, Louis, Angot, Marivaux, Balzac, Mirbeau. Theoretical readings by Rancière, Marx, Bourdieu, Angela Davis, Foucault. Conducted in French. F 1:30–3:20

FREN 980a, Seminar on the Profession Christopher L. Miller

Open only to French department graduate students entering the job market, this workshop concentrates on the skills and the materials needed for candidacy. Individual and group activities throughout the fall term. Intense focus on the preparation of written materials, followed by training in performative skills. For credit (does not count toward sixteen-course requirement). Graded Satisfactory/Unsatisfactory.

GENETICS

Sterling Hall of Medicine I313, 203.785.5846

<http://medicine.yale.edu/genetics>

M.S., M.Phil., Ph.D.

Chair

Richard Lifton

Director of Graduate Studies

Antonio Giraldez

Professors Allen Bale, Susan Baserga (*Molecular Biophysics & Biochemistry*), W. Roy Breg, Jr. (*Emeritus*), Lynn Cooley, Daniel DiMaio, Patrick Gallagher (*Pediatrics*), Joel Gelernter (*Psychiatry; Neurobiology*), Antonio Giraldez, Peter Glazer (*Therapeutic Radiology*), Jeffrey Gruen (*Pediatrics*), Murat Gunel (*Neurosurgery*), Karen Hirschi (*Internal Medicine/Cardiology*), Arthur Horwich, Kenneth Kidd, Richard Lifton (*Internal Medicine/Nephrology; Molecular Biophysics & Biochemistry*), Haifan Lin (*Cell Biology*), Maurice Mahoney, Charles Radding (*Emeritus*), Margretta Seashore, Nenad Sestan (*Neurobiology*), Gerald Shadel (*Pathology*), Carolyn Slayman, Stefan Somlo (*Internal Medicine/Nephrology*), Joann Sweasy (*Therapeutic Radiology*), Peter Tattersall (*Laboratory Medicine*), Sherman Weissman, Tian Xu, Hongyu Zhao (*Public Health; Biostatistics*)

Associate Professors Martina Brueckner (*Pediatrics/Cardiology*), Keith Choate (*Dermatology*), Valentina Greco, Natalia Ivanova, Mustafa Khokha (*Pediatrics*), Peining Li, Jun Lu, Arya Mani (*Internal Medicine*), Michael Nitabach (*Cellular & Molecular Physiology*), James Noonan, Valerie Reinke, Zhaoxia Sun, Scott Weatherbee

Assistant Professors Kaya Bilguvar, Chris Cotsapas (*Neurology*), Mark Hammarlund, Janghoo Lim, In-Hyun Park, Curt Scharfe, Michele Spencer-Manzon, Andrew Xiao, Hui Zhang

Fields of Study

Molecular Genetics: chromosome structure and function, genetic recombination, viral genetics, DNA damage repair, ribosome biogenesis, protein folding, neurodegenerative diseases, non-coding RNA function, and the regulation of gene expression. Genomics: genome mapping, genome modification, high-throughput technology, evolutionary genetics, and functional genomics. Cellular and Developmental Genetics: limb development, kidney development, cilia function, stem cell development, genetic control of the cytoskeleton, cell death, aging, cell fate determination, cell cycle progression, cell migration, cell signaling, and growth control. Cancer Genetics: oncogenesis and tumor suppression, tumor progression and metastasis. Model Organism Genetics: forward genetic screens in *Drosophila*, *C. elegans*, yeast, zebrafish, frogs, and mouse, transposon and insertional mutagenesis, gene and protein trapping, mosaic genetics. Medical Genetics: genetic basis of human disease, chromosome rearrangements, population and quantitative genetics.

Special Admissions Requirements

The department welcomes applicants who have a bachelor's or master's degree in biology, chemistry, or a related field, with experience (from course work and/or research) in the field of genetics. GRE General Test scores are required. A pertinent Subject Test in Biochemistry and Molecular Biology, Biology, or Chemistry is recommended.

To enter the Ph.D. program, students apply to the Molecular Cell Biology, Genetics, and Development (MCGD) track within the interdepartmental graduate program in the Biological and Biomedical Sciences (BBS).

Special Requirements for the Ph.D. Degree

The Ph.D. program in Genetics is designed to provide the student with a broad background in general genetics and the opportunity to conduct original research in a specific area of genetics. The student is expected to acquire a broad understanding of genetics, spanning knowledge of at least three basic areas of genetics, which include molecular, cellular, organismal, and population genetics. Normally this requirement is accomplished through the satisfactory completion of formal courses, many of which cover more than one of these areas. Students are required to pass at least five graduate-level courses that are taken for a grade. Advanced graduate study becomes increasingly focused on the successful completion of original research and the preparation of a written dissertation under the direct supervision of a faculty adviser along with the guidance of a thesis committee.

A qualifying examination is given during the second year of study. This examination consists of a period of directed reading with the faculty followed by the submission of two written proposals and an oral examination. Following the completion of course work and the qualifying examination, the student submits a dissertation prospectus and is admitted to candidacy for the Ph.D. degree. There is no language requirement. An important aspect of graduate training in genetics is the acquisition of communication and teaching skills. Students participate in presentation seminars and two terms (or the equivalent) of teaching at the TF-10 level. Teaching activities are drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school levels. Students are not expected to teach during their first year. In addition to all other requirements, students must successfully complete GENE 901b, First-Year Introduction to Research – Ethics: Scientific Integrity in Biomedical Research, prior to the end of their first year of study. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study.

M.D./Ph.D. Students

M.D./Ph.D. students affiliate with the Department of Genetics graduate program via a different route than other incoming graduate students in the department, resulting in some modification of the academic requirements for the Ph.D. portion of the M.D./Ph.D. degree. Typically, one or more research rotations is done during the first two years

of medical school (in many cases, the first rotation is done during the summer between years one and two). No set number of research rotations is required. M.D./Ph.D. students officially affiliate with the Department of Genetics after selecting a thesis adviser and consulting with the DGS. M.D./Ph.D. students interested in Genetics are required to consult with the DGS prior to formal affiliation to determine an appropriate set of courses tailored to the student's background and interests.

The courses, rotations, and teaching requirements for M.D./Ph.D. students entering the Genetics graduate program (see below) are modified from the normal requirements for Ph.D. students. Besides the modifications in these three requirements, M.D./Ph.D. students in the Department of Genetics are subject to all of the same requirements as the other graduate students in the department.

Courses Four graduate-level courses taken for a grade are required (two Yale graduate-level courses taken for a grade during medical school may be counted toward this requirement at the discretion of the DGS). Course work is aimed at providing a firm basis in genetics and in cellular molecular mechanisms, with graduate-level proficiency in genetics, cell biology, and biochemistry.

Required courses: In addition to the four graduate-level courses, all M.D./Ph.D. students must take: Basic Concepts of Genetic Analysis (GENE 625a) or Genomic Methods for Genetic Analysis (GENE 760b); Graduate Student Seminar: Critical Analysis and Presentation of Scientific Literature (2 terms; GENE 675a and b, graded Satisfactory/Unsatisfactory); Ethics: Scientific Integrity in Biomedical Research (as part of GENE 901b, graded Satisfactory/Unsatisfactory).

Recommended courses: Advanced Eukaryotic Molecular Biology (GENE 743b); Biochemical and Biophysical Approaches in Molecular and Cellular Biology (MCDB 630b); Molecules to Systems (CBIO 502); Molecular and Cellular Basis of Human Disease (CBIO 601).

Electives: Other courses may be taken in a wide variety of fields relevant to the biological and biomedical sciences.

Laboratory rotations One or more rotations are necessary to identify a thesis adviser. No set number of research rotations is required.

Teaching One term of teaching is required. Previous teaching while enrolled at the Yale School of Medicine may count toward this requirement at the discretion of the DGS.

Qualifying exam M.D./Ph.D. students take their qualifying exam in the term following the completion of their course work. The structure of the qualifying exam is identical to that for other Ph.D. students in Genetics. Students read with three faculty members for five weeks, one of whom supervises the reading on the thesis research topic, but who is not the thesis adviser. The following two weeks are devoted to writing two research proposals, one on the student's thesis research. An oral exam follows in the eighth week.

Prospectus M.D./Ph.D. students submit their prospectus once their qualifying exam has been completed, but no later than the 30th of June following their exam.

Candidacy M.D./Ph.D. students will be admitted to candidacy once they have completed their course work, obtained two Honors grades, passed their qualifying exam, and submitted their dissertation prospectus.

Thesis committee M.D./Ph.D. students are required to have one thesis committee meeting per year, beginning the term after passing their qualifying exam. However, students are strongly encouraged to consider having additional meetings if they feel their project could benefit from the assistance of members of the thesis committee.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. Students are not admitted for this degree. They may receive this recognition if they leave Yale without completing the qualifying exam but have satisfied the course requirements as described above, as well as the Graduate School's Honors requirement.

Prospective applicants are encouraged to visit the BBS Web site (<http://bbs.yale.edu>), MCGD Track.

Courses

GENE 625a/MB&B 625a^U/MCDB 625a^U, Basic Concepts of Genetic Analysis

Tian Xu and staff

The universal principles of genetic analysis in eukaryotes are discussed in lectures. Students also read a small selection of primary papers illustrating the very best of genetic analysis and dissect them in detail in the discussion sections. While other Yale graduate molecular genetics courses emphasize molecular biology, this course focuses on the concepts and logic underlying modern genetic analysis. MW 11:35–12:50

GENE 645b/BIS 645b/CB&B 647b, Statistical Methods in Human Genetics

Hongyu Zhao and Kenneth Kidd

Probability modeling and statistical methodology for the analysis of human genetics data are presented. Topics include population genetics, single locus and polygenic inheritance, linkage analysis, quantitative trait analysis, association analysis, haplotype analysis, population structure, whole genome genotyping platforms, copy number variation, pathway analysis, and genetic risk prediction models. Prerequisites: genetics; BIS 505a and b; STAT 541 or equivalent; or permission of the instructor.

GENE 655a/CBIO 655a, Stem Cells: Biology and Application In-Hyun Park,

Haifan Lin, and faculty

This course is designed for first-year or second-year students to learn the fundamentals of stem cell biology and to gain familiarity with current research in the field. The course is presented in a lecture and discussion format based on primary literature. Topics include stem cell concepts, methodologies for stem cell research, embryonic stem cells, adult stem cells, cloning and stem cell reprogramming, and clinical applications of stem cell research. Prerequisites: undergraduate-level cell biology, molecular biology, and genetics. TH 1:30–3

GENE 675a and b, Graduate Student Seminar: Critical Analysis and Presentation of Scientific Literature Valentina Greco and staff

Students gain experience in preparing and delivering seminars and in discussing presentations by other students. A variety of topics in molecular, cellular, developmental,

and population genetics are covered. Required of all second-year students in Genetics. Graded Satisfactory/Unsatisfactory. W 1:30–3

GENE 703b, The Mouse in Biomedical Research Caroline Zeiss

This course describes aspects of comparative genomics, construction of genetically altered mice, mouse phenotyping, and study design relevant to the use of mice in the study of human disease. Prerequisites: undergraduate-level knowledge of genetics and mammalian anatomy and physiology.

GENE 734a/MB&B 734a/MBIO 734a, Molecular Biology of Animal Viruses

Brett Lindenbach

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions.

GENE 743b/MB&B 743b^U/MCDB 743b, Advanced Eukaryotic Molecular Biology

Mark Hochstrasser, Karla Neugebauer, Matthew Simon, Patrick Sung

Selected topics in transcriptional control, regulation of chromatin structure, mRNA processing, mRNA stability, RNA interference, translation, protein degradation, DNA replication, DNA repair, site-specific DNA recombination, somatic hypermutation. Prerequisite: biochemistry or permission of the instructor. TTH 11:35–12:50

GENE 749a/MB&B 749a^U, Medical Impact of Basic Science Joan Steitz,

I. George Miller, Andrew Miranker, Karla Neugebauer, David Schatz,
Thomas Steitz, and staff

Consideration of examples of recent discoveries in basic science that have elucidated the molecular origins of disease or that have suggested new therapies for disease. Emphasis is placed on the fundamental principles on which these advances rely. Reading is from the primary scientific and medical literature, with emphasis on developing the ability to read this literature critically. Aimed primarily at undergraduates. Prerequisite: biochemistry or permission of the instructor. MW 1–2:15

GENE 760b, Genomic Methods for Genetic Analysis James Noonan

Introduction to the analysis and interpretation of genomic datasets. The focus is on next-generation sequencing (NGS) applications including RNA-seq, ChIP-seq, and exome and whole genome sequencing. By the end of the course, each student will be able to process and analyze large-scale NGS datasets and interpret the results. This course is intended only for graduate students who are interested in applying genomic approaches in their thesis research. At a minimum, students must have basic familiarity with working in a UNIX/Linux computing environment. Prior experience with shell scripting or a scripting language such as Perl, Python, or Ruby is strongly recommended. Interested students must contact the instructor early in the fall term to discuss their prior experience and expectations for the course. Enrollment limited to twenty. Prerequisite: permission of the instructor.

GENE 777b/MCDB 677b, Mechanisms of Development Valerie Reinke and staff

An advanced course on mechanisms of animal development focusing on the genetic specification of cell organization and identity during embryogenesis and somatic differentiation. The use of evolutionarily conserved signaling pathways to carry out

developmental decisions in a range of animals is highlighted. Course work includes student participation in critical analysis of primary literature and a research proposal term paper. W 1:30–3:20

GENE 840a and b, Medical Genetics Margretta Seashore

Clinical rotation offering medical and graduate students the opportunity to participate in the Genetic Consultation Clinic, genetic rounds, consultation rounds, and genetic analysis of clinical diagnostic problems.

GENE 900a/CBIO 900a/MCDB 900a, First-Year Introduction to Research – Grant Writing and Scientific Communication Scott Holley and faculty

Grant writing, scientific communication, and laboratory rotation talks for Molecular Cell Biology, Genetics, and Development track students. M 4–5:30

GENE 901b/CBIO 901b/MCDB 901b, First-Year Introduction to Research – Ethics: Scientific Integrity in Biomedical Research Joerg Bewersdorf

Ethics and laboratory rotation talks for Molecular Cell Biology, Genetics, and Development track students. TH 4:15–5:45

GENE 911a/CBIO 911a/MCDB 911a, First Laboratory Rotation Craig Crews

First laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

GENE 912b/CBIO 912b/MCDB 912b, Second Laboratory Rotation Craig Crews

Second laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

GENE 913b/CBIO 913b/MCDB 913b, Third Laboratory Rotation Craig Crews

Third laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

GENE 921a and b, Reading Course in Genetics and Molecular Biology

Directed reading with faculty. Term paper required. Prerequisite: permission of Genetics DGS.

GEOLOGY AND GEOPHYSICS

Kline Geology Laboratory, 203.432.3124

<http://earth.yale.edu>

M.S., M.Phil., Ph.D.

Chair

Jay Ague

Director of Graduate Studies

Alexey Fedorov [F]

Jeffrey Park [Sp]

Professors Jay Ague, David Bercovici, Ruth Blake, Mark Brandon, Derek Briggs, Peter Crane, David Evans, Alexey Fedorov, Debra Fischer, Jacques Gauthier, Shun-ichiro Karato, Jun Korenaga, Mark Pagani, Jeffrey Park, Peter Raymond, Danny Rye, James Saiers, Ronald Smith, John Wettlaufer

Associate Professors William Boos, Kanani Lee, Mary-Louise Timmermans

Assistant Professors Bhart-Anjan Bhullar, Pincelli Hull, Maureen Long, Noah Planavsky, Trude Storelvmo, Nadine Unger

Fields of Study

Fields include geochemistry and petrology, geophysics, ice physics, mineral physics, seismology and geodynamics, structural geology and tectonics, paleontology and paleoecology, oceanography, meteorology, cryospheric dynamics, and climatology.

Special Admissions Requirements

The department welcomes applicants oriented toward the earth sciences who have a bachelor's or master's degree in such fields as biology, chemistry, engineering, mathematics, meteorology, or physics, as well as those trained in geological, geophysical, and geochemical sciences. Scores from a pertinent GRE Subject Test are desirable but not required. The TOEFL or IELTS exam is required of all applicants for whom English is a second language.

Special Requirements for the Ph.D. Degree

There is no formal language requirement and no required curriculum. Students plan their course of study in consultation with their adviser to meet individual interests and needs and to lay the foundations for dissertation research. At the end of the first year the faculty reviews the standing of each student. A student recommended for continuation in the Ph.D. program will be so notified. Some students may be encouraged at that time to pursue only the M.S. degree. At the end of the second year the faculty reviews each student's overall performance to determine whether he or she is qualified to continue for the Ph.D. degree. In order to qualify, a student must have met the Graduate School Honors requirement and maintained a better than passing record in the areas of concentration. Also, a student must have satisfied the requirements of the Qualifying Exam by

having completed two Research Discourses termed (according to their degree of development) the Minor and the Major Discourses. The Major Discourse will be presented at the Qualifying Presentation, followed by an extended question period wherein the student must successfully defend both Discourses. Remaining degree requirements include a dissertation review in the third year; the preparation and defense of the dissertation; and the submission of the dissertation to the Graduate School. The department requires that an additional copy, for which the student will be reimbursed, be deposited with the librarian of the Kline Geology Library.

Teaching experience is regarded as an integral part of the graduate training program in Geology and Geophysics. For that reason all students are required to serve as teaching fellows (5 hours per week) for two terms during the course of their predoctoral training.

In addition to all other requirements, students must successfully complete G&G 710b, Responsible and Ethical Conduct of Research, prior to the end of their first year of study.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. Awarded only to students who are not continuing for the Ph.D. Students are not admitted for this degree. Minimum requirements include satisfactory performance in a course of study (typically six or more courses with at least one Honors grade in a graduate-level class) that is approved by the director of graduate studies (DGS), and a research project with the approval of the DGS and the student's thesis committee.

Program materials are available at www.geology.yale.edu or upon request to the Director of Graduate Studies, Department of Geology and Geophysics, Yale University, PO Box 208109, New Haven CT 06520-8109; e-mail, dgs@geology.yale.edu.

Courses

[G&G 500b^U, Mineral Deposits]

[G&G 501b^U/ASTR 540b^U, Radiative Processes in Astrophysics/Stellar Atmospheres]

[G&G 502a^U, Introduction to Geochemistry]

[G&G 504a^U, Minerals and Human Health]

[G&G 507a, Experimental Methods in Earth Sciences]

[G&G 508b, The Global Carbon Cycle]

[G&G 510a, Introduction to Isotope Geochemistry]

[G&G 511a, Stratigraphic Principles and Applications]

[G&G 512a^U, Structure and Deformation of the Lithosphere]

[G&G 513a^U, Invertebrate Paleontology: Evolving Form and Function]

[G&G 515b^U, Paleobotany]

[G&G 518a^U, Trace Fossil Analysis]

G&G 519a^U, Introduction to the Physics and Chemistry of Earth Materials

Shun-ichiro Karato

Basic principles that control the physical and chemical properties of Earth materials. Equation of state, phase transformations, chemical reactions, elastic properties, diffusion, kinetics of reaction, and mass/energy transport. TTH 1–2:15

G&G 521b^U, Geophysical Fluid Dynamics David Bercovici

An examination of the equations governing rotating stratified flows with application to oceanic and atmospheric circulation as well as climate. Mathematical models are used to illustrate the fundamental dynamical principles of geophysical fluid phenomena such as waves, boundary layers, flow stability, turbulence, and large-scale flows. The course aims to provide a general theoretical framework for understanding the structure and circulation of the ocean and the atmosphere. MW 11:35–12:50

G&G 522a^U, Physics of Weather and Climate Trude Storelvmo

The climatic system; survey of atmospheric behavior on time scales from days (i.e., weather) to decades (i.e., climate); formulation of mathematical equations describing weather and climate with selected applications to small- and large-scale phenomena. TTH 1–2:15

G&G 523b^U, Climate Dynamics Alexey Fedorov

A survey of fluid dynamics with application to circulation in the ocean and atmosphere, as well as mantle and core. Mathematical models are used to illustrate the fundamental dynamical principles of geophysical fluid phenomena such as convection, waves, boundary layers, flow stability, turbulence, and large-scale flows. The course aims to provide a general theoretical framework for understanding the structure and circulation of the ocean, atmosphere, and Earth's interior. MW 11:35–12:50

[G&G 524a, Mathematical Methods in Geophysics]**[G&G 525a/ENAS 761a, Introduction to Continuum Mechanics]****G&G 526a^U, Introduction to Earth and Planetary Physics** Jun Korenaga

An introduction to the structure and dynamics of Earth and other planets in the context of cosmic evolution. Review of basic physical principles and their applications to geophysics and planetary physics. Star formation and nucleosynthesis; planetary accretion and the birth of the solar system; heat flow, plate tectonics, and mantle dynamics; seismology and geodesy; core dynamics, geomagnetism, and planetary magnetism. Prerequisites: PHYS 181b and MATH 120a or b or equivalents. MW 9–10:15

[G&G 528a^U, Science of Complex Systems]**[G&G 529b, Introduction to Geodynamics]****[G&G 533a^U, Paleogeography]****G&G 535a^U, Physical Oceanography** Alexey Fedorov

An introduction to ocean dynamics and physical processes controlling the large-scale ocean circulation, ocean stratification, the Gulf Stream, wind-driven waves, tides, tsunamis, coastal upwelling, and other oceanic phenomena. Equations of motion. Modern

observational, theoretical, and numerous other techniques used to study the ocean. The ocean role in climate and global climate change. MW 11:35–12:50

[G&G 536b, **Atmospheric Waves, Convection, and Vortices**]

[G&G 540a^U, **Methods in Geomicrobiology**]

[G&G 545a, **Marine Micropaleontology**]

G&G 555a^U, Thermodynamics of Mountain Belts Jay Ague

Examination of the fundamental principles governing the formation of metamorphic and igneous rocks during mountain building. Topics include processes of heat and mass transfer in orogenic belts, generation of igneous rocks in continental and subduction settings, ultra-high-pressure and ultra-high-temperature metamorphism, spatial and temporal patterns of petrologic processes throughout geologic time, and pressure-temperature-time paths of metamorphic and igneous rocks. MW 9–10:15

[G&G 556a^U, **Introduction to Seismology**]

[G&G 557b, **Advanced Seismology**]

G&G 562b^U/ARCG 762b^U/EMD 548b/F&ES 726b, Observing Earth from Space

Ronald Smith, Xuhui Lee, Mark Ashton

A practical introduction to satellite image analysis of Earth's surface. Topics include the spectrum of electromagnetic radiation, satellite-borne radiometers, data transmission and storage, computer image analysis, the merging of satellite imagery with GIS and applications to weather and climate, oceanography, surficial geology, ecology and epidemiology, forestry, agriculture, archaeology, and watershed management.

[G&G 567b^U, **Geochemical Approaches to Archaeology**]

[G&G 570b, **Cloud Physics and Dynamics**]

G&G 602b^U, Paleoclimates Mark Pagani

A study of the dynamic evolution of Earth's climate. Topics include warm (the Cretaceous, the Eocene, the PETM, the Pliocene) and cold (the "snowball Earth") climates of the past, glacial cycles, abrupt climate changes, the climate of the past thousand years, and the climate of the twentieth century. TTH 11:35–12:50

[G&G 610b^U, **Advanced Topics in Macroevolution**]

[G&G 611a, **Advanced Stratigraphy**]

[G&G 616a, **Advanced Petrology**]

[G&G 617b, **Leaf Architecture of the Flowering Plants**]

G&G 618a, Petrology of Light Stable Isotopes Danny Rye

The principles and applications of light stable isotopes to geological materials.

G&G 621b, Geochemistry of Heavy and Radioactive Isotopes in Rock Systems

Danny Rye

The principles and application of radioactive and radiogenic isotopes to geological materials.

G&G 631a, Vertebrate Paleontology: Phylogeny of Vertebrates Jacques Gauthier

The seminar offers a detailed look at current issues in the phylogeny, anatomy, and evolution of fossil and recent vertebrates. Lectures review the broad outline of vertebrate phylogeny and evolution. Lab section is required. HTBA

[G&G 644b, Mantle Dynamics and Geochemistry]**[G&G 650b^U, Deformation of Earth Materials]****G&G 655a^U, Extraordinary Glimpses of Past Life** Derek Briggs

Study of exceptionally well preserved fossil deposits (*lagerstaetten*) that contain non-mineralized animal skeletons and casts of the soft parts of organisms. Examples such as the Burgess Shale and Solnhofen limestones; what they can reveal about the history and evolution of life, ancient lifestyles and environments, and preservational processes. MW 11:35–12:50

[G&G 657a, Marine, Atmospheric, and Surficial Geochemistry]**G&G 658b, Seismic Data Analysis** Jeffrey Park

Topics in the interpretation of seismic data from earthquakes, explosions, and other seismic phenomena. Estimation of travel times, whole-earth seismic profiles, waveform cross-correlation, seismic noise processing, receiver functions, shear-wave birefringence, and tomography.

[G&G 659a, Time Series Analysis with Geoscience Applications]**[G&G 660a, Diagenesis, Weathering, and Geochemical Cycles]****G&G 666b/AMTH 666b/ASTR 666b, Classical Statistical Thermodynamics**

John Wettlaufer

Classical thermodynamics is derived from statistical thermodynamics. Using the multi-particle nature of physical systems, we derive ergodicity, the central limit theorem, and the elemental description of the second law of thermodynamics. We then develop kinetics, transport theory, and reciprocity from the linear thermodynamics of irreversible processes. Topics of focus include Onsager reciprocal relations, the Fokker-Planck equation, stability in the sense of Lyapunov, and time invariance symmetry. We explore phenomena that are of direct relevance to astrophysical and geophysical settings. No quantum mechanics is necessary as a prerequisite.

[G&G 675b, Quantitative Tectonics]**G&G 690a and b, Directed Research in Geology and Geophysics**

By arrangement with faculty.

G&G 691a or b, Independent Research

In addition to the seminars noted below, others on special topics like evolution, invertebrate and vertebrate paleontology, statistical mechanics and spectroscopy, structural geology and tectonics, petrology, volcanology, and physics of oceans and atmospheres are offered according to student interest, by arrangement with departmental faculty. Seminars are often organized around the research interests of visiting faculty as well. Prerequisite: approval of DGS and adviser.

G&G 703a and b, Seminar in Systematics Jacques Gauthier

3 HTBA

G&G 710a, Responsible and Ethical Conduct of Research Alexey Fedorov

A 5-to-6-week lecture course (1 hour) that is required of all graduate students and must be completed within the first year. Course topics include record keeping and data management/retention; plagiarism and fraud; collaboration, coauthorship, and ownership of research materials and intellectual property; laboratory dynamics and sexual harassment. G&G 710a is in addition to the existing online ethics module, “The Yale Guide to Professional Ethics” (https://www.sis.yale.edu/pls/rcr/login_c_pkg.go_to_front_door), that must be completed by all GSAS students within the first term of study, regardless of source of financial support.

G&G 719b, Topics in Mineral Physics Kanani Lee

The seminar focuses on advanced topics in planetary structure, composition, and evolution from the perspective of mineral physics. The seminar relies on both classic mineral physics papers as well as recently published results. T 3:30–5

[G&G 720a, Caves, Chemistry, and Climate]

[G&G 735a, Principles in Organic Geochemistry]

[G&G 740a, Student Research Seminar]

[G&G 742a, Seminar in Polar Processes and Climate]

G&G 744b, Seminar in Mantle and Core Processes

T 4–5:30

[G&G 746a or b, Seminar in Climate and Energy]

G&G 747a or b, Topics in Geochemistry

[G&G 757b, Studies in Global Geoscience]

G&G 767b, Seminar in Ice Physics John Wettlaufer

We bring together the basic thermodynamics and statistical mechanics of crystal growth, surface phase transitions, metastability, and instability to explore the many faces of the surface of ice. These processes control the macroscopic growth shapes of ice crystals, underlie the enigma of the snowflake, and have implications in, inter alia, the atmosphere, the oceans, basic materials science, and astrophysics.

G&G 775a and b, Seminar in Lithosphere and Surface Processes Noah Planavsky,

Mark Brandon

The seminar focuses on advanced topics in the evolution and structure of the lithosphere. The theme for the seminar changes each term, covering topics such as the restoration of continents in deep time, true polar wander, lithospheric instabilities, orogenesis at convergent plate boundaries, interactions between climate and tectonics. Meetings are for 1.5 hours, once a week, and are organized around readings from the primary research literature.

G&G 800a or b, Tutorial in Paleobiology

[G&G 805a or b, Fossil Floras]

**G&G 810a or b, Tutorial in Structural Geology and Tectonics or Solid Earth
Geophysics**

G&G 820a or b, Tutorial in Meteorology, Oceanography, or Fluid Dynamics

G&G 830a or b, Tutorial in Geochemistry, Petrology, or Mineralogy

G&G 840a or b, Tutorial in Sedimentology

G&G 860a or b, Tutorial in Remote Sensing

GERMANIC LANGUAGES AND LITERATURES

W. L. Harkness Hall, 203.432.0788

<http://german.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Rüdiger Campe

Director of Graduate Studies

Carol Jacobs (WLH 310, carol.jacobs@yale.edu)

Professors Rüdiger Campe, Carol Jacobs, Rainer Nägele, Paul North, Brigitte Peucker (*on leave* [F]), Henry Sussman (*Visiting*), Kirk Wetters

Affiliated Faculty Jeffrey Alexander (*Sociology*), Seyla Benhabib (*Political Science; Philosophy; on leave* [Sp]), Karsten Harries (*Philosophy; on leave* [Sp]), Gundula Kreuzer (*Music; on leave*), Patrick McCreless (*Music*), Steven Smith (*Political Science*), David Sorkin (*History*), Nicola Suthor (*History of Art*), Katie Trumpener (*Comparative Literature; English*), Jay Winter (*History*)

Fields of Study

German literature and culture from the Middle Ages to the twenty-first century in Germany, Austria, and Switzerland; literary and cultural theory; literature and philosophy; literature and science; media history and theory; visibility and German cinema.

Special Admissions Requirement

All students must provide evidence of mastery of German upon application.

Requirements for the Ph.D. Degree

Students are required to demonstrate, besides proficiency in German, a reading knowledge of one other foreign language by the beginning of the third term of study. French is recommended, although occasionally, on consultation with the director of graduate studies (DGS), other relevant languages may be substituted. The faculty in German considers teaching to be essential to the professional preparation of graduate students. Four terms of teaching are required beginning in the third year of study. Students normally teach undergraduate language courses under supervision for at least three terms. Other teaching experiences are available thereafter in literature, theory, film, etc.

In the first two years of study, students take four courses per term. Three of these sixteen courses in the first four terms may be audited.

Oral examinations must be passed in the fifth and sixth terms of study, and a dissertation prospectus should be submitted no later than the end of the sixth term. All students will be asked to defend the prospectus in an informal discussion with the faculty. The defense will take place before the prospectus is officially approved, usually in May of the sixth term. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation requirements, including the prospectus.

After the submission of the prospectus, the student's time is devoted mainly to the preparation of the dissertation. A dissertation committee will be set up for each student at work on the dissertation. It is expected that students will periodically pass their work along to members of their committee, so that faculty members in addition to the dissertation adviser can make suggestions well before the dissertation is submitted. Drafts of each chapter must be submitted in a timely fashion to all members of the student's committee: The first chapter should be submitted to the committee by February 1 of the fourth year of study; the second chapter should be submitted by January 1 of the fifth year. There will be a formal review of the first chapter.

Two concentrations are available to graduate students: Germanic Literature and German Studies. There is a special combined degree with Film and Media Studies; see below.

Special Requirements for the Germanic Literature Concentration

During the first two years of study, students are required to take sixteen term courses, four of which may be taken outside the department. Three courses may be audited.

Special Requirements for the German Studies Concentration

During the first two years of study, students are required to take sixteen term courses, seven of which may be taken outside the department. Three of those courses may be audited. Students are asked to define an area of concentration and will meet with appropriate advisers from both within and outside the department.

Combined Ph.D. Program with Film and Media Studies

The Department of Germanic Languages and Literatures also offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. in Germanic Languages and Literatures and Film and Media Studies. For further details, see Film and Media Studies. Applicants to the combined program must indicate on their application that they are applying both to Film and Media Studies and to Germanic Languages and Literatures. All documentation within the application should include this information.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program may qualify for the M.A. degree upon completion of a minimum of eight graduate term courses and the demonstration of reading knowledge in either Latin or French.

Further information is available upon request to the Registrar, Department of Germanic Languages and Literatures, Yale University, PO Box 208210, New Haven CT 06520-8210; e-mail, german@yale.edu.

Courses

GMAN 536b^U/CPLT 536b^U, Around Kafka Henry Sussman

Franz Kafka's writings viewed as a site for the radical questioning and dislocation of Western systems, institutions, and mores of the early twentieth century. Attention to

the shorter fiction, the novels, the letters, and their strategic interrelations; examination of the fields of knowledge, ideological presumptions, and aesthetic and cultural experiments that Kafka touched, and to some degree deranged, with his writing. W 1:30–3:20

GMAN 558a^U/CPLT 575a^U/JDST 694a^U, Georg Lukács: Literature and Politics

Kirk Wetters, Hannan Hever

Lukács is presented through his complex and multifaceted development as a crucial and enigmatic figure, at once a leading Jewish intellectual and perhaps the most important of all twentieth-century Marxist theorists. Following the Second World War, while he was still alive, his legacy had already become polarized in terms of “young Lukács” vs. “old Lukács,” East vs. West, romantic vs. realist vs. modernist, revolutionary vs. reactionary. Though Lukács’s influence rose and fell in conjunction with the Cold War, key critical terms and methods (such as “reification”) survived and are very much a part of current political problems and contemporary critical approaches (e.g., Jameson, Moretti, Honneth). TH 1:30–3:20

GMAN 560b^U/CPLT 586b^U, Knowing Fiction Carol Jacobs

Fiction and related prose pieces in which the relationships between narration, fiction, understanding, and knowing play a critical role. Focus on works by Western writers of the nineteenth century through the present. The texts’ theoretical implications and implicit self-definitions; the import of concepts such as truth, fiction, self-consciousness, perception, science, and narrative. M 1:30–3:20

GMAN 563b^U/CPLT 629b^U/PHIL 645b^U, Nietzsche and His Readers Paul North

Reading and discussion of Friedrich Nietzsche’s major texts, as well as critiques and interpretations by some of his most influential twentieth-century readers. T 3:30–5:20

GMAN 565a, Nothing Paul North

European thought has concerned itself historically with “things” and occasionally with the highest and most permanent things such as the world, the soul, and God. Yet in order to articulate what these things are and do, philosophers and artists often turned to a concept of nothing. Leibniz, for example, formulated the most fundamental philosophical question as “Why is there something rather than nothing?” And yet the meaning and function of nothing remain obscure. What kind of thing is it? Is there just one kind of nothing? How does “no” operate on this special kind of “thing” to give it such power? In this course we study the moments when “nothing” becomes crucial to philosophical, religious, political, and artistic projects. Other negativities will be important too, such as those signaled by the little words “no,” “not,” “non-,” “never,” “nor,” “-less,” “in-” and “un-,” “void,” and “null.” Authors read include Plato, Gorgias, Philo, Duns Scotus, Meister Eckhart, Shakespeare, Kant, Bergson, Heidegger, Walser, Beckett, and Sartre. M 3:30–5:20

GMAN 584b^U, Medieval German Lyric Mary Paddock

This course offers a comprehensive introduction to the courtly poetry of the German High Middle Ages (12th–13th centuries), focusing on the woman’s voice as a performance device in the lyric of major artists of that era. Attention is given to the language and formal conventions of a wide range of lyric subgenres and to the development of the woman’s role in the lyric of other European cultures of the time. TH 3:30–5:20

GMAN 589a^U, Hegel and Dialectical Thought Henry Sussman

By necessity, this course is a recursion to German idealism's unparalleled innovation. It is also the chronicle of the rise and fate of a powerful philosophical operating system. Beginning with a careful inventory of the engine-room of Hegelian dialectics, the seminar trains its camera on the astonishingly broad swathe of philosophical and literary projects arising in the wake of the dialectical adventure — up to the twentieth-century postwar period. Additional readings in Schlegel, Kierkegaard, Marx, Freud, Kafka, Benjamin, and Blanchot. Students are encouraged to do German, Danish, and French readings in the original. W 3:30–5:20

GMAN 600a^U/CPLT 787a^U, Novels of the Institution Rüdiger Campe

Close reading of novels of institutions — school, law court, administration, hospital — from ca. 1900. The shift of focus from the individual to the institution; consequences of this shift for the concept and form of the novel. Works by R. Walser, Joyce, Kafka, Musil, and Thomas Mann; readings in social and aesthetic theory by Simmel, Lukács, and Benjamin. T 1:30–3:20

GMAN 605a^U/CPLT 517a^U, Interpretation and Authority Carol Jacobs

Close readings of works on problems of authority and interpretation by Sigmund Freud, Walter Benjamin, Roland Barthes, and Paul de Man. Exploration of their writing as a performance that questions simplistic notions of truth. Consideration of the problem of how to interpret texts that unsettle the very nature of interpretation. M 1:30–3:20

GMAN 619a^U/CPLT 530a^U, The Question of Form Carol Jacobs

The concept of art in relation to form and deformation. Starting with Plato (*The Republic*), we then trace its echoes in modern literature (Keats, Shelley, Hardy, Kleist, Kafka) and film (Godard, Egoyan, Dreyer, Sun Zhou, Wong Kar-Wai). W 1:30–3:20

GMAN 630b^U/CPLT 533b^U, Illegitimacy Kirk Wetters

Theoretical exploration of legitimacy as a fundamental historical, legal, and political concept; works by Weber, Schmitt, Blumenberg, and Luhmann. Literary readings on illegitimacy in the specific sense “born out of wedlock”; authors include Shakespeare, Goethe, Kleist, Dostoevsky, and Gide. W 3:30–5:20

GMAN 645b^U/CPLT 589b^U, Walter Benjamin and the Modernization of Nineteenth-Century Paris Henry Sussman

The radical modernization of Paris under the Second Empire (1851–70) as seen through the eyes of Walter Benjamin. Focus on Benjamin's Arcades Project, a compendium that charted developments such as Parisian mass transit and streamlined traffic, the construction of apartment houses, and the dissemination of mass media. Readings from other literary texts on the same events include works by Balzac, Zola, and Aragon. M 3:30–5:20

GMAN 651a^U/PHIL 672a^U/PLSC 583a^U, Contemporary Critical Theory

Seyla Benhabib

A careful examination of Hegel's theory of the modern state and its elaboration by Habermas and Honneth. W 9:25–11:15

GMAN 652a/CPLT 840a/FILM 840a/HSAR 687a/RUSS 712a, Moscow/Berlin:

Leftist Avant-Gardes and Interwar Modernism Katerina Clark, Katie Trumpener
 From 1918 to the mid-1930s, Moscow and Berlin were central gathering points for left-wing modernists. Each city developed its own modes of modernism, yet in sustained dialogue, given massive Russian emigration to Berlin after 1918, the Weimar obsession with early Soviet aesthetics (and cinema), intellectuals traveling in both directions, and the large-scale emigration of German leftists to the Soviet Union after 1933. And in the late 1940s and '50s, Soviet intellectuals (and German emigrants returning from Moscow) shaped a "late modernism" in East Berlin. Centered on literature and film, the course also considers a wide array of art forms (including painting, photography, architecture, music, and aesthetic theory). Works by modernists such as Eisenstein, Pudovkin, Vertov, Nabokov, Shklovsky, El Lissitzky, Rodchenko, Malevich, Tretiakov, Lukács, Moholy-Nagy, Benjamin, Brecht, Richter, Beckmann, Grosz, Heartfield, Höch, Lang, Döblin, Ruttman, Mies van der Rohe, Eisler, Busch, Konrad Wolf, Peter Weiss. T 1:30–3:20

GMAN 677b/CPLT 595b/HSAR 644b, Passions, 1600–1800 Rüdiger Campe,

Nicola Suthor
 Theories of passion from Descartes, Spinoza, and Hobbes to Burke, Adam Smith, and Kant. The relationship between passion and its representation in art and literature: Alberti, Raphael, Rembrandt; Shakespeare; Poussin, Marino; Sandrart, LeBrun; Greuze, Diderot, Lessing, Goethe, and others. In the background, discussion of contemporary history and theory of emotion. T 1:30–3:20

GMAN 730b^U/CPLT 716b^U/FILM 729b^U, New Waves: East/West Germany in Cold

War Europe Katie Trumpener
 Before 1961, Berlin was the best place in Europe to follow both Eastern and Western Europe's emerging cinematic New Waves. And first in East, then in West Germany, young filmmakers developed distinctive approaches to political and documentary filmmaking, to the Nazi past and the Cold War, to class, gender, and social transformation. This course juxtaposes the two German New Waves, focusing on aesthetic ferment, institutional barriers, and transformation. Features, documentaries, and experimental films by Gerhard Klein, Konrad Wolf, Alexander Kluge, Herbert Vesely, Edgar Reitz, Jean-Marie Straub and Danièle Huillet, Jürgen Böttcher, Heiner Carow, Frank Beyer, Wim Wenders, Rainer Werner Fassbinder, Helke Sander, Helke Misselwitz, read against other Eastern and Western New Wave films (i.e., by Lindsay Anderson, Karel Reisz, Andrzej Munk, Alain Resnais, Mikhail Kalatozov, Milos Forman). T 1:30–3:20

GMAN 900a,b, Directed Reading

By arrangement with the faculty.

GLOBAL AFFAIRS

Jackson Institute for Global Affairs
Horchow Hall, 203.432.3418
<http://jackson.yale.edu/academics>
M.A.S., M.A.

Director

James Levinsohn (*Global Affairs; School of Management*)

Director of Graduate Studies

Lloyd Grieger (*Sociology*)

Director of Student Affairs

Cristin Siebert (203.432.5954, cristin.siebert@yale.edu)

Professors Julia Adams (*Sociology*), Elizabeth Bradley (*Public Health*), John Gaddis (*History*), Jeffrey Garten (*School of Management*), Jacob Hacker (*Political Science; on leave [Sp]*), Oona Hathaway (*Law*), Stathis Kalyvas (*Political Science*), Paul Kennedy (*History*), James Levinsohn (*School of Management*), A. Mushfiq Mobarak (*School of Management*), Catherine Panter-Brick (*Anthropology; on leave [F]*), W. Michael Reisman (*Law*), Susan Rose-Ackerman (*Political Science; Law*), Peter Schott (*Economics; School of Management*), Ian Shapiro (*Political Science*), Timothy Snyder (*History*), Aleh Tsyvinski (*Economics*), Christopher Udry (*Economics*), Steven Wilkinson (*Political Science*), Elisabeth Wood (*Political Science*), Ernesto Zedillo (*International Economics & Politics*)

Associate Professors Patrick Cohrs (*History*), Ana De La O Torres (*Political Science*), Susan Hyde (*Political Science*), Kaveh Khoshnood (*Public Health*), Jason Lyall (*Political Science*), Nuno Monteiro (*Political Science; on leave*), Nancy Qian (*Economics*)

Assistant Professors Costas Arkolakis (*Economics*), David Atkin (*Economics*), Katharine Baldwin (*Political Science*), Lorenzo Caliendo (*Economics; School of Management*), Zack Cooper (*Public Health*), Alexandre Debs (*Political Science*), Lloyd Grieger (*Sociology*), Daniel Keniston (*Economics*), Thania Sanchez (*Political Science; on leave [Sp]*), Tariq Thachil (*Political Science*), Jonathan Wyrzten (*Sociology; International Affairs*)

Senior Lecturers Charles Hill (*International Security Studies*), Justin Thomas

Lecturers Michael Boozer (*Economics*), Robert Hecht, Robert Hopkins, William Casey King, Matthew Kocher (*Political Science*), Alice Miller (*Public Health; Law*), Sean Smith, Kristina Talbert-Slagle (*Public Health*), Edward Wittenstein

Visiting Professors* Nicoli Natrass, Robert Trager

Senior Fellows* Sigga Benediktsdottir, David Brooks, Howard Dean, Rosemary DiCarlo, Robert Ford, Thomas Graham, Unni Karunakara, Michele Malvesti, Stanley McChrystal, John Negroponte, Stephen Roach, Emma Sky, Matthew Spence

*For a complete list of visiting professors and senior fellows, see the Jackson Institute Web site.

The Jackson Institute for Global Affairs nurtures degree programs and scholarship with a strong interdisciplinary and policy-oriented international focus. The programmatic interests of the institute focus on development and security.

The Jackson Institute for Global Affairs administers the two-year Master of Arts (M.A.) and the one-year Master of Advanced Study (M.A.S.) degrees in Global Affairs. The fifty to sixty students in the M.A. program combine fundamental training in core disciplines in Global Affairs with an individualized concentration that has relevance to current international issues. Students in the M.A.S. program select courses based on their individual academic and professional goals. In addition to courses in the Global Affairs program, students take courses throughout the Yale Graduate School of Arts and Sciences and Yale's professional schools.

Fields of Study

The programs are designed to combine breadth of knowledge of the basic disciplines of global affairs with depth of specialization in a particular academic discipline, geographic area, specialized functional issue, and/or professional field. The M.A. program is designed primarily for students seeking an advanced degree before beginning a career in global affairs; joint degrees are offered with the School of Forestry & Environmental Studies, the Law School, the School of Management, and the School of Public Health. The M.A.S. program is aimed at midcareer professionals with extensive experience in a field of global affairs such as, but not limited to, international security, diplomacy, and development.

Special Admissions Requirements

Applicants to either program must take the GRE General Test; students whose native language is not English and who did not earn their undergraduate degree at an English-language university must take the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS). The minimum score on the TOEFL is 610 on the paper-based test or 102 on the Internet-based test. Entering M.A. students are strongly encouraged to have taken introductory courses in microeconomics and macroeconomics prior to matriculation.

Special Requirements for the M.A. Degree

The M.A. in Global Affairs requires two years of graduate study at Yale. To complete the degree, students must pass sixteen courses that fulfill the core and concentration requirements, demonstrate proficiency in a modern language, complete a summer internship or project, and maintain the grade average specified below.

Core Students take GLBL 801, 802, and 803 during the first term of enrollment.

Concentration Beyond the core courses and courses taken in fulfillment of the language requirement, each student must identify and demonstrate the academic integrity of a coherent set of courses as a proposed concentration for approval by the director of graduate studies (DGS). Students are able to develop concentrations based on a topical, regional, or disciplinary focus, or a combination of a topical and regional focus. Sample concentrations are available from the Jackson Institute Web site.

Language requirement The equivalent of four terms of language study at Yale is required to graduate. This competence must be demonstrated through successful completion of a Yale L4 class or by testing into a Yale L5 class. International students who completed secondary school or a university degree in a language other than English will be considered to have met the language requirement. Students may study language as part of their Yale program.

Summer internship requirement All students enrolled in the Global Affairs M.A. program are required to use the summer between the first and second years of the program to further their professional or academic education. It is expected that this requirement be fulfilled by obtaining experience through full-time employment or a full-time internship. The requirement may also be fulfilled by completing language study, other relevant course work, or independent research on an approved topic.

Each first-year student must file a form with the director of career services before June 1 stating the nature of his or her summer internship or approved alternative and submit a self-evaluation form by September 1.

Expectation of academic performance M.A. candidates are required to achieve at least two grades of Honors, while maintaining a High Pass average. To remain in good academic standing at the end of the first year, M.A. students are expected to complete half of the course work required for the degree, with at least a High Pass average and one grade of Honors. Students who do not have at least a High Pass average or the required number of courses at the end of the first year will not be allowed to continue in the program.

Special Requirements for the M.A.S. Degree

The M.A.S. in Global Affairs requires one year of graduate study at Yale. To complete the degree, students must pass eight courses in one year of full-time study. Courses are chosen in consultation with the director of graduate studies (DGS) at the start of each term. The program of study is customized to a student's individual academic and professional goals.

Special Requirements for the M.A. Joint-Degree Programs

Joint-degree candidates must fulfill all of the requirements of both programs in which they are enrolled before receiving either degree. Joint-degree students must take at least twelve graduate-level courses in Arts and Sciences departments or in professional schools other than the one granting the joint degree toward the Global Affairs program requirements. Three of these will be GLBL 801, 802, and 803, though the DGS may waive a portion of the Core for a joint-degree candidate. Two of the twelve courses may be language courses. Under no circumstances will students be allowed a Global Affairs concentration in the functional area in which they will be receiving a joint degree.

Applicants to the joint-degree programs must apply separately, by the appropriate deadline, to the Graduate School for the Global Affairs M.A. program and to the professional school involved. Decisions on admissions and fellowship support are made independently by each school. Students are encouraged to apply to both programs simultaneously. They may also apply during their first year at Yale to the second program for

a joint degree. If accepted into the new program, they must receive approval for credit allocation upon registration from both degree programs.

For more information, visit <http://jackson.yale.edu/academics>, e-mail jackson.institute@yale.edu, or call 203.432.3418.

Courses

GLBL 504b^U, International Economics Peter Schott

Introduction to conceptual tools useful for understanding the strategic choices made by countries, firms, and unions in a globalized world. Prerequisite: two terms of introductory economics.

GLBL 529a/CDE 585a/LAW 20568, Sexuality, Gender, Health, and Human Rights

Alice Miller

This course explores the application of human rights perspectives and practices to issues in regard to sexuality and health. Through reading, interactive discussion, paper presentation, and occasional outside speakers, students learn the tools and implications of applying rights and law to a range of sexuality and health-related topics. The overall goal is twofold: to engage students in the world of global sexual health and rights policy making as a field of social justice and public health action; and to introduce them to conceptual tools that can inform advocacy and policy formation and evaluation. Class participation, short reaction papers, and a final paper required. TH 9:25–11:15

GLBL 539b^U/PLSC 758b^U, Political Parties in the Developing World Tariq Thachil

Political parties are routinely described as ineffective, unresponsive, and corrupt. Yet they are vital players in both democratic and nondemocratic regimes across the globe. Parties are essential for several basic political functions, ranging from representing societal interests, providing political alternatives, mobilizing voting publics, and even maintaining social control. It is thus essential for any serious student of democracy to understand how political parties emerge and function. This course introduces students to the big questions surrounding parties and party systems, with an emphasis on the non-Western world. It examines how different kinds of parties form, the various ways in which they seek to forge linkages with ordinary citizens, and the effect of their competition on democratic institutions. The readings examine a variety of parties, from those that led independence movements, to those that represent particular ethnic groups or religious ideology. Examples are drawn from countries in Latin America, Asia, the Middle East, and sub-Saharan Africa.

GLBL 543b/MGT 672b, Practicum in Data Analysis Using Stata Justin Thomas

This course provides students with practical hands-on instruction in the analysis of survey data using the statistical package Stata. It serves as a bridge between the theory of statistics/econometrics and the practice of social science research. Throughout the term students learn to investigate a variety of policy and management issues using data from the United States as well as several developing countries. The course assumes no prior knowledge of the statistical package Stata. Prerequisite: graduate course in statistics.

GLBL 554b^U, Violence: State and Society Matthew Kocher

The course examines violence that occurs mainly within the territory of sovereign states. We focus on violence as an object of study in its own right. For the most part, we look at violence as a dependent variable, though in some instances it functioned as an independent variable, a mechanism, or an equilibrium. We ask why violence happens, how it “works” or fails to work, why it takes place in some locations and not others, why violence takes specific forms (e.g., insurgency, terrorism, mass killing), what explains its magnitude (the number of victims), and what explains targeting (the type or identity of victims). Special attention to connecting theoretical literatures in the social sciences with policy-relevant debates in government and nongovernmental service.

GLBL 555a/PLSC 665a^U, Causes of War Allan Dafoe

Examination of social, symbolic, and psychological aspects of international relations, with emphasis on the roles of perception and reputation in militarized conflict. Topics include deterrence, honor, prestige, signaling, audience costs, and international law. Rationalist, psychological, and cultural perspectives. Some attention to research design.

GLBL 590b^U, Cybersecurity, Cyber War, and International Relations

Edward Wittenstein

Cyberspace is the backbone of our global commerce and communication and defense systems, and it is the critical infrastructure that powers our modern civilization. Yet despite the benefits that have resulted from this global connectivity, significant vulnerabilities persist and threats are on the rise, especially to American national security interests. Drawing from academic and government sources in the fields of history, law, political science, and sociology, this course analyzes the rapidly evolving realm of international cyber relations. Topics include cyber crime, cyber espionage, cyber war, and cyber governance. After exploring the history, growth, current functions, and management of the Internet, the class turns to a number of recent challenges that cyberspace has helped produce: scandals such as WikiLeaks and Edward Snowden’s disclosures about the NSA; new cyber weapons like Stuxnet; technologies employed by authoritarian governments to monitor and stifle online dissent; the role that social networking technologies have played in the Arab Spring revolutions; tensions in U.S.-China relations resulting from cyber espionage and theft of intellectual property; and online “hactivists” whose protests cause significant Internet disruption. Particular attention is paid to whether any existing policy frameworks provide a basis for strengthening U.S. cybersecurity, fostering greater international understanding, and developing common cyber norms of behavior. The seminar also reflects on the legal and ethical dimensions of cybersecurity; the challenges of attribution and deterrence in cyberspace; the role of national and international government oversight; the relationship between the public and private sectors; and the tensions among privacy, transparency, freedom, and national security on the Internet.

GLBL 591b/LAW 21651, The Law of the Sea W. Michael Reisman

This seminar considers intensively some current problems concerning combating piracy; protection of the marine environment and conservation; maritime boundary delimitation; procedures for determining the boundaries of outer continental shelves; the Seabed Authority; rights and obligations of states not party to the U.N. Convention on the Law

of the Sea; the Arctic and the controversy on whaling. There will also be a workshop on using ArcGIS. Follows Law School academic calendar. M 4:10–6

GLBL 592a^U, Intelligence, Espionage, and American Foreign Policy

John Negroponte, Edward Wittenstein

The discipline, theory, and practice of intelligence; the relationship of intelligence to American foreign policy and national security decision making. Study of the tools available to analyze international affairs and to communicate that analysis to senior policy makers. Case studies of intelligence successes and failures from World War II to the present.

GLBL 597a/LAW 20626, Decision Making under Conditions of Uncertainty

Robert Post, Tim Collins

The course focuses on government and private decision making under conditions of high normative diversity and uncertainty. It uses as a case example how policy makers ought to respond to the unpredictable events now overtaking the Ukraine. Each week the course features a visitor who discusses how he or she went about making decisions under conditions of deep uncertainty. 0.5 GSAS credits. Follows Law School academic calendar.

GLBL 601a, International and Macro Economics Sigga Benediktsdottir

GLBL 618a^U/MGT 911a, The Next China Stephen Roach

Born out of necessity in the post-Cultural Revolution chaos of the late 1970s, modern China is about reforms, opening up, and transition. The Next China will be driven by the transition from an export- and investment-led development model to a pro-consumption model. China's new model could unmask a dual identity crisis – underscored by China's need to embrace political reform and the West's long-standing misperceptions about China. Prerequisite: basic undergraduate macroeconomics. MW 10:30–11:20, 1 HTBA

GLBL 627b, Complex Emergencies: The Case of South Sudan Unni Karunakara

This seminar is designed to provide an understanding of complex emergencies. Using South Sudan as a case, we examine a long-standing humanitarian context and discuss the impact of history, politics, economics, and the environment on human security and suffering. T 9:25–11:15

GLBL 690b, Operating in Difficult Environments Emma Sky

GLBL 724a, National Security Decision Making: Theory and Practice

Michele Malvesti

This seminar examines national security decision making both from a theoretical perspective and from its execution in practice. The seminar focuses on how decisions are made rather than on national security policy or strategy or theories of international relations. It is divided into three sections. The first – drawn, in part, from the instructor's nearly six years on the National Security Council staff – introduces students to the current structures, processes, institutions, and primary actors involved in national security decision making. The second section delves into analytic and theoretical models of decision making. The seminar concludes with discussions on practical application and execution, has students participate in a crisis simulation, and explores possible reforms. Emphasis

throughout is placed on the national security decision-making system of the United States (and particularly the executive branch), but seminar participants are encouraged to examine the systems of other states as well. W 3:30–5:20

GLBL 765b, Contemporary Issues in American Diplomacy and National Security

John Negroponte

The seminar addresses key issues in U.S. foreign policy and how they are being addressed by the current administration. Readings and discussion deal with selected regional and functional topics, with emphasis on those with the most pressing national security implications. The course is taught from the perspective of a diplomatic practitioner with additional experience in other aspects of national security. M 9:25–11:15

GLBL 781a, Financial Stability in Peripheral Economies Sigga Benediktsdottir

GLBL 790b, Leadership Stanley McChrystal

This course examines the practical execution of leadership in today's environment. Using a combination of historical case studies and recent events, we review how dramatic changes in technology, society, politics, media, and globalization have increased the complexity of the tasks facing modern leaders. Although the course includes the military aspects of leadership, the overall objective is to study leadership in a wider context, identifying the common factors shared by politics, business, education, warfare, and other fields. Specific topics include the changing leadership environment; the role of the leader; driving change; making difficult decisions; dealing with risk; coping with failure; navigating politics; and the effect of modern media. Application and course dates at <http://jackson.yale.edu/glbl-790-leadership-seminar-application>.

GLBL 791b, Moral Dilemmas in Humanitarian Action Unni Karunakara

This course discusses cases that examine ethical and moral dilemmas in the delivery of humanitarian assistance at the organizational, operational and individual levels. W 9:25–11:15

GLBL 799a or b, Independent Project

By arrangement with Jackson Institute Senior Fellows.

GLBL 801a, Economics: Principles and Applications James Levinsohn, Zack Cooper

This course deals with the application of basic microeconomic analysis to public policy issues. The principal goal is to teach students the process of economic reasoning and how to apply that reasoning to policy issues in the real world. The course covers the basic topics in microeconomic theory: consumer theory, production theory, market models from competition to monopoly, theories of labor and capital markets, and models of externalities and other common market failures. Some calculus will be used without apology along with a great deal of algebra and graphical analysis. TTH 2:30–3:45, 1 HTBA

GLBL 802a, Applied Methods of Analysis Lloyd Grieger

The course focuses on useful analytical approaches in public policy and the social sciences. The first part of the course focuses on mathematical skills. The second part focuses on methods for analyzing empirical data and builds on the mathematical skills from the first part of the course. Special focus is devoted to developing the skills necessary to

synthesize and evaluate empirical evidence from the social sciences. Students leave the class with an applied understanding of how quantitative methods are used as tools for analysis in public affairs. MW 1–2:15, 1 HTBA

GLBL 803a, History of the Present Timothy Snyder

The first half of the course presents some of the major diplomatic (and sometimes military) confrontations of the twentieth century, beginning with the First Balkan War, including the breakdowns of the late 1930s and progressing through the end of the Cold War. The second half introduces the history of Ukraine and closes with a case study of the Russian invasion of Ukraine's south and east as the end of the post-cold war order. In both parts emphasis is placed upon a close reading of primary documents and upon the reconstruction of possible alternatives. W 3:30–5:20

GLBL 811a/AMST 782a/E&RS 648a/HIST 788a, 1968: Social Movements in Comparative Perspective and Their Legacies Becky Conekin

In this seminar we explore post-WWII social movements and their legacies primarily across Western and Eastern Europe, North America, and Mexico. Analysis of other countries or regions in class discussions and final research papers is encouraged, based on student interest. Examining both the actuality and symbolic character of these movements in contemporary history, we analyze the political, social, and cultural meanings of protest and its impact on class, generational, gender, and racial relations. In addition, we discuss different national histories and discourses about identity, while exploring the varied geographies of the Cold War. We then move to a more thematic approach focusing on, for example, civil rights, antiwar and student protests, and countercultural politics. We conclude with a look at the social movements that developed out of the 1960s, such as second-wave feminism and gay and lesbian rights. This course offers students historical insights into the civil rights and student movements of the turbulent sixties that will shed light on current youth organizing and protest around the world. W 1:30–3:20

GLBL 823b/ANTH 583b, Health Disparities and Health Equity: Biocultural

Perspectives Catherine Panter-Brick

A biocultural perspective on debates in medical anthropology and global health that focus on health disparities and equity. The intersection of biological and cultural issues in matters of health research and intervention. Application of theoretical frameworks to case studies in global health inequality. M 3:30–5:20

GLBL 849b, Big Data and Global Policies William Casey King

Cell phones, twitter accounts, human genetic sequencing, trade figures, Web content, video surveillance, drone-collected bits and bytes, national security, and investigative sifting have generated a massive and ever-growing torrent of information. The term “big data” has recently been coined to capture this shift in the way we live and think. This course defines big data, investigates big data analytical and visualization methods, and explores implications of big data analyses on a variety of sectors including global policy, human trafficking, national security, global capitalism, and global health and finance.

GLBL 885b, World Order Charles Hill

Henry Kissinger's major book analyzing the ideas, institutions, wars, and peace-making diplomacy of the modern era is studied along with his 1950 thesis, "The Meaning of History," in the context of the international state system and its fate. Open to graduate and undergraduate students with permission of the instructor.

GLBL 887a/HIST 787a, Classic and New Approaches to International History

Patrick Cohrs

This reading seminar appraises both classic and new approaches to international history. It focuses on a close reading of influential contributions to the methodology and writing of international, diplomatic, comparative, global, and transnational history from Thucydides to recently influential attempts to interpret the evolution of the international system and international society. The underlying aim is to discuss which approaches have advanced our understanding of fundamental questions and problems in a field that in the eyes of some has become increasingly amorphous, and which trends may have had the opposite effect. On this basis, the seminar seeks to explore what are the new frontiers of scholarship. M 3:30–5:20

GLBL 902b, Non-State Actors in World Politics Susan Hyde

Within global governance, the role of non-state actors such as international organizations, transnational advocacy networks, multinational corporations, and terrorist networks has become important yet understudied. After reviewing how non-state actors fit into dominant theories of international relations, the course focuses on how to evaluate the relevance of non-state actors in specific areas of international politics and how non-state actors may help or hinder specific international problems. Issue areas that are covered include human rights, money, terrorism, globalization, and international environmental politics. (formerly INRL 650)

GLBL 903b/HIST 785b, The Making of a Connected World Patrick Cohrs

This course has two parts. The first explores a process that has transformed the modern world: globalization. The course analyzes its origins, distinctive stages, and the consequences of what it engendered—not only accelerating global interconnectedness but also, and crucially, different forms of regional and global interdependence. The focus is on the political, economic, and cultural forces that spurred, or impeded, what ultimately became an unstoppable historical development. Globalization's dynamics are traced from the era of imperialist competition in the nineteenth century to the aftermath of the twentieth century's global cold war. The course's second part examines the history of attempts to establish more durable systems of regional and eventually global order, particularly after crises and wars that had worldwide repercussions. It highlights fundamental changes in the sphere of classic international politics; the growing importance of nongovernmental actors and transnational attempts to create a global community; and the relevance of supranational institutions and regimes of international law. It thus seeks to illuminate longer-term learning processes and to show which aspirations to meet the challenges of a connected world have decisively influenced the international (dis)order of the twenty-first century. M 3:30–5:20

GLBL 910a/HIST 980a, Genocide in History and Theory Benedict Kiernan

Comparative research and analysis of genocidal occurrences from ancient times to the present; theories and case studies; an interregional, interdisciplinary perspective. Readings and discussion, guest speakers, research paper. TH 1:30–3:20

GLBL 999a or b, Directed Reading

By arrangement with faculty.

HISTORY

240 Hall of Graduate Studies, 203.432.1366

<http://history.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Naomi Lamoreaux

Director of Graduate Studies

Carolyn Dean (236 HGS, 203.432.1361)

Professors Jean-Christophe Agnew, Abbas Amanat, Ned Blackhawk, David Blight, Daniel Botsman (*on leave* [Sp]), Paul Bushkovitch, George Chauncey, Henry Cowles, Stephen Davis, Carolyn Dean, John Demos (*Emeritus*), Carlos Eire, Laura Engelstein, John Mack Faragher, Paul Freedman, Joanne Freeman, Reinaldo Funes (*Visiting*), John Gaddis, Beverly Gage, Glenda Gilmore, Bruce Gordon, Valerie Hansen, Robert Harms, Jonathan Holloway, Matthew Jacobson, Gilbert Joseph, Paul Kennedy, Benedict Kiernan, Jennifer Klein, Naomi Lamoreaux, Kathryn Lofton, Mary Lui, J.G. Manning, Ivan Marcus (*on leave* [Sp]), John Merriman, Joanne Meyerowitz (*on leave*), Alan Mikhail (*on leave* [Sp]), Peter Perdue, Steven Pincus, Stephen Pitti (*on leave*), Lamin Sanneh, Stuart Schwartz (*on leave* [Sp]), Frank Snowden (*on leave* [F]), Timothy Snyder, David Sorkin (*on leave* [F]), Harry Stout, Francesca Trivellato, John Harley Warner (*on leave* [Sp]), Anders Winroth (*on leave* [F]), Keith Wrightson (*on leave* [Sp])

Associate Professors Paola Bertucci (*on leave*), Patrick Cohrs, Fabian Drixler, Crystal Feimster (*on leave*), Daniel Magaziner, Naomi Rogers, Edward Rugemer (*on leave* [F]), Paul Sabin, Marci Shore, Eliyahu Stern (*on leave*)

Assistant Professors Jennifer Allen, Rosie Bsheer, Rohit De, Alejandra Dubcovsky-Joseph, Marcela Echeverri (*on leave*), Anne Eller (*on leave*), Denise Ho, Isaac Nakhimovsky, Joanna Radin, William Rankin, Julia Stephens, Jenifer Van Vleck

Lecturers* Adel Allouche, Annping Chin (*Senior Lecturer*), Becky Conekin (*Senior Lecturer*), Ivano Dal Prete, William Metcalf, Chitra Ramalingam, Stuart Semmel (*Senior Lecturer*)

*For a complete list of lecturers, see the undergraduate bulletin, *Yale College Programs of Study*.

Fields of Study

Fields include ancient, medieval, early modern, and modern Europe (including Britain, Russia, and Eastern Europe), United States, Latin America, East Asia, Southeast Asia, Middle East, Africa, Jewish history; and diplomatic, environmental, ethnic, intellectual, labor, military, political, religious, social, and women's history, as well as the history of science and medicine (see the section in this bulletin on the History of Science and Medicine).

Special Admissions Requirements

The deadline for submission of the application for the History graduate program is December 15.

The department requires a short book review (maximum 1,000 words) to accompany the application. It should cover the book that has most shaped the applicant's understanding of the kind of work he or she would like to do as a historian.

In addition, the department requires submission of an academic writing sample of not more than 25 pages, double spaced. Normally, the writing sample should be based on research in primary source materials.

Special Requirements for the Ph.D. Degree

LANGUAGE REQUIREMENTS

All students must pass examinations in at least one foreign language by the end of the first year. Students are urged to do everything in their power to acquire adequate linguistic training before they enter Yale and should at a minimum be prepared to be examined in at least one language upon arrival. Typical language requirements for major subfields are as follows:

African Either (1) French and German or Portuguese or Dutch-Afrikaans; or (2) French or German or Portuguese and Arabic; or (3) French or German or Portuguese or Dutch-Afrikaans and an African language approved by the director of graduate studies (DGS) and the faculty adviser.

American One language relevant to the student's research interests.

Ancient French, German, Greek, and Latin.

Chinese Chinese and Japanese; additional languages like French, Russian, or German may be necessary for certain dissertation topics.

East European The language of the country of the student's concentration plus two of the following: French, German, Russian, or an approved substitution.

Global/International Two languages to be determined by the DGS in consultation with the adviser.

Japanese Japanese and French or German; Chinese may be necessary for certain fields of Japanese history.

Jewish Modern Hebrew and German, and additional languages such as Latin, Arabic, Yiddish, Russian, or Polish, as required by the student's areas of specialization.

Latin American Spanish, Portuguese, and French.

Medieval French, German, and Latin.

Middle East Arabic, Persian, or Turkish (or modern Hebrew, depending on area of research) and a major European research language (French, German, Russian, or an approved substitute).

Modern Western European (including British) French and German; substitutions are permitted with the approval of the DGS.

Russian Russian plus French or German with other languages as required.

Southeast Asian Choice of Dutch, French, Spanish, Portuguese, Chinese, Sanskrit, or Arabic, plus one or more Southeast Asian language (e.g., Bahasa Indonesian, Burmese, Khmer, Lao, Malay, Tagalog, Thai, Tetum, or Vietnamese). In certain cases, Ph.D. dissertation research on Southeast Asia may also require knowledge of a regional or local language, e.g., Balinese or Cham.

Foreign students whose native language is not English may receive permission during their first year to hand in some written work in their own language. Since, however, the dissertation must be in English, they are advised to bring their writing skills up to the necessary level at the earliest opportunity.

ADDITIONAL REQUIREMENTS

These new regulations will be observed by students admitted in 2013 and following years. Students admitted earlier may opt to observe either the new or the old regulations.

During the first year of study, students normally take six term courses, including Approaching History (HIST 500). During the second year of study, they may opt to take four to six term courses, with the approval of their adviser and the DGS. Students who plan to apply for outside grants at the beginning of their third year are recommended to take the Prospectus Tutorial (HIST 995) during their second year, and it is required for students in European history. The tutorial should result in a full draft of the dissertation prospectus. The ten courses taken during the first two years should normally include at least six chosen from those offered by the department. Students must achieve Honors in at least two courses in the first year, and Honors in at least four courses by the end of the second year, with a High Pass average overall. Courses graded in the Satisfactory/Unsatisfactory mode count toward the course work requirement but do not count toward the Honors requirement.

Two of the ten courses must be research seminars in which the student produces an original research paper from primary sources. The Prospectus Tutorial does not count as a research seminar. All graduate students, regardless of field, will be required to take two seminar courses in a time period other than their period of specialty.

Students in their second year should choose their courses so that at least one course will prepare them for a comprehensive examination field in their third year. Some fields offer reading seminars specifically designed to help prepare students for examination; others encourage students to sign up for examination tutorials (HIST 994) with one of their examiners.

By the end of their fifth term, at the latest, students are expected to take comprehensive examinations. Students will have a choice of selecting three or four fields of concentration: a major field and either two or three minor fields. The examination must contain one minor field that deals 50 percent or more with the historiography of a region of the world other than the area of the student's major field. The examination will have a written component that will be completed before the oral component. For their major

field, students will write a historiographical essay of maximum 8,000 words. For each of the minor fields, the student will prepare a syllabus for an undergraduate lecture class in the field. All of these are to be written over the course of the examination preparation process and will be due on a definite, uniform date toward the end of the students' fifth term, typically on the Friday before Thanksgiving break (or on a corresponding date in the spring term). The oral examination examines the students on their fields and will, additionally, include discussion of the materials produced for the written component of the examination. If the student selects the four-field option, the major field will be examined for thirty minutes. If the student selects the three-field option, the major field will be examined for sixty minutes and each minor field for thirty minutes.

By the end of their sixth term, at the latest, students are expected to hold a prospectus colloquium, but those who took the Prospectus tutorial (HIST 995) during their second year are encouraged to hold the colloquium at the beginning of their third year. The prospectus colloquium offers students an opportunity to discuss the dissertation prospectus with their dissertation committee in order to gain the committee's advice on the research and writing of the dissertation and its approval for the project. The dissertation prospectus provides the basis of grant proposals.

Completion of ten term courses (including HIST 500), the language requirements of the relevant field, the comprehensive examinations, and the prospectus colloquium will qualify a student for admission to candidacy for the Ph.D., which must take place by the end of the third year of study.

It is also possible for students who have completed extensive graduate work prior to entering the Yale Ph.D. program to complete course work sooner. Students may petition for course waivers based on previous graduate work (up to three term courses) only after successful completion of the first year.

Students normally serve as teaching fellows during four terms to acquire professional training. Ordinarily students would be expected to teach in their third and fourth years, but with the approval of the DGS and their adviser, students may teach in the second year in areas of particular value to their professional development, or if they have received course waivers and completed course work early. During their first term of teaching, students must attend training sessions run by the Graduate Teaching Center. Students may teach, normally in their fourth term of teaching, as seminar fellows, teaching an undergraduate seminar in conjunction with a faculty member, if such positions are available.

By the end of their ninth term, students are required to submit a chapter of their dissertation to the dissertation committee. This chapter will then be discussed with the student by the committee, in a chapter conference, to give the student additional advice and counsel on the progress of the dissertation. This conference is designed to be an extension of the conversation begun in the prospectus colloquium and is not intended as a defense: its aim is to give students early feedback on the research, argument, and style of the first writing accomplished on the dissertation. No less than one month before students plan to submit their dissertations, a relatively polished full draft of the dissertation should be discussed with the student by the dissertation committee, in a dissertation defense of one to two hours, to give the students additional advice and counsel on completing the dissertation or on turning it into a book, as appropriate. Students are required to submit the draft to their committee in sufficient time for the committee to be able to read it. This

defense is designed to give students advice on the overall arguments and the final shape of the dissertation or book, and to leave time for adjustments coming out of the discussion.

The fellowship package offered to Ph.D. students normally includes two terms of the University Dissertation Fellowship (UDF), which finances a full year of research and writing without any teaching duties. Students may choose to take the UDF at any point after they have advanced to candidacy and before the end of their sixth year. They may choose to take the UDF in consecutive terms or in two separate terms. They should apply for the fellowship in the term prior to that in which they wish to receive it. Students may not serve as teaching fellows when they are on the UDF. The department strongly recommends that students apply for a UDF only after completing the first chapter conference and that they have drafted at least two chapters before starting the fellowship.

Students who have not submitted the dissertation by the end of the sixth year need not register in order to submit. If, however, students wish to register for a seventh year for good academic reason, they may petition the Graduate School for extended registration. The petition, delivered through the History DGS, will explain the academic reasons for the request. Only students who have completed the first chapter conference will be considered for extended registration.

Combined Ph.D. Programs

HISTORY AND AFRICAN AMERICAN STUDIES

The Department of History also offers, in conjunction with the Department of African American Studies, a combined Ph.D. in History and African American Studies. For further details, see African American Studies.

HISTORY AND RENAISSANCE STUDIES

The Department of History also offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in History and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. Students who have completed all requirements for admission to candidacy for the Ph.D. may receive the M.Phil. degree. Additionally, students in History are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program may qualify for the M.A. degree upon completion of a minimum of seven graduate term courses at Yale, of which two must have earned Honors grades and the other five courses must average High Pass overall. Students must also pass an examination in one foreign language. A student in the American Studies program who wishes to obtain an M.A. in History, rather than an M.A. in American Studies, must include in the courses completed at least two research seminars in the History department.

Terminal Master's Degree Program For this terminal master's degree, students must pass seven term courses, four of which must be in History; substantial written work must be submitted in conjunction with at least two of these courses, and Honors grades are

expected in two courses, with a High Pass average overall. All students in this program must pass an examination in one foreign language. Financial aid is not available for this program.

More information is available on the department's Web site, <http://history.yale.edu>.

Courses

HIST 500a, Approaching History: Problems, Methods, and Theory

Daniel Botsman, Jennifer Klein

An introduction to the professional study of history, which offers new doctoral students an opportunity to explore (and learn from each other about) the diversity of the field, while also addressing issues of shared concern and importance for the future of the discipline. By the end of the term participants have been exposed to some of the key methodological and theoretical approaches historians have developed for studying different time periods, places, and aspects of the human past. Required of all first-year doctoral students. T 9:25–11:15

HIST 502b/ANTH 741b/ARCG 741b/CLSS 841b/NELC 841b, Frontier and Province in the Premodern World Andrew Johnston, William Honeychurch

From Achaemenid India or Han China to Roman Gaul and Egypt to Iraqi Kurdistan, the province and its organizational equivalents (e.g., *nomes* in Egypt, *commanderies* in China) have long constituted one of the fundamental building blocks of states, ancient and modern, and a fascinatingly complex site of cultural and political negotiation in imperial encounters. The aim of this year's core seminar is to explore social equilibria between governance and the governed in the premodern world, via the interaction—religious, artistic, linguistic, administrative, economic—between local units and large imperial frameworks. As an object of comparative study, the province, representing the intersection of imperial power and local communities, allows us to combine “top-down” and “bottom-up” approaches to the ancient world, to investigate some of the key practices and discourses of empire while attempting to recover the agency and voices of subaltern provincial actors. It offers as well a chance to reconsider the “center-periphery” paradigm taken over from world-systems theory, and to propose new models for understanding the complex relationships between an imperial “center” and the governance of territories. This interdisciplinary seminar examines a wide range of aspects of the province as a trans-historical phenomenon—law, economy, art, literature, religion, monumentality, urbanism, and politics—across the ancient Mediterranean world and beyond, making use of the unique resources and collections at Yale, especially the Art Gallery and Beinecke Library.

HIST 505b/CLSS 853b, Hellenistic Civilization J.G. Manning

Survey of trends and recent developments and research in Hellenistic history; connections to other historical periods. F 1:30–3:20

HIST 536a, Cartularies, Charters, and Archives Paul Freedman

A survey of medieval documents and their preservation. Looks at routine documents including sales, wills, leases, loans, and other records illustrative of social history. Also church privileges, immunities, litigation, and other ecclesiastical documentation. We look at original records in the Beinecke Library and published cartularies (collections of

documents put together in order to register, organize, and defend property and rights). The different kinds of archives, their organization, and their accessibility are also discussed. T 1:30–3:20

HIST 542b/MDVL 555b, Law in Medieval Europe Anders Winroth

This seminar explores the creation in the twelfth and thirteenth centuries of a sophisticated system of law, the European Common Law (*ius commune*). All late medieval and much modern legislation is based on this legal system. The course focuses on its roots in the Roman law of Emperor Justinian and in ecclesiastical legislation. We also study the influence of the *ius commune* on national and local medieval law. The emphasis is on using law in historical research and on learning the technical skills necessary. Prerequisite: facility with Latin or another relevant medieval language. M 9:25–11:15

HIST 563a/CPLT 812a/ITAL 600a/RNST 500a, The Renaissance in Italy

David Quint

An introduction to the Renaissance in Italy, focused on reading and analyzing key texts. TH 9:25–11:15

HIST 564b/RNST 500b, Introduction to Renaissance Studies Carlos Eire

An introduction to the Renaissance beyond Italy, focused on reading and analyzing key texts. W 3:30–5:20

HIST 579a/RLST 679a, Popular Religion in Europe, 1300–1700 Carlos Eire

Readings and discussion in recent scholarship on the history of religion in the Christian West in the late medieval and early modern periods. TH 3:30–5:20

HIST 582a/AMST 705a/RLST 705a, Readings in Religion in American Society, 1600–2015 Kathryn Lofton, Harry Stout

This seminar explores intersections of religion and society in American history from the colonial period to the present as well as methodological problems important to their study. T 3:30–5:20

HIST 585b^U/RLST 694b^U, Enlightenment and Religion David Sorkin

This course explores the relationship between the Enlightenment and religion. We probe two related issues. First, how did the *philosophes* view religion? We then ask the less conventional question of the uses theologians or clergy made of the Enlightenment. The course crosses national borders (England, France, German states, and Habsburg empire) and confessional boundaries (Protestantism, Catholicism, Judaism). Our focus is Western and Central Europe. W 3:30–5:20

HIST 595b/JDST 844b/RLST 692b, Introduction to Modern Jewish History: History and Historiography David Sorkin

This course introduces students to European Jewish history since approximately 1648. It teaches the major historiographical traditions as well as the major themes of European Jewish history. Its audience is students specializing in Jewish history but also other historians who wish to add an understanding of Jewish history to their understanding of Europe. M 3:30–5:20

HIST 596a^U/JDST 761a^U/RLST 773a^U, Jewish History and Thought to Early Modern Times Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire. Focus on the formative period of classical rabbinic Judaism and on the symbiotic relationships among Jews, Christians, and Muslims. Jewish society and culture in its biblical, rabbinic, and medieval settings.

TTH 11:35–12:50

HIST 601a/JDST 790a/RLST 776a, Jewish History, Thought, and Narratives in Medieval Societies Ivan Marcus

Research seminar that focuses on the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain).

TH 9:25–11:15

HIST 617b, Britain: Modernity and Empire Steven Pincus

Why and in what ways did Britain become the paradigmatic modern nation? This research seminar introduces students to a variety of approaches to the study of modernization and to a range of questions about the coming of modernity in Britain. Topics may include the emergence of the novel, the origins of the British Empire, England's economic transformation, the development of representative politics, the emergence of the bourgeois public sphere, and secularization, among others. It emphasizes methodological as well as substantive questions. The course is appropriate for historians of any period or area, as well as for graduate students in related disciplines. T 9:25–11:15

HIST 628a, Microhistories Keith Wrightson

A research seminar. The first weeks are devoted to reading and discussing a number of outstanding microhistorical studies of individuals, families, communities, incidents, and processes, principally (though not exclusively) drawn from the literature on the early modern period. Particular attention is paid to questions of sources and their use. Thereafter members of the class undertake individual microhistorical studies on subjects of their choice and present work-in-progress papers to the seminar. TH 9:25–11:15

HIST 631a, Micro/Macro: Perspectives from Early Modern Europe

Francesca Trivellato

How do changes in the temporal and geographical scale of analysis affect the sources, methods, and interpretations of historians' work? Are microhistory and global history compatible? Whom do we gain or lose from adopting a comparative perspective or from writing connected histories? Influential studies of early modern Europe and the world, 1500–1800, allow us to probe these methodological questions of large import for all historians. Topics include environmental history, popular culture, state building, China and Europe, as well as a host of theoretical interventions. T 5:30–7:20

HIST 632b, Readings in Late Medieval and Early Modern Italy Francesca Trivellato

Classic and recent works in the history of the Italian peninsula (ca. 1200–1600). Topics include the rise of communes and state building, family and gender, business and trade, conflicts and exchanges with the Ottoman Empire. The class has two primary goals: to reflect on the changes in focus and approach among historians of the Italian peninsula

over the past half century and, for those students who have reading knowledge of Italian, to reflect on the convergences and differences between scholars writing in English and those writing in Italian. Knowledge of Italian is helpful but not required. T 5:30–7:20

HIST 641a, British and Iberian Atlantic Steven Pincus, Stuart Schwartz

This reading course investigates the burgeoning literature on the emergence of the Atlantic world in the early modern period. The course takes an explicitly comparative approach by examining the British and Iberian Atlantic worlds side by side, with occasional glances at French, Portuguese, and Dutch developments. Themes to be investigated include movements of goods, ideas, peoples, and cultures across the Atlantic. We also consider the independence movements of the late eighteenth and early nineteenth centuries. T 1:30–3:20

HIST 649a, Emergence of Modern Paris John Merriman

This reading and discussion course emphasizes the evolution of modern Paris since the late Ancien Régime to the present. Salient themes include the concomitants of population increase; the emerging social geography of nineteenth-century Paris, center and periphery; radical political challenges; the literature and painting of changing Parisian life; migration and mobility; Paris during the World Wars; and urban form and planning. A knowledge of French is helpful but not absolutely necessary. M 1:30–3:20

HIST 664b, Historiography of Modern Germany Jennifer Allen

This reading seminar surveys major themes in German history since unification. Through readings of both classic and recent research, students familiarize themselves with key debates that have shaped historical understanding of modern Germany. W 9:25–11:15

HIST 667a/WGSS 667a, History of Sexuality in Modern Europe Carolyn Dean

This reading class provides an introduction to the various lines of inquiry informing the history of sexuality. The course asks how historians and others constitute sexuality as an object of inquiry and addresses different arguments about the evolution of sexuality in Europe, including the relationship between sexuality and the state and sexuality and gender. T 1:30–3:20

HIST 683b, Global History of Eastern Europe Timothy Snyder

A thematic survey of major issues in modern east European history, with emphasis on recent historiography. A reading course with multiple brief writing assignments. TH 3:30–5:20

HIST 687a, Russia, the USSR, and the World, 1855–1945 Paul Bushkovitch

Political and economic relations of Russia/Soviet Union with Europe, the United States, and Asia from tsarism to socialism. W 1:30–3:20

HIST 703a/AMST 803a, Research in Early National America Joanne Freeman

A research seminar focused on the early national period of American history, broadly defined. Early weeks familiarize students with sources from the period and discuss research and writing strategies. Students produce a publishable article grounded on primary materials. W 9:25–11:15

HIST 707a/AMST 711a, Introduction to the Literature of American History

Alejandra Dubcovsky-Joseph

This course is designed as an introduction to the historiography of early America from about 1500 to the American Revolution. It provides an overview of critical debates within the field and acquaints students with some of the most influential works of both recent and “classic” historians. T 1:30–3:20

HIST 724b/AMST 767b, Research Seminar in U.S. Urban History Mary Lui

Students conduct archival research to write an original, article-length essay on any aspect of U.S. urban history in any century. The first half of the seminar consists of weekly readings and discussions while the latter half consists of article workshop meetings focused on student writing. T 9:25–11:15

HIST 727a/AMST 796a, Approaches to the History of Capitalism and Culture

Jean-Christophe Agnew

A research seminar oriented around themes and issues in U.S. political economy from the late nineteenth century through the end of the twentieth. Readings in the first part of the term look at various approaches to writing about political economy: for example, business history, intellectual history, labor history, biography, local monograph, or transnational history. Research projects explore new possibilities for writing about labor, business, the state, and capitalism. W 3:30–5:20

HIST 734b/AMST 780b, Class and Capitalism in Twentieth-Century United States

Jennifer Klein

Reading course on class formation, labor, and political economy in the twentieth-century United States; how regionalism, race, and class power shaped development of American capitalism. The course reconsiders the relationships between economic structure and American politics and political ideologies, and between global and domestic political economy. Readings include primary texts and secondary literature (social, intellectual, and political history; geography). TH 1:30–3:20

HIST 736b/AFAM 709b/AMST 709b/WGSS 736b, Research in Twentieth-Century U.S. Political and Social History Glenda Gilmore

Projects chosen from the post-Civil War period, with an emphasis on twentieth-century social and political history, broadly defined. TH 9:25–11:15

HIST 743b/AMST 839b/F&ES 843b/HSBM 744b, Readings in Environmental History Paul Sabin

Readings and discussion of key works in environmental history. The course explores major forces shaping human-environment relationships, such as markets, politics, and ecological dynamics, and compares different approaches to writing about social and environmental change. M 1:30–3:20

HIST 747b/AFAM 763b/AMST 731b, Methods and Practices in U.S. Cultural History

Matthew Jacobson

This sampling of U.S. cultural history from the early national period to the present is designed to unfold on two distinct planes. The first is a rendering of U.S. culture itself—a survey, however imperfect, of the major currents, themes, and textures of U.S.

culture over time, including its contested ideologies of race and gender, its organization of productivity and pleasure, its media and culture industries, its modes of creating and disseminating “information” and “knowledge,” its resilient subcultures, and its reigning nationalist iconographies and narratives. The second is a sampling of scholarly methods and approaches, a meta-history of “the culture concept” as it has informed historical scholarship in the past few decades. The cultural turn in historiography since the 1980s has resulted in a dramatic reordering of “legitimate” scholarly topics, and hence a markedly different scholarly landscape, including some works that seek to narrate the history of the culture in its own right (Kasson’s history of the amusement park, for instance), and others that resort to cultural forms and artifacts to answer questions regarding politics, nationalism, and power relations (Melani McAlister’s *Epic Encounters*). In addition to providing a background in U.S. culture, then, this seminar seeks to trace these developments within the discipline, to understand their basis, to sample the means and methods of “the cultural turn,” and to assess the strengths and shortcomings of culture-based historiography as it is now constituted. T 1:30–3:20

HIST 748a, American Conservatism in the Twentieth Century Beverly Gage

An examination of historical and historiographical problems in the study of American conservatism. Topics include electoral and institutional politics, social movements, business and labor, mass politics, free-market ideology, neoconservatism, anticommunism, and the Christian right. TH 3:30–5:20

HIST 750a/AFAM 802a/AMST 804a, Readings in African American History since 1865 Glenda Gilmore

Students read major secondary works alongside key primary sources on African American history from 1865 to the present. The course covers Reconstruction; the Jim Crow era; the Long Civil Rights Movement, including its classical phase; African American transnationalism; and urban, political, and labor history from the African American perspective. The course emphasizes gender and racial formation. Students read thematically within the course, make class presentations, and write a historiographical paper. W 1:30–3:20

HIST 755a/AMST 777a, Research on the United States and the World

Jenifer Van Vleck

This research seminar is designed to enable students to produce an original, article-length paper based on primary research. Questions considered include: What does it mean to work across geographical borders (or, indeed, disciplinary borders), conceptually and methodologically? Why might an international/transnational perspective enrich our understanding of U.S. history? How can we historicize the relationship between “domestic” U.S. history and the history of U.S. foreign relations? During the first four weeks of class, we read recent historiography on the United States’ role in the world. Remaining weeks are devoted to a series of writing workshops, in which students share and discuss their work at various stages of the research and writing process. We also discuss practical strategies for publishing articles in academic journals, using seminar papers to advance work on the dissertation, and finding archival collections and sources at Yale that are relevant to the United States’ international history. W 3:30–5:20

HIST 761b/LAW 21063, American Legal History Claire Priest

This course examines the foundations of the American legal, political, and economic order from the colonial period through the early twentieth century. We analyze the emergence of American property law, slavery, women's legal history, intellectual property, and corporate law as well as federalism, the Constitution, and judicial review. The course readings consist of contemporary sources, recently published works, and classics in the field. Self-scheduled examination or paper option. Follows Law School academic calendar. TTH 2:10–3:30

HIST 769a^U/AMST 686a^U, Introduction to Documentary Studies

Matthew Jacobson

This mixed graduate/undergraduate seminar surveys documentary work in three media—film, photography, and sound—since the 1930s, focusing on the documentary both as a cultural form with a history of its own and as a parcel of skill sets and storytelling and production practices to be studied and mastered. Readings and discussions cover important scholarly approaches to documentary as a genre, as well as close readings of documentaries themselves and practitioners' guides to various aspects of documentary work. Topics include major trends in documentary practice across the three media, documentary ethics, aesthetics and truth-claims, documentary's relationship to the scholarly disciplines and to journalism, and documentary work as political activism. Class meetings include screenings/viewings/soundings of documentary works, and practitioners' panels and workshops with Yale documentarians (including Charles Musser, Zareena Grewal, Elihu Rubin, Gretchen Berland, and Laura Wexler) and local New Haven documentarians such as Jake Halpern (Yale '97, *This American Life*). Students' final projects may take the form of a traditional scholarly paper on some aspect of documentary history or a particular documentary producer, or an actual piece of documentary work—a film treatment, a brief video, a set of photographs, a sound documentary, or script. MW 2:30–3:45

HIST 775b/AMST 866b/WGSS 712b, Readings in the History of Sexuality

George Chauncey

Selected topics in the history of sexuality, especially the emergence of the category of “sexuality” itself and how it has been articulated with hierarchies of gender, race, class, age, nation, and empire. The course also considers sexuality as a source of public and personal identity; a component of social organization and subcultural social life; an object of scientific study, government management, and legal regulation; and a site of political and cultural conflict. W 1:30–3:20

HIST 785b/GLBL 903b, The Making of a Connected World Patrick Cohrs

This course has two parts. The first explores a process that has transformed the modern world: globalization. The course analyzes its origins, distinctive stages, and the consequences of what it engendered—not only accelerating global interconnectedness but also, and crucially, different forms of regional and global interdependence. The focus is on the political, economic, and cultural forces that spurred, or impeded, what ultimately became an unstoppable historical development. Globalization's dynamics are traced from the era of imperialist competition in the nineteenth century to the aftermath of the twentieth century's global cold war. The course's second part examines the history of attempts to

establish more durable systems of regional and eventually global order, particularly after crises and wars that had worldwide repercussions. It highlights fundamental changes in the sphere of classic international politics; the growing importance of nongovernmental actors and transnational attempts to create a global community; and the relevance of supranational institutions and regimes of international law. It thus seeks to illuminate longer-term learning processes and show which aspirations to meet the challenges of a connected world have decisively influenced the international (dis)order of the twenty-first century. M 3:30–5:20

HIST 787a/GLBL 887a, Classic and New Approaches to International History

Patrick Cohrs

This reading seminar appraises both classic and new approaches to international history. It focuses on a close reading of influential contributions to the methodology and writing of international, diplomatic, comparative, global, and transnational history from Thucydides to recently influential attempts to interpret the evolution of the international system and international society. The underlying aim is to discuss which approaches have advanced our understanding of fundamental questions and problems in a field that in the eyes of some has become increasingly amorphous, and which trends may have had the opposite effect. On this basis, the seminar seeks to explore what are the new frontiers of scholarship. M 3:30–5:20

HIST 788a/AMST 782a/E&RS 648a/GLBL 811a, 1968: Social Movements in Comparative Perspective and Their Legacies Becky Conekin

In this seminar we explore post-WWII social movements and their legacies primarily across Western and Eastern Europe, North America, and Mexico. Analysis of other countries or regions in class discussions and final research papers is encouraged, based on student interest. Examining both the actuality and symbolic character of these movements in contemporary history, we analyze the political, social, and cultural meanings of protest and its impact on class, generational, gender, and racial relations. In addition, we discuss different national histories and discourses about identity, while exploring the varied geographies of the Cold War. We then move to a more thematic approach focusing on, for example, civil rights, antiwar and student protests, and countercultural politics. We conclude with a look at the social movements that developed out of the 1960s, such as second-wave feminism and gay and lesbian rights. This course offers students historical insights into the civil rights and student movements of the turbulent sixties that will shed light on current youth organizing and protest around the world. W 1:30–3:20

HIST 807a/AMST 650a, Resistance, Rebellion, and Survival Strategies in Modern Latin America Gilbert Joseph

An interdisciplinary examination of new conceptual and methodological approaches to such phenomena as peasants in revolution, millenarianism, “banditry,” refugee movements, and transnational migration. F 1:30–3:20

HIST 820b, Problems in Modern Mexican History: People, State, and Nation in Historical Motion Gilbert Joseph

Focusing on the relationship between forms of the state and grassroots political culture, the course examines prevailing trends and controversies in historical writing on Mexico, with special attention given to the Mexican Revolution and its legacies. F 1:30–3:20

HIST 822a, Environmental History of the Caribbean Reinaldo Funes

An environmental history of the Caribbean since European arrival, presenting a regional perspective from an ecological perspective that rejects the current vision of political, social, and cultural fragmentation. Emphasis on tropical ecology, plantation systems, and the ecological implications of U.S. economic and political interest in the region.

T 3:30–5:20

HIST 833b/AFST 833b, Agrarian History of Africa Robert Harms

The course examines changes in African rural life from precolonial times to the present. Issues to be examined include land use systems, rural modes of production, gender roles, markets and trade, the impact of colonialism, cash cropping, rural-urban migration, and development schemes. W 9:25–11:15

HIST 837a/AFST 837a, Decolonization and Independence in Africa Robert Harms

This seminar looks at the process of decolonization in twentieth-century Africa and explores some of the major political, economic, and cultural forces that influenced the trajectories of independent African countries. W 9:25–11:15

HIST 838a/AFST 838a, Ideology in African History Daniel Magaziner

This course in African intellectual history considers ways that various African peoples have made sense of their world, in ways both conscious and unconscious, ascribed and articulated, successful and failed, and how historians have developed interpretations of the continent's intellectual history. Topics to be considered include political theory, health and healing regimes, rainmaking, nationalism, Marxism, Christianity, Islam, and prophetic movements. Students work on a historiographical essay and facilitate discussion. Readings include monographs, novels, and other media. TH 3:30–5:20

HIST 848b, Urban Places, Contested Spaces: Cities of the Middle East

Rosie Bsheer

This seminar examines how cities have been planned and inhabited, stratified and resisted, destroyed and reimagined. We aim to better understand how urban environments are defined by the populations that inhabit them, move through them, and depart them. Conversely, we examine how space influences identity politics, nation and state building, social life and cultural production. This course explores how identity and urban space functioned symbiotically from the nineteenth to the twenty-first century, a period of rapidly increasing global contact, colonial expansion and studies, urban studies, and architecture. A significant proportion of the material is on the Middle East and North Africa, but the readings draw on several Asian and Western cities. TH 3:30–5:20

HIST 860a/NELC 830a, From Medina to Constantinople: The Middle East from 600 to 1517 Adel Allouche

The seminar discusses the religious and political events that shaped the Middle East from the rise of Islam to the Ottoman conquest of Egypt. It encompasses Arab lands, Iran, and Turkey. TH 1:30–3:20

HIST 863a, Narratives of Modern Iran Abbas Amanat

Close reading, content analysis, and contextual study of modern Persian historical narratives, autobiographies, reform literature, memoirs, travel accounts, and selective

documents as well as major studies on the themes of power, morality and violence, Islam and politics, modernity, and contested identities. W 3:30–5:20

HIST 869b, Issues in Tang, Song, and Yuan Dynasties Valerie Hansen

A survey of the historical genres of premodern China: the dynastic histories, other chronicles, gazetteers, literati notes, and Buddhist and Daoist canons. How to determine what different information these sources contain for research topics in different fields. Prerequisite: at least one term of classical Chinese. M 1:30–3:20

HIST 871a/EAST 571a, The History of the People's Republic of China Denise Ho

This is a reading seminar that examines recent English-language scholarship on the People's Republic of China, focusing on the Mao period (1949–76). Considering the question of the PRC as history, the seminar compares present-day scholarship to earlier social science research and discusses the questions being asked and answered by historians today. Reading knowledge of Chinese is not required; open to undergraduates with permission of the instructor. M 1:30–3:20

HIST 874b, East Asian Studies Research Seminar Peter Perdue

This course focuses on developing skills needed for academic writing in East Asian studies, including preparation of thesis prospectuses, research papers, and grant proposals. We begin with discussions of recent trends in the East Asian modern history and literature fields, and of academic writing styles. Students then draft projects for presentation to the class. Prerequisite: knowledge of modern Chinese or Japanese; open to undergraduate majors in East Asian Studies with permission of the instructor. TH 3:30–5:20

HIST 877b, Readings in Modern Chinese History Peter Perdue

In this course we read and discuss recent English-language monographs on modern Chinese history. The primary focus is topics that span the Qing to twentieth century and contain international, transnational, and comparative implications. No knowledge of Chinese required; open to undergraduates with permission of the instructor. W 1:30–3:20

HIST 878b, Readings in Japanese History to 1900 Fabian Drixler

A critical introduction to debates in the history of Japan up to about 1900, with particular emphasis on the Tokugawa and Meiji periods but some coverage of earlier times as well. This year's seminar focuses particularly on debates in social, economic, and environmental history. Readings are in English but, depending on student interest, supplemental materials may also be assigned in Japanese. W 3:30–5:20

HIST 885a, Readings in the History of Nineteenth-Century Japan Daniel Botsman

An overview of the historiography of the Tokugawa-Meiji transition and the beginnings of Japan's emergence as a modern world power. May include readings in Japanese as well as English. W 1:30–3:20

HIST 891a/EALL 772a, Readings in the Intellectual History and Political Thought of the Qing Dynasty Annping Chin

The course focuses on the historical and political writings in China's last dynasty. The readings include the works of reformers, intellectual historians, and political theorists, from the beginning of the Qing (Huang Zongxi and Gu Yanwu), through the middle period (Dai Zhen and Zhang Xuecheng), to its conclusion (Wei Yuan, Yan Fu, Kang Youwei, and Liang Qichao). Readings in Chinese and English. M 3:30–5:20

HIST 895b, Twentieth-Century Vietnam Benedict Kiernan

French colonial rule, cultural change, Japanese occupation, and the origins, course, and aftermath of the Vietnamese-American conflict. War and society from the formation of a modern national identity to the rise of communism, the resurgence of Buddhism, independence and division, the U.S. intervention, escalation and defeat, the postwar Cambodian conflict and the 1979 Chinese invasion, regional integration, and economic reform. Readings, discussion, and research. W 3:30–5:20

HIST 896b/SAST 820b, Readings in South Asia: Across the Disciplines Rohit De, Julia Stephens

Since the emergence of subaltern studies in the 1980s, South Asian historiography has been dominated by debates over the methods and theory that have come to influence the broader discipline of history. The seminar introduces participants to the major debates in South Asian studies through reading the original texts alongside newer scholarship addressing the themes of bureaucracy, secularism, visual media, political economy, and the environment. M 7–8:50

HIST 911a^U/HSHM 680a^U, History of Chinese Science William Summers

Major themes in Chinese scientific thinking from antiquity to the twentieth century. Non-Western concepts of nature and the development of science in China; East-West scientific exchanges; and China's role in modern science. W 7–8:50

HIST 913b/HSHM 713b, Geography and History William Rankin

A research seminar focused on methodological questions of geography and geographic analysis in historical scholarship. We consider approaches ranging from the Annales School of the early twentieth century to contemporary research in environmental history, history of science, urban history, and more. We also explore interdisciplinary work in social theory, historical geography, and anthropology and grapple with the promise (and drawbacks) of GIS. Students may write their research papers on any time period or geographic region, and no previous experience with geography or GIS is necessary. Open to undergraduates with permission of the instructor. TH 1:30–3:20

HIST 921a/HSHM 710a, Problems in Science Studies Joanna Radin

Exploration of the methods and debates in the social studies of science, technology, and medicine. This course covers the history of the field and its current intellectual, social, and political positioning. It provides critical tools—including feminist, postcolonial, and new materialist perspectives—to address the relationships among science, technology, medicine, and society. M 1:30–3:20

HIST 930a/HSHM 701a, Problems in the History of Medicine and Public Health

John Harley Warner

An examination of the variety of approaches to the social and cultural history of medicine and public health. Readings are drawn from recent literature in the field, sampling writings on health care, illness experiences, ideas, and medical cultures in Europe, the Americas, Asia, and Africa from antiquity to the twentieth century. Topics include the role of gender, class, ethnicity, race, religion, and region in the experience of health care and sickness; the intersection of lay and professional understandings of the body; and the role of the marketplace in shaping professional identities and patient expectations.

W 1:30–3:20

HIST 931b/HSHM 702b, Problems in the History of Science Henry Cowles

Survey of classic and recent work in the history of science, broadly conceived. Topics include physical, life, and human sciences; role of technology and instruments; relationship between theory and practice; and interactions with society, politics, and capitalism. Focus on mastering debates in history of science, with connections to philosophy, anthropology, and literary studies. W 9:25–11:15

HIST 943b/HSHM 736b/WGSS 730b, Health Politics, Body Politics Naomi Rogers

A reading seminar on struggles to control, pathologize, and normalize human bodies, with a particular focus on science, medicine, and the state, both in North America and in a broader global health context. Topics include disease, race, and politics; repression and regulation of birth control; the politics of adoption; domestic and global population control; feminist health movements; and the pathologizing and identity politics of disabled people. W 1:30–3:20

HIST 949a^U/HSHM 656a^U, Photography and the Sciences Chitra Ramalingam

Does photography belong in the history of art, or does its status as an “automatic” or “scientific” recording technique and its many uses in the sciences distinguish its history from that of earlier visual media? How does photography look when we approach it from the cultural history of science? How might its role in the sciences have shaped photographic aesthetics in the arts? This course examines the making of photography’s discursive identity as an experimental and evidentiary medium in the sciences, from its announcement to the public in 1839 to the digital innovations of the present day. We take a historical and archival perspective on uses for (and debates over) photography in different fields of the natural and human sciences, grounded in visits to photographic collections at Yale. TH 1:30–3:20

HIST 962b/AMST 790b, Writing History John Demos

The focus of the seminar is prose writing about history. We proceed through reading and discussion of exemplary texts, with an emphasis on their literary aspects (including thematic and narrative structure, author-to-subject connections, the fact/fiction boundary, and the moral dimension of historical work). There is also a monthlong practicum, set in the middle of the term and devoted entirely to the students’ own writing. The goal throughout is to raise consciousness about this oft-neglected part of the historian’s task—and to improve performance within it. T 3:30–5:20

HIST 965a/ANTH 541a/F&ES 836a/PLSC 779a, Agrarian Societies: Culture, Society, History, and Development Peter Perdue, James Scott, Kalyanakrishnan Sivaramakrishnan

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from anthropology, economics, history, political science, and environmental studies are used to develop a meaning-centered and historically grounded account of the transformations of rural society. Team-taught. W 1:30–5:20

HIST 967a, Intellectual History as Storytelling Marci Shore

This seminar explores the discipline of intellectual history from the perspective of the historian’s role as author of that history. Topics include the challenges of working with

highly personal and subjective sources; the moral dilemmas of relativism; and the relationship between voyeurism and empathy. How do historians relate to novelists grappling with similar material? How can we “employ” and narrate the history of ideas? How can we write nonfiction about people whose worldviews involved elaborate fantasies about the past, present, and future? How can we situate abstract ideas in the concrete times, places, and lives? The relationship between lunacy and genius is often very close; we discuss how historians can approach morally ambiguous historical protagonists be they communist poets, surrealist novelists, fascist philosophers, or others. M 1:30–3:20

HIST 970b/PLSC 640b, Advanced Topics in Modern Political Philosophy

Karuna Mantena, Isaac Nakhimovsky

This seminar is designed to survey modern political philosophy at a level appropriate for graduate students (to help them prepare for the field exam) and for advanced undergraduates who have completed substantial course work in intellectual history and/or political theory. This term, the seminar addresses the topic of democracy and inequality from Rousseau to Marx. We pursue the politics of classical political economy by tracing discussions of the identity of the modern representative republic, the nature of capitalism or commercial society, and the relation between the two from Rousseau to Marx. While the main focus is close analysis of the writings of Rousseau, Smith, and Marx, we also mark the trajectory from Smith to Marx via readings from Kant, Hegel, Condorcet, Malthus, Ricardo, and Proudhon. T 1:30–3:20

HIST 980a/GLBL 910a, Genocide in History and Theory Benedict Kiernan

Comparative research and analysis of genocidal occurrences from ancient times to the present; theories and case studies; an interregional, interdisciplinary perspective. Readings and discussion, guest speakers, research paper. TH 1:30–3:20

HIST 985b/MGT 984b, Studies in Grand Strategies, Part I Elizabeth Bradley,

John Gaddis, Charles Hill

This two-term course begins in January with readings in classical works from Sun Tzu to Clausewitz to Kissinger. Students identify principles of strategy and examine the extent to which these were or were not applied in historical case studies from the Peloponnesian War to the post-Cold War period. During the summer students undertake research projects or internships designed to apply resulting insights to the detailed analysis of a particular strategic problem or aspect of strategy. Written reports are presented and critically examined early in the fall term. Students must take both terms, fulfill the summer research/internship, and attend additional lectures to be scheduled throughout the spring and fall terms. Admission is by competitive application only; deadline is early November. Please visit <http://iss.yale.edu/programs/grand-strategy> for application information. M 3:30–5:20

HIST 985a/MGT 984a, Studies in Grand Strategies, Part II Elizabeth Bradley,

John Gaddis, Charles Hill

Part II of the two-term linked seminar offered during the calendar year 2015. Research seminar. M 3:30–5:20

HIST 994a/b, Oral Exam Tutorial

Graded Satisfactory/Unsatisfactory.

HIST 995a/b, Prospectus Tutorial

Graded Satisfactory/Unsatisfactory.

HIST 998a/b, Directed Readings

Offered by permission of the instructor and DGS to meet special requirements not covered by regular courses. Graded Satisfactory/Unsatisfactory.

HIST 999a/b, Directed Research

Offered by arrangement with the instructor and permission of DGS to meet special requirements.

HISTORY OF ART

Loria Center, Rm. 252, 203.432.2668
<http://arthistory.yale.edu>
 M.A., M.Phil., Ph.D.

Chair

Tim Barringer (Loria 657, 203.432.8162, timothy.barringer@yale.edu)

Director of Graduate Studies

Jacqueline Jung (Loria 553, 203.432.2684, jacqueline.jung@yale.edu)

Professors Brian Allen (*Adjunct*), Carol Armstrong, Tim Barringer, Edward Cooke, Jr., Diana Kleiner (*on leave* [Sp]), Kobena Mercer, Amy Meyers (*Adjunct*), Mary Miller, Robert Nelson (*on leave*), Jock Reynolds (*Adjunct*), Vincent Scully (*Emeritus*), Robert Thompson (*Emeritus*), Mimi Hall Yiengpruksawan

Associate Professors Milette Gaifman, Jacqueline Jung, Kishwar Rizvi

Assistant Professors Craig Buckley, J.D. Connor, Erica James, Youn-mi Kim, Jennifer Raab, Tamara Sears, Sebastian Zeidler

Lecturers Mia Genoni, John Gordon, David Sensabaugh

Fields of Study

Fields include Greek and Roman; Medieval and Byzantine; Renaissance; Early Modern; eighteenth-, nineteenth-, and twentieth-century European; Modern Architecture; African; African American; American; American Decorative Arts; British; Pre-Columbian; Islamic; Chinese; Japanese; South Asian; and Film.

Special Requirements for the Ph.D. Degree

Students in the history of Western art must pass examinations in German and one other language pertinent to their field of study. One examination must be passed during the first year of study, the other not later than the beginning of the third term. Students of non-Western art must qualify in two languages selected by agreement with the adviser and the director of graduate studies (DGS). They have an extra year in which to do so. During the first two years of study, students normally take twelve term courses. Normally in March of the second year, students submit a qualifying paper that should demonstrate the candidate's ability successfully to complete a Ph.D. dissertation in art history. During the fall term of the third year, students are expected to take the qualifying examination. Candidates must demonstrate knowledge of their field and related areas, as well as a good grounding in method and bibliography. By the end of the second term of the third year, students are expected to have established a dissertation topic. A prospectus outlining the topic must be approved by a committee at a colloquium by the end of the third year. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation requirements, including the prospectus and qualifying examination. Admission to candidacy must take place by the end of the third year.

The faculty considers teaching to be an important part of the professional preparation of graduate students. Students are required to do four terms of teaching. This requirement is fulfilled in the second and third years. Students may also serve as a graduate research assistant at either the Yale University Art Gallery or the Yale Center for British Art. This can be accepted in lieu of one or two terms of teaching, but students may accept a graduate research assistant position at any time after the end of their first year. Application for these R.A. positions is competitive.

Combined Ph.D. Programs

HISTORY OF ART AND AFRICAN AMERICAN STUDIES

The Department of the History of Art offers, in conjunction with the Department of African American Studies, a combined Ph.D. in History of Art and African American Studies. Students in the combined-degree program must take five courses in African American Studies as part of the required twelve courses and are subject to the language requirement for the Ph.D. in History of Art. The dissertation prospectus and the dissertation itself must be approved by both History of Art and African American Studies. For further details, see African American Studies.

HISTORY OF ART AND FILM AND MEDIA STUDIES

The Department of the History of Art offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. in the History of Art and Film and Media Studies. Students are required to meet all departmental requirements, but many courses may count toward completing both degrees at the discretion of the directors of graduate studies in History of Art and Film and Media Studies. For further details, see Film and Media Studies.

HISTORY OF ART AND RENAISSANCE STUDIES

The Department of the History of Art offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in the History of Art and Renaissance Studies. For further details, see Renaissance Studies.

The Center for the Study of American Art and Material Culture

The Center for the Study of American Art and Material Culture provides a programmatic link among the Yale faculty, museum professionals, and graduate students who maintain a scholarly interest in the study, analysis, and interpretation of American art and material culture. It brings together colleagues from a variety of disciplines—from History of Art and American Studies to Anthropology, Archaeological Studies, and Geology and Geophysics—and from some of Yale's remarkable museum collections, from the Art Gallery and Peabody Museum to Beinecke Library. Center activities will focus upon one particular theme each year and will include hosting one or more visiting American Art and Material Culture Fellows to teach a course each term and interact with Yale colleagues; weekly lunch meetings in which a member makes a short presentation centered on an artifact or group of artifacts followed by lively discussion about methodology, interpretation, and context; and an annual three-day Yale-Smithsonian Seminar on Material Culture.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in the History of Art are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.) This degree is awarded after the satisfactory completion of eight term courses and after evidence of proficiency in one required foreign language.

Program materials are available upon request to the Director of Graduate Studies, Department of the History of Art, Yale University, PO Box 208272, New Haven CT 06520-8272.

Courses

HSAR 500a, Methods in Art History

This seminar is designed to introduce students to a range of art historical methods past and present: a variety of formalisms, connoisseurship, different kinds of iconography, the social history of art, psychoanalysis, and a number of other approaches that are sometimes referred to as visual culture. Readings include classic texts by Riegl, Wölfflin, Panofsky, and Warburg, and more recent approaches by Alpers, Clark, and Crary, among others. TH 3:30–5:20

HSAR 512a or b, Directed Research

By arrangement with faculty.

HSAR 544b/CLSS 867b, In Search of the Ancient Artist Milette Gaifman

Classical literature has bequeathed us the names of many celebrated Greek artists, from Pheidias, who made the colossal statue of Olympian Zeus, to Apelles, the court painter of Alexander the Great. Strikingly, very few works by these “Old Masters” survive in the archaeological record. This course tackles the problems that arise from the gap that exists between famous artists known to us from the ancient textual tradition and the mass of objects that survive by lesser-known, often anonymous makers. Is it appropriate to apply the concept of the “artist” (rather than “craftsman”) to ancient material culture? What evidence is there for actual artistic production in the Greek and Roman world, and what can this tell us about ancient artists? What light does antiquity throw on the modern category of the “artist”? How useful is literary evidence for traditional art historical practices of attribution and connoisseurship, in the case of antiquity? Covering the period from Archaic Greece until the early Roman Empire, we explore the role, status, agency, and identity of the ancient artist across a variety of media, including vase painting, metal work, marble and bronze sculpture, and engraved gems. This course is taught as part of the Yale-Cornell Consortium for the Study of Ancient Art, in conjunction with a course at Cornell University taught by Verity Platt. In March 2016, we will meet our Cornell colleagues in Washington, D.C., where we will attend the exhibition *Power and Pathos: Bronze Sculpture of the Hellenistic World*, and students will present their work to each other in an informal workshop. W 10:30–12:20

HSAR 569a/ARCG 569a/CLSS 868a, Living the Life of Nero: Megalomania and Making Great Art Diana Kleiner

Nero is Rome's most infamous emperor. Played with gusto by Peter Ustinov in *Quo Vadis*, Nero personifies Roman leadership at its most tyrannical. Nonetheless, the Roman Age of Nero witnessed an extraordinary efflorescence of art and architecture that set the stage for Rome's magisterial second century. Furthermore, in a society in which few names of artists and architects were recorded, the work of those of Nero's era (Severus, Celer, Fabullus, Zenodorus) is well documented and enhanced by new archaeological discoveries. Student projects focus on the fabled Domus Aurea, the alleged Tomb of Nero, Third- and Fourth-Style Roman wall painting, the legendary Colossus of Nero, and other Neronian portraiture. The commissioning of art by powerful elite Roman women and freedmen in the Neronian age is also explored, and there is emphasis on the possible correlation between megalomania and great art. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. T 1:30–3:20

HSAR 590a, Emotion and Affect in Medieval Art and Culture Jacqueline Jung

This interdisciplinary seminar explores the valences of emotions and forms of their representation in high medieval Europe (twelfth to fourteenth century). We consider emotions historically, as internal states of consciousness typically, though not always, motivated by external stimuli, and externalized – sometimes directly, through bodily performances of feeling, and sometimes indirectly, through verbal or visual articulations – as tools of communication, self-revelation, or calls to action. We look carefully at renderings of emotional states in textual sources (letters, chronicles, romances, and devotional writings) and in images of various mediums and functions. Our aim is to tease out the problems artists faced and the choices they made when trying to convey feelings through figural representations, and the complex and varied ways they expected beholders to understand, internalize, and make use of the feelings brought to view. Topics include the face as conveyor of emotion; the moving body as generator of emotions; compassion and the ethics of viewership; varieties and values of mirth; anger as instrument; tears as index and sign; the gendering of grief; emotions and human relationships; emotions and the senses. Authors include Gerd Althoff, Paul Binski, Martin Büchsel, Jeffrey Hamburger, C. Stephen Jaeger, Jacqueline Jung, Jacques Le Goff, Barbara Rosenwein, Jean-Claude Schmitt, and Kathryn Starkey, among others. French and German reading skills are strongly recommended. F 1:30–3:20

HSAR 606a, A Global Renaissance Kishwar Rizvi

This seminar focuses on current scholarship that posits the connected nature of maritime cultures of the Indian Ocean and the Mediterranean Sea. Looking from the perspectives of both Europe and the Islamic world, the seminar considers the mobility of ideas and objects and the communities of merchants, artists, and scholars who traveled from Japan to England to the Americas. The mobility brought about profound cultural changes that were reflected and augmented by changes in the urban, architectural, and artistic productions of this period. T 10:30–12:20

HSAR 644b/CPLT 595b/GMAN 677b, Passions, 1600–1800 Rüdiger Campe,
Nicola Suthor

Theories of passion from Descartes, Spinoza, and Hobbes to Burke, Adam Smith, and Kant. The relationship between passion and its representation in art and literature: Alberti, Raphael, Rembrandt; Shakespeare; Poussin, Marino; Sandrart, LeBrun; Greuze, Diderot, Lessing, Goethe, and others. In the background, discussion of contemporary history and theory of emotion. T 1:30–3:20

HSAR 678b/ENGL 830b, Portraiture and Character from Hogarth to Woolf
Ruth Bernard Yeazell

Case studies in the visual and verbal representation of persons in Anglo-American painting and fiction, with particular attention to novels that themselves include portraits or address relations between the two media. Novelists tentatively to include Henry Fielding, Jane Austen, Henry James, Edith Wharton, Oscar Wilde, and Virginia Woolf. Painters to include William Hogarth, Joshua Reynolds, Thomas Gainsborough, Thomas Lawrence, James McNeill Whistler, John Singer Sargent, and Vanessa Bell. Selected readings in recent theories of fictional character and in the history and theory of portraiture. Whenever possible, we draw on paintings in Yale's collections. TH 1:30–3:20

HSAR 679b, Re-Reading Ruskin Timothy Barringer

What is the role of art in a capitalist society? How does the artistic production of an era reflect its social, economic, and moral conditions? What is the relationship between mankind and nature or the environment? How does the workman relate to the products of his labor? How can beauty be defined and understood? What is the place of religion in social and aesthetic thought? What do we mean by truth in relation to visual representation? These are among the questions that preoccupied John Ruskin, one of the protean figures of the nineteenth century, yet one whose work raises significant issues for our own time. The course aims to provide a full overview of Ruskin's significance, across a wide disciplinary and historical terrain, in the light of recent critical responses to his work. Far from being merely an art critic, Ruskin was a figure whose impact was felt across the fields of art history, aesthetic theory, museology, theology, architectural history and practice, literature, social criticism, politics, economics, geology, botany, climatology, and every aspect of Victorian life. His prose works run to thirty-nine large volumes, and his voluminous correspondence and diaries fill many more. Gifted as a draftsman, he produced a large corpus of watercolors and drawings. The class examines the many facets of Ruskin's work, aiming to place each in historical context while also exploring the relevance of his ideas for our contemporary world. The class concludes with a study trip to the UK and Venice. Enrollment limited. Prerequisite: permission of the instructor. W 1:30–3:20

HSAR 684a, Painting, Photography, Film Carol Armstrong

This seminar, which takes its title from László Moholy-Nagy's 1925 book, treats the concept of medium-specificity as it applies to painting, photography, film, and related media. It centers on photography and its historically vexed relationship to painting and the modernist discourses of medium purity, autonomy, and self-reflexivity, but it also takes up the history of those discourses as they relate to other media and as they are troubled by the hybridity of the photograph. Beginning with the philosophical origins

of the distinction between literature and the visual arts, the seminar considers Clement Greenberg's polemics on painting, sculpture, and collage and his occasional forays into photographic criticism. It addresses attempts at developing an ontology of the photograph (Roland Barthes's *Camera Lucida* most particularly), as well as criticisms of those attempts. It also addresses revisions of the definition of photography, as well as multimedia, inter-media, post-medium, and new media discourses. Finally, it looks at declarations and predictions of the death of painting, the end of photography, and the mutation of film into a digital medium. Readings in key theoretical and critical texts set in relation to particular practices in painting, drawing, and photography; discussions, oral presentations, and final papers. W 1:30–3:20

HSAR 687a/CPLT 840a/FILM 840a/GMAN 652a/RUSS 712a, Moscow/Berlin:

Leftist Avant-Gardes and Interwar Modernism Katerina Clark, Katie Trumpener
From 1918 to the mid-1930s, Moscow and Berlin were central gathering points for left-wing modernists. Each city developed its own modes of modernism, yet in sustained dialogue, given massive Russian emigration to Berlin after 1918, the Weimar obsession with early Soviet aesthetics (and cinema), intellectuals traveling in both directions, and the large-scale emigration of German leftists to the Soviet Union after 1933. And in the late 1940s and '50s, Soviet intellectuals (and German emigrants returning from Moscow) shaped a "late modernism" in East Berlin. Centered on literature and film, the course also considers a wide array of art forms (including painting, photography, architecture, music, and aesthetic theory). Works by modernists such as Eisenstein, Pudovkin, Vertov, Nabokov, Shklovsky, El Lissitzky, Rodchenko, Malevich, Tretiakov, Lukács, Moholy-Nagy, Benjamin, Brecht, Richter, Beckmann, Grosz, Heartfield, Höch, Lang, Döblin, Ruttman, Mies van der Rohe, Eisler, Busch, Konrad Wolf, Peter Weiss. T 1:30–3:20

HSAR 698a/AFAM 737a, The Global Caribbean Erica James

The Caribbean is a hyper-diaspora, both a site of dispersal and a point of departure for people of African, Indian, Chinese, European, and native heritages. Though it is often reduced to signs of sun, sand, sea, and sex, a closer engagement of the lived realities of the Caribbean complicates singular or essential readings of race, culture, identity, and aesthetics and poses a fundamental challenge to the writing of art histories of the region. This course offers a close examination of the written record of the art history and visual and performance cultures of the Caribbean. In process it attempts to critically engage fundamental aspects of art historical scholarship, theory, methodology, historiography, aesthetics, exhibition practices, and the uses and limits of the term "Caribbean" in an effort to consider methods of art historical scholarship beyond the moorings of postcolonial, postrevolutionary, postindependence, and postnational discourses. W 2:30–4:20

HSAR 701a, Art and Punishment Meredith Gamer

This research seminar considers the relationship between the visual arts and the theory, practice, and perception of punishment in Europe and America from the Middle Ages to present. What political, social, and cultural purposes has the representation of punishment served, and how have these changed over time and place? How have individual artists—from Titian and Hogarth to Goya and Warhol to contemporary artists such as Ken Gonzales-Day and Sam Durant—addressed this theme? How have technologies

of torture, execution, and incarceration been aided and shaped by aesthetic theory and architectural practice, and vice versa? We explore these questions through a series of case studies, focusing, for example, on key iconographies (the Flaying of Marsyas, the Crucifixion); on sites of punishment (the gallows, anatomy theater, prison, and guillotine); and on media (painting, print, photography, and video). Readings are drawn from art history, anthropology, sociology, literature, and critical theory. TH 3:30–5:20

HSAR 709a/FILM 806a, Introduction to Sound Studies J.D. Connor

How does sound become an object for history? for philosophy? for art? In recent decades an explosion of scholarly work has made sound studies an essential part of cultural and aesthetic history. We examine crucial dimensions of the critical field: the phenomenology and structure of the soundscape, models of technological history, philosophies of sound in the arts, the study of “listening cultures,” sound and film, and taping. TH 3:30–5:20, screenings T 7:30

HSAR 713b/FILM 808b, The Movement of Images: Modern Cinema and the Museum Thomas Elsaesser

Over the past two decades, the cinema has redefined itself in several ways: as a photographic medium, as popular entertainment, and as a significant public sphere. But it has also entered the museum and gallery spaces: classic directors like Renoir and Hitchcock are granted museum retrospectives, and contemporary filmmakers receive commissions for new work, or curate shows that cast a fresh light on film, its prehistories, alternative histories, and post-histories. This might signal that the cinema has finally come of age as the art form of the twentieth century, and thus has earned the right to enter into the traditional institutions of patronage, artistic heritage, and cultural patrimony. Or does this move into the museum merely confirm the “death” of cinema, and is it even predicated on the cinema’s demise, making it ready to be preserved and embalmed? How complementary or contradictory are the “black box” and the “white cube” in such a new arrangement of space, spectator, and *dispositif*? The course looks at some of the major exhibitions and retrospectives devoted to “the moving image” from the mid-1990s to the present and asks what theoretical shifts, perspective corrections, and critical readjustments accompany these displacements, on the side of cinema studies as well as on the part of art history.

HSAR 716a/AMST 716a/ANTH 769a/ARCG 769a, Landscapes of Meaning:

Museums and Their Objects Anne Underhill, Cyra Levenson

This seminar explores how museums convey various meanings about ethnographic, art, and archaeological objects through the processes of collecting, preparing exhibitions, and conducting research. Participants also discuss broader theoretical and methodological issues such as the roles of museums in society, relationships with source communities, management of cultural heritage, and various specializations valuable for careers in art, natural history, anthropology, history, and other museums. T 9:25–11:15

HSAR 722a/AMST 819a/REL 981a/RLST 695a, Visual Controversies: Religion and the Politics of Vision Sally Promey, Vasileios Marinis

This interdisciplinary seminar explores the destruction, censorship, and suppression of pictures and objects, as these acts have been motivated by religious convictions and practices, in medieval Europe and then in the United States from colonization to the

present. In such episodes, religion does not operate in a vacuum but draws attention to other cultural pressure points concerning, for example, race, ethnicity, gender, and sexuality. Already in the third century in Europe, and as early as the seventeenth century in the geographic area that is now the United States, individuals and groups practiced a range of behaviors we might meaningfully, though often figuratively, label iconoclastic. This course focuses most specifically on the emergence of Christian art and architecture in dialogue (or competition) with Greco-Roman religions and Islam; and on variations of Protestant Christianity; while it also directs attention to case studies within Byzantine Orthodoxy, American Judaism, Islam, and Catholicism and looks to comparative situations and episodes of contention elsewhere in the world. Topics likely considered include the conversion of “pagan” temples into Christian churches in late antiquity; iconoclastic interventions on Christian floor mosaics in Palestine after the Muslim conquest; destruction of images during Byzantine Iconoclasm; attitudes toward images during the Protestant Reformation; American Puritan uses of a theology of figuration to justify genocide as an “iconoclastic” act in the Pequot War; Shaker constructions of elaborate visionary pictures as forms of “writing” rather than “art”; sculptor Rose Kohler’s determination to define and regulate “Jewish art” in her work with National Council of Jewish Women; recent adjudication of the public display of the Ten Commandments or Christian nativity scenes; the Western contexts of the destruction of the Bamiyan Buddhas; and international culture wars and the specific uses of “blasphemy” charges to restrict the visual practices of religions. Prerequisite: permission of the instructors. M 3:30–5:20

HSAR 723b/AMST 806b/RLST 701b/WGSS 768b, Studies in “New” Materialities:

Agency, Ontology, Embodiment, Cognition Sally Promey

This advanced research course invites students to engage and interrogate a set of “new” ideas about objects and materiality emerging in disciplines as far-ranging as political science, cultural anthropology, ethics, history of art, cognitive science, religious studies, and gender and sexuality studies. One concern is to explore how these ideas, far from being “new,” have a deep, and deeply political, history in relation to Western efforts to make sense of and order the material (and spiritual) world and to mark and distinguish Western modernity and “civilization.” In the second half of the term, research projects take the shape of applying some of these theoretical models to case studies concerning specific objects, bodies, and materials. Note that a course on the same subject is being offered simultaneously at another institution, with students and professors in both courses entering into various sorts of conversation during the term. TH 1:30–3:20

HSAR 731b/JDST 692b/RLST 798b, Witnessing, Remembrance, Commemoration

Margaret Olin

Memory and its expressions structure and inform many aspects of contemporary visual culture. This seminar pursues readings about memory and witnessing chosen from among the works of such writers as Sigmund Freud, Albert Camus, Frances Yates, Maurice Halbwachs, and the authors of the Book of Genesis, as well as writings about commemoration by James Young and Pierre Nora, among others. Discussions apply these readings to the study of witnessing and memorializing as artistic practices, and examine visual realizations of such works, including some monuments and memorials near campus, but with a nonexclusive emphasis on Jewish examples, such as videos in

the Fortunoff archive. Student projects center on theory or on special cases of witnessing or commemoration, ritual, memorial practice, and monuments, whether built, written, aural, electronic, or played out on the streets. M 3:30–5:20

HSAR 785a/AFAM 580a, Cross-Cultural Aesthetics: From Hybridity to

Transculturation Kobena Mercer

Examines theories and methods in the reception of early-twentieth-century African American modernism, mid-twentieth-century studies of Caribbean art and culture, and black Atlantic art from the 1980s onward, addressing concepts of hybridity, creolization, syncretism, translation, and transculturation in the analysis of visual arts. W 3:30–5:20

HSAR 790b/AFAM 736b/WGSS 788b, Bodies and Borders: Psychoanalysis, Race, and Representation Kobena Mercer

Introducing methods from cultural studies, postcolonial studies, and psychoanalysis, this seminar examines representations of black bodies in modern art and visual culture. Abolitionist, Orientalist, and primitivist painting and sculpture are investigated through concepts of fetishism, fantasy, and the gaze, and in light of post-1960s artistic practices addressing interracial border zones as sites of cross-cultural hybridity. Artists include Carl Van Vechten, Wifredo Lam, Adrian Piper, Robert Mapplethorpe, Kara Walker, and Renée Cox; texts include Mikhail Bakhtin, Homi Bhabha, Frantz Fanon, and Griselda Pollock. W 3:30–5:20

HSAR 801b, Time and Space in Buddhist Art Youn-mi Kim

Each religion has its own cosmology with a unique concept of time and space. The concept of time and space developed by East Asian Buddhists was related to, but distinct from, the Buddhist tradition of the religion's home country of India, and it resulted in the birth of a new type of art and architecture in China, Korea, and Japan. Through exploration of East Asian Buddhist art, this course examines how East Asian Buddhists understood human life and death in the cycles of time and space, how they mapped hell and paradise in the cosmos, and how they attempted to visualize their perception of time and space in their art and architecture. In a larger context, the course examines the relationship among image, text, and practice in East Asian Buddhism through comparative readings of visual images and texts. By the end of the term, students achieve an understanding of how the East Asian Buddhist view of the cosmos gave birth to various types of visual arts, and how those visual materials in turn influenced religious practices and experience. T 1:30–3:20

HSAR 809a, Architecture and Audacity in Japan Mimi Hall Yiengpruksawan

The architectural history of Japan is marked by occasional virtuosités of such scale and imagination, such as the Ise Shrine, as to defy the very traditions and practices whence they emerged. Such productions might be called audacities, in the sense that they engaged—beyond technological prowess and economic wherewithal—a visionary boldness that came close to achieving the impossible. This seminar explores the notion of the audacity and the impossible by examining some of Japan's acclaimed architectural productions, including the tomb of King Nintoku, the Ise Shrine, Tōdaiji Daibutsuden, the Byōdōin Phoenix Hall, Itsukushima Shrine, Chūsonji Konjikidō, Kinkakuji, Himeji Castle, Rikyū's Taian, Ninomaru Palace, Katsura Rikyū, and Tōshōgū. W 10:30–12:20

HISTORY OF SCIENCE AND MEDICINE

The Graduate Program in the History of Science and Medicine is a semi-autonomous graduate track within the Department of History. The program's students are awarded degrees in History, with a concentration in the History of Science and Medicine.

207 Hall of Graduate Studies, 203.432.1365

<http://hshm.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Paul Freedman

Director of Graduate Studies

John Harley Warner [F]

Naomi Rogers [Sp]

Faculty Paola Bertucci (*History; on leave*), Henry Cowles (*History of Medicine*), Joanna Radin (*History of Medicine*), William Rankin (*History*), Naomi Rogers (*History of Medicine; Women's, Gender & Sexuality Studies*), William Summers (*Therapeutic Radiology; on leave* [Sp]), John Harley Warner (*History of Medicine; History; on leave* [Sp])

Affiliated Faculty Dimitri Gutas (*Near Eastern Languages & Civilizations*), Jennifer Klein (*History*), Joanne Meyerowitz (*History; on leave*), Amy Meyers (*Center for British Art*), Alan Mikhail (*History; on leave* [Sp]), Kevin Repp (*Curator, Modern European Books & Manuscripts, Beinecke Library*), Paul Sabin (*History*), Gordon Shepherd (*Neurobiology*), Frank Snowden (*History; History of Medicine; on leave* [F]), Rebecca Tannenbaum (*History*), Jenifer Van Vleck (*History*)

Fields of Study

All subjects and periods in the history of science and history of medicine, especially the modern era. Special fields represented include American and European science and medicine; disease, therapeutics, psychiatry, drug abuse, and public health; physics; science and national security; science and law, science and religion, life sciences, human genetics, eugenics, molecular biology, biotechnology, microbiology, intellectual property, gender, race, and science/medicine; bioethics and medical research.

Special Admissions Requirements

Applicants should have a strong undergraduate background in history and in a science relevant to the direction of their graduate interests. These requirements will be applied with flexibility, and outstanding performance in any field pertinent to the program will be taken into consideration.

Special Requirements for the Ph.D. Degree

Either French and German or two languages relevant to the student's research interests and approved by the director of graduate studies (DGS) of the program. Students may fulfill the requirement either by passing an approved language course for credit or by passing a language test administered by the program faculty.

Students will ordinarily take twelve term courses during the first two years. All students will normally take the two-term core seminar sequence HSHM 701a/702b or equivalents, HSHM 710a, four additional graduate seminars in history of science or medicine, and at least one graduate course in a field of history outside of science or medicine. The remaining courses can be taken in history of medicine or science, history, science, or any other field of demonstrated special relevance to the student's scholarly objectives. Two of the twelve courses must be graduate research seminars in the History of Science and Medicine.

During the first two years of study, students must achieve Honors in at least two courses in the first year and Honors in at least four courses by the end of the second year, with a High Pass average overall. If a student does not meet this standard by the end of the first or second year, the relevant members of the department will consult and promptly advise the student whether the student will be allowed to register for the fall of the following academic year.

Students who enter having previously completed graduate work may obtain some credit toward the completion of the total course requirement, the amount being contingent on the extent and nature of the previous work and its fit with their intended course of study at Yale.

All students are expected, prior to entering on their dissertation work, to develop a broad general knowledge of the discipline. This knowledge may be acquired through a combination of course work taken at Yale or elsewhere, regular participation in the program colloquia and workshops, and preparation for the qualifying oral examination.

Students will normally spend the summer following their second year preparing for the oral qualifying examination, which will be taken in the third year, preferably during the first half.

The qualifying examination will cover four areas of chosen concentration:

- 1 & 2. two fields in the history of science and/or history of medicine;
3. a field in an area of history outside of medicine and/or science;
4. a field of special interest, the content and boundaries to be established with the adviser for the field. The student may elect to do a second field in history outside of history of science or medicine; or a field in one of the sciences; or a field in a subject such as bioethics, health policy, public health, medical anthropology, medical sociology, science and law, science and national security, science and religion, science and culture, biotechnology, gender, science and medicine; race, science and medicine, or cultural studies.

During their first term in the program, all students will be advised by the DGS. During the second term and thereafter, each student will be advised by a faculty member of his or her choosing. The adviser will provide guidance in selecting courses and preparing for the qualifying examination. The adviser may also offer help with the development of ideas for the dissertation, but students are free to choose someone else as the dissertation supervisor when the time comes to do so. Students are encouraged to discuss their interests and program of study with other members of the faculty.

Students are encouraged to begin thinking about their dissertation topics during the second year. They are required to prepare a dissertation prospectus as soon as possible following the qualifying examination and to defend the prospectus orally before being

admitted to full candidacy for the doctoral degree. Ordinarily the prospectus defense is held in the second term of the third year, with advancement to candidacy before the start of the fourth year.

Teaching is an important part of the professional preparation of graduate students in History of Science and Medicine. Students will teach, usually in the third and fourth years of study. They may, however, teach in the second term of the second year, deferring the completion of their required course work to the first term of the third year. Students are also encouraged to participate in the programs to develop teaching skills offered by the Graduate School. Two terms of teaching are required of all students; four terms are required of students on Yale-supported fellowships.

In the fourth or fifth year, and preferably no later than the fall term of the fifth year, students are required to submit a chapter of the dissertation (not necessarily the first chapter) to the dissertation committee. This chapter will then be discussed with the student by members of the committee, preferably in a colloquium, to give the student additional advice and counsel on the progress of the dissertation. This conference is designed to be an extension of the conversation begun in the prospectus defense and is not intended as another defense; its aim is to give students early feedback on the research, argument, and style of the first writing accomplished on the dissertation.

M.D./Ph.D. and J.D./Ph.D. Joint-Degree Programs

Students may pursue a doctorate in History of Science and Medicine jointly with a degree in Medicine or Law. Standard graduate financial support is provided for the doctoral phase of work toward such a joint degree. Candidates for the joint degree in Law must apply for admission to both the Law School and the Graduate School. Information about the joint-degree program with Medicine can be obtained from the Web site of the Yale School of Medicine (<http://medicine.yale.edu/mdphd>) and from the Web site of the Section of the History of Medicine (<http://medicine.yale.edu/histmed>).

Master's Degrees

M.Phil. and M.A. (en route to the Ph.D.) See Degree Requirements under Policies and Regulations.

Terminal Master's Degree Program The terminal M.A. program is designed particularly for those who plan to combine teaching or scholarship in these fields with a professional career in medicine or science. Students who enroll in the terminal master's degree program leading to the M.A. are expected to complete six term courses during two terms of study and to submit an acceptable master's paper. Course work must include the graduate seminar HSHM 701a/702b and one additional graduate seminar in history of science or medicine. The remaining courses are to be chosen in consultation with the DGS or a faculty adviser.

For more information about the History of Science and Medicine program and admission to the Graduate School, see <http://hshm.yale.edu> and <http://gsas.yale.edu/admission-graduate-school>; or contact Barbara McKay (barbara.mckay@yale.edu).

Courses

HSHM 656a^U/HIST 949a^U, Photography and the Sciences Chitra Ramalingam

Does photography belong in the history of art, or does its status as an “automatic” or “scientific” recording technique and its many uses in the sciences distinguish its history from that of earlier visual media? How does photography look when we approach it from the cultural history of science? How might its role in the sciences have shaped photographic aesthetics in the arts? This course examines the making of photography’s discursive identity as an experimental and evidentiary medium in the sciences, from its announcement to the public in 1839 to the digital innovations of the present day. We take a historical and archival perspective on uses for (and debates over) photography in different fields of the natural and human sciences, grounded in visits to photographic collections at Yale. TH 1:30–3:20

HSHM 680a^U/HIST 911a^U, History of Chinese Science William Summers

Major themes in Chinese scientific thinking from antiquity to the twentieth century. Non-Western concepts of nature and the development of science in China; East-West scientific exchanges; and China’s role in modern science. W 7–8:50

HSHM 701a/HIST 930a, Problems in the History of Medicine and Public Health

John Harley Warner

An examination of the variety of approaches to the social and cultural history of medicine and public health. Readings are drawn from recent literature in the field, sampling writings on health care, illness experiences, ideas, and medical cultures in Europe, the Americas, Asia, and Africa from antiquity to the twentieth century. Topics include the role of gender, class, ethnicity, race, religion, and region in the experience of health care and sickness; the intersection of lay and professional understandings of the body; and the role of the marketplace in shaping professional identities and patient expectations. W 1:30–3:20

HSHM 702b/HIST 931b, Problems in the History of Science Henry Cowles

Survey of classic and recent work in the history of science, broadly conceived. Topics include physical, life, and human sciences; role of technology and instruments; relationship between theory and practice; and interactions with society, politics, and capitalism. Focus on mastering debates in history of science, with connections to philosophy, anthropology, and literary studies. W 9:25–11:15

HSHM 710a/HIST 921a, Problems in Science Studies Joanna Radin

Exploration of the methods and debates in the social studies of science, technology, and medicine. This course covers the history of the field and its current intellectual, social, and political positioning. It provides critical tools—including feminist, postcolonial, and new materialist perspectives—to address the relationships among science, technology, medicine, and society. M 1:30–3:20

HSHM 713b/HIST 913b, Geography and History William Rankin

A research seminar focused on methodological questions of geography and geographic analysis in historical scholarship. We consider approaches ranging from the Annales School of the early twentieth century to contemporary research in environmental history,

history of science, urban history, and more. We also explore interdisciplinary work in social theory, historical geography, and anthropology and grapple with the promise (and drawbacks) of GIS. Students may write their research papers on any time period or geographic region, and no previous experience with geography or GIS is necessary. Open to undergraduates with permission of the instructor. TH 1:30–3:20

HSHM 736b/HIST 943b/WGSS 730b, Health Politics, Body Politics Naomi Rogers

A reading seminar on struggles to control, pathologize, and normalize human bodies, with a particular focus on science, medicine, and the state, both in North America and in a broader global health context. Topics include disease, race, and politics; repression and regulation of birth control; the politics of adoption; domestic and global population control; feminist health movements; and the pathologizing and identity politics of disabled people. W 1:30–3:20

HSHM 744b/AMST 839b/F&ES 843b/HIST 743b, Readings in Environmental

History Paul Sabin

Readings and discussion of key works in environmental history. The course explores major forces shaping human-environment relationships, such as markets, politics, and ecological dynamics, and compares different approaches to writing about social and environmental change. M 1:30–3:20

HSHM 914a or b, Research Tutorial I

By arrangement with faculty.

HSHM 915a or b, Research Tutorial II

By arrangement with faculty.

HSHM 920a or b, Independent Reading

By arrangement with faculty.

HSHM 930a or b, Independent Research

By arrangement with faculty.

IMMUNOBIOLOGY

Anlyan Center (TAC) S625, 203.785.3857

<http://immunobiology.yale.edu/>

M.S., M.Phil., Ph.D.

Chair

Richard Flavell

Director of Graduate Studies

Susan Kaech (TAC 641B, 203.737.2423, susan.kaech@yale.edu)

Director of Graduate Admissions

João Pereira (TAC 541A, 203.737.2089, joao.pereira@yale.edu)

Student Services Officer

Barbara Cotton (TAC S625, 203.785.3857, barbara.cotton@yale.edu)

Professors Jeffrey Bender (*Internal Medicine*), Alfred Bothwell, Lieping Chen, Joseph Craft (*Internal Medicine*), Peter Cresswell, Madhav Dhodapkar (*Internal Medicine*), Vishwa Dixit (*Comparative Medicine*), Richard Flavell, David Hafler (*Neurology*), Kevan Herold, Akiko Iwasaki, Paula Kavathas (*Laboratory Medicine*), Ruslan Medzhitov, Jordan Pober, Nancy Ruddle (*Public Health*), David Schatz, Robert Tigelaar (*Dermatology*)

Associate Professors Tarek Fahmy (*Biomedical Engineering*), Daniel Goldstein, Susan Kaech, Eric Meffre, Bing Su

Assistant Professors Stephanie Eisenbarth (*Laboratory Medicine*), Ann Haberman (*Laboratory Medicine*), Martin Kriegl, João Pereira, Aaron Ring, Carla Rothlin

Fields of Study

The Immunobiology graduate program is designed to prepare students for independent careers in research and teaching in immunology or related disciplines. The educational program emphasizes interdisciplinary training and collaborative and interactive research, an approach based on the idea that solving difficult problems requires the integration of individuals with common goals but differing expertise. Graduate students are diverse in their interests and ethnic backgrounds, and more than 50 percent are women.

Research Areas

Research focuses on the molecular, cellular, and genetic underpinnings of immune system function and development, on host-pathogen interactions, and on human and translational immunology, with a particular interest in a variety of autoimmune disorders. These research interests break down into six major themes, spanning almost all aspects of the immune system and its role in disease prevention.

Lymphocyte development A central focus of research is to understand the molecular events underlying the development of B and T lymphocytes. Areas of major interest include the receptors and signals that control lymphocyte lineage commitment, cell

maturation, cell proliferation, and cell death; the establishment of the proper environments for lymphocyte development; mechanisms that regulate the state of chromatin during lymphocyte development; and the mechanisms by which antibody and T cell receptor genes are assembled and diversified.

Mounting an immune response An effective immune response requires the coordinated action of numerous cell types. A critical first step is the activation of cells of the innate immune system, including monocytes, macrophages, dendritic cells, and neutrophils; and the receptors and signaling molecules that control this process are under intensive study. The mechanism by which cells take up, process, and present antigen is a major interest, as is the recognition of this antigen by T cell receptors on T lymphocytes. Cytoplasmic signal transduction molecules, nuclear transcription factors, and mechanisms controlling gene expression are all under study.

Regulating the immune response The immune response is tightly regulated through the interaction of cell surface receptors with secreted cytokines and with one another, and the mechanisms by which these interactions exert their regulatory influences are studied in several laboratories. Another major interest is in learning how specialized cells or anatomic locations, such as vascular endothelial cells or the epidermis, regulate and direct the immune response.

Consequences of an immune response Apart from the obvious consequence of the elimination of an invading organism, an appropriate immune response results in immunological memory and large numbers of activated lymphocytes, which must be eliminated. The mechanisms controlling immunological memory, tolerance, and apoptosis, as well as those leading to autoimmunity, are a major interest of many faculty. Diabetes, multiple sclerosis, lupus, and rheumatoid arthritis are just some of the autoimmune diseases under study. Much of this work takes place in the context of the Section of Human and Translational Immunology.

Infectious disease and the host-pathogen interaction A major interest is the study of infectious organisms – bacterial, viral, and parasitic – and the immune response to them. A great deal of effort is directed toward understanding the strategies used by infectious agents to avoid the immune system. HIV, HBV (hepatitis B virus), herpes simplex virus, parvoviruses, *Candida albicans*, *Borrelia burgdorferi* (the causative agent of Lyme disease), *Leishmania*, *Streptococcus pneumoniae*, and *Legionella pneumophila* are all under study.

Structural analysis of immune system receptors and effectors There is a growing interest in using structural approaches to understand the function of key molecules of the immune response. For example, a major effort is devoted toward understanding how the Toll-like receptors, despite their similarity in extracellular-ligand recognition regions, are able to specifically recognize such a wide variety of pathogen-associated molecular patterns (PAMPS). Another effort is aimed at understanding the mechanism of APOBEC enzymes in controlling viruses such as HIV.

Facilities

More than thirty laboratories are actively involved in research in immunology. Many share immediately adjoining or nearby laboratory space on the top three floors of the Anlyan Center (TAC) or at 300 George Street, and five faculty are funded by the Howard Hughes Medical Institute. The Department of Immunobiology provides one of the largest, highest-ranked training programs in immunology in the country, led by a faculty with a reputation for excellence in research. The Department of Immunobiology maintains a wide variety of major equipment, and Dr. Richard Flavell, chair of the department, oversees a very active transgenic mouse/ES cell/knockout facility to which members of the department have access.

Program Entry

Most students enter the Immunobiology graduate program through the Immunology track of the Program in Biological and Biomedical Sciences (BBS). Other types of students enter from the M.D./Ph.D. program (see below), the MRSP (see below), or another BBS track, with approval of the Immunobiology director of graduate studies (DGS) and the faculty adviser.

The faculty and students of the BBS program are organized into interest-based tracks. Immunobiology, being one of seven tracks, encourages individualized attention to maximize scientific interactions. There is complete freedom to work with any of the 350 faculty members affiliated within any of the tracks and to take courses offered by any of the BBS departments or programs. Students are encouraged to supplement core courses in molecular and cellular immunology with additional courses selected from the wide range available in cell biology, molecular biology, developmental biology, biochemistry, genetics, pharmacology, molecular medicine, neurobiology, and bioinformatics. Research seminars and informal interactions with other graduate students, postdoctoral fellows, and faculty also form an important part of graduate education.

The Section of Human and Translational Immunology (HTI) is a component of the Immunobiology department and is located at 10 Amistad Street and 300 George Street. Its mission is to accelerate the application of new developments in the field of immunology to the treatment of human diseases. HTI faculty study the immunologic aspects of a very broad range of human diseases, encompassing investigations in the fields of cancer; transplantation of solid organs and stem cells; autoimmune diseases; and neurologic disease.

The Medical Research Scholars Program (MRSP) is open to students who have already been accepted into the BBS program. A separate application is also required, and is to be submitted to the BBS. A total of eight students each year (four first-years and four second-years) will be enrolled as Medical Research Scholars. They remain in their BBS tracks or departments but participate in the additional MRSP curriculum. The program bridges barriers between traditional predoctoral and medical training by providing Yale Ph.D. students with both medically oriented course work and a mentored clinical experience. This combination of medical knowledge and face-to-face interaction with patients and their doctors provides a new perspective to Ph.D. students and enhances the rigorous training in basic science already provided.

Admission requirements In addition to meeting general BBS requirements, applicants are expected to have a firm foundation in the biological and physical sciences. It is preferred that students have taken courses in biology, organic chemistry, biochemistry, genetics, cell biology, physics, and mathematics. Actual course requirements, however, are not fixed, and students with outstanding records in any area of the biological sciences may qualify for admission. There are no specific grade requirements for prior course work, but a strong performance in basic science courses is of great importance for admission. In special cases, the Medical College Admission Test (MCAT) may be substituted.

Special Requirements for the Ph.D. Degree

Students are required to take six courses for a grade in the Yale Graduate School.

Required graded courses for first- and second-year students are:

1. IBIO 530a, Biology of the Immune System (Students have the option of passing out of 530 by taking the final exam from the previous year.)
2. IBIO 531b, Advanced Immunology
3. Two Immunobiology seminar courses taken from this series: IBIO 536, 537, 538, 539 (The second seminar course can be audited if a student has grades in six other science courses and has already taken one seminar course for credit.)

Required credit-only, nongraded courses for first-year students are:

1. IBIO 600a, Introduction to Faculty Research
2. IBIO 611a, 612b, 613b, Research Rotations (short research projects are taken under the guidance of three Yale professors)
3. IBIO 601b, Fundamentals of Research: Responsible Conduct of Research

Fourth-year students are required to take IBIO 603b, a refresher training course in the responsible conduct of research.

Additional courses are determined based on the individual needs of the student, and include courses in biochemistry, cell biology, genetics, molecular biology of prokaryotes, molecular biology of eukaryotes, animal viruses, the structure of nucleic acids and proteins, microbiology, and disease mechanisms. Students choose courses after consulting the DGS and the thesis adviser.

Honors The Graduate School uses grades of Honors, High Pass, Pass, or Fail. Students are required to earn a grade of Honors in at least two courses in the first two years, and are expected to maintain a High Pass average. There is no foreign language requirement.

Teaching Students are required to serve as a science TA (teaching assistant) for two terms before the end of their sixth term. Teaching protocol and rules are as follows: (1) two term-long science courses are required as a fulfillment of the Ph.D.; (2) first-year students do not teach; (3) IBIO 603b, Teaching in the Science Education Outreach Program (SEOP), is an approved teaching credit only when taught as the second teaching experience; (4) teaching opportunities are first given to students who need the credit; (5) teaching for additional income is available when openings exist after those selected for credit are hired; and (6) the maximum teaching allowable is one course per term corresponding to a TF-10 position. All courses taught outside of the lab for extra income must be approved by both the thesis adviser and the DGS.

A Yale McDougal Center one-day seminar entitled "Teaching at Yale" is offered each year. Attending this seminar is recommended prior to teaching.

Early in their fourth term (or in certain circumstances, in their third term), students make a thirty-minute presentation to the department of their proposed research and initial results. Thereafter, they meet with their prospectus committee, which assigns four or five broad areas of biology and immunology that are of particular relevance to the proposed research and on which the student will be examined in the prospectus exam. During the next several weeks, students prepare a formal research proposal (in NIH grant format) concerning the proposed thesis research and study for the exam. The exam is oral, and covers all aspects of immunology generally, with a focus on the assigned areas mentioned above. The student is also questioned on aspects of the thesis proposal.

Requirements for admission to candidacy, which usually takes place after six terms of residence, are (1) completion of course requirements and teaching requirements; (2) completion of the prospectus examination; and (3) certification of the student's research abilities by vote of the faculty upon recommendation from the student's thesis committee, which takes place at the student's first committee meeting after the prospectus examination.

Progress in thesis research in the third and later years is monitored carefully by the student's thesis committee (composed of the adviser and three or four other faculty). See below.

M.D./Ph.D. Students Majoring in Immunobiology

Required Six courses for a grade. Out of the six courses the following are mandatory:

1. IBIO 530a, Biology of the Immune System (Students have the option of passing out of 530 by taking the final exam from the previous year.)
2. IBIO 531b, Advanced Immunology
3. Two Immunobiology seminar courses taken from this series: IBIO 536, 537, 538, 539 (The second seminar course can be audited if a student has grades in six other courses and has already taken one seminar course for credit.)

Also required *Two grades of Honors:* Yale University graduate courses taken for a grade at the School of Medicine may be counted toward the Honors fulfillment and the seven total required courses. Verification must be provided to the DGS. *One semester of teaching:* Previously taught courses in the School of Medicine may count toward this requirement. To request credit for previous teaching experience, a note from the course director describing the teaching experience (duration of the teaching experience, frequency of class meetings, number of students taught, materials covered, dates, and for whom) should be provided to the Immunobiology DGS. *Responsible Conduct of Research, Refresher Course:* Fourth-year students are required to take a refresher training course in the responsible conduct of research. M.D./Ph.D. students can fulfill this NIH requirement through Immunobiology (IBIO 603b) or through the M.D./Ph.D. program.

M.D./Ph.D. students are not required to take:

1. IBIO 600a, Introduction to Research
2. IBIO 611a, 612b, 613b, Research Rotations
3. IBIO 601b, Fundamentals of Research: Responsible Conduct of Research. A note

from the DGS of the M.D./Ph.D. program must be forwarded to the Immunobiology DGS stating that the student has taken a course in Research Conduct and Ethics, or its equivalent in the School of Medicine. *Include dates, titles, and faculty.* If the student has not taken this course, then registration in this class is required.

Annual thesis committee meetings Each student is required to have a thesis committee meeting at least every twelve months, and more frequently if the student or committee feels that it would be appropriate or helpful. The thesis supervisor (the student's PI) then submits a thesis committee report form to the DGS summarizing the student's progress.

Master's Degrees

M.Phil. A student is entitled to the M.Phil. degree once all academic, teaching, and prospectus requirements have been met. Also required is a first-year committee meeting at which the members sign an approval form stating that the student is making good progress toward his or her research.

M.S. (en route to the Ph.D.) Students who complete at least one year of resident graduate study at Yale with the quality of work judged satisfactory by the Department of Immunobiology faculty and who have satisfied ten courses with an average grade point average of High Pass (graded) and Pass (ungraded) may petition for the award of the M.S. degree. Students must petition through the Registrar's Office of the Graduate School in early October for the December award of the M.S. and by the middle of March for the May award.

The Web site at <http://bbs.yale.edu> offers complete information on the Biological and Biomedical Sciences Program (BBS) and the more than 350 participating faculty.

Courses

For a complete listing of immunology-related courses, see <http://bbs.yale.edu>.

IBIO 530a/MCDB 530a^U, Biology of the Immune System Carla Rothlin,
Peter Cresswell, Kevan Herold, Akiko Iwasaki, Susan Kaech, Ruslan Medzhitov,
Eric Meffre, João Pereira, David Schatz

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens. Immunologic memory and vaccines. Human diseases including allergy, autoimmunity, cancer, immunodeficiency, HIV/AIDS. MWF 9:25–10:15

IBIO 531b, Advanced Immunology Alfred Bothwell and faculty

The historical development and central paradigms of key areas in immunology. The course attempts to develop a clear understanding of how these paradigms were established experimentally. Landmark studies are discussed to determine how the conclusions were obtained and why they were important at the time they were done. Lecture and discussion format; readings of primary research papers and review articles. Prerequisite: IBIO 530a or equivalent. Enrollment limited to fifteen. MW 4–6

IBIO 539b, Advanced Immunology Seminar: Cancer Immunology

Madhav Dhodapkar, Lieping Chen, Katerina Politi

IBIO 600a, Introduction to Research: Faculty Research Presentations

Susan Kaech and faculty

Introduction to the research interests of the faculty. Required of all first-year Immunology/BBS students. Pass/Fail.

IBIO 601b/CB&B 601b, Fundamentals of Research: Responsible Conduct of

Research Susan Kaech and faculty

A weekly seminar presented by faculty trainers on topics relating to proper conduct of research. Required of first-year Immunobiology students, first-year CB&B students, and training grant-funded postdocs. Pass/Fail. T 5

IBIO 603b, Responsible Conduct of Research, Refresher Course

The NIH requires that students receive training in the responsible conduct of research every four years. This course meets that requirement for fourth-year students. The course has two components: (1) one large-group session is held for all fourth-year students through the BBS; the main topics are scientific misconduct and authorship; (2) two Immunobiology faculty facilitate discussions based on RCR topics, gathered in advance from the students; anonymous or hypothetical stories are selected by the faculty and discussed in a workshop environment in which students are then asked to analyze each case and suggest courses of actions.

IBIO 611a, Research Rotation 1 Susan Kaech and faculty

Intensive experience in the design and execution of experiments in immunology or other areas of biology. Students design a focused research project in consultation with a faculty mentor and execute the designed experiments in the mentor's laboratory. Students are expected to read relevant background papers from the literature, design and perform experiments, interpret the resulting data, and propose follow-up experiments. Students are also expected to attend the mentor's weekly lab meeting(s) as well as weekly Immunobiology departmental seminars and Research in Progress seminars. The course concludes with the student giving a brief presentation of the work performed at Rotation Talks, attended by other first-year immunology-track graduate students. Evaluation is by the mentor; students also evaluate the rotation experience. Students must turn in a prioritized list of four possible mentors to Barbara Cotton in the office of the director of graduate studies at least one week prior to the beginning of the course. Mentors are assigned by the DGS. Graded Pass/Fail. Course dates are Sept. 15–Dec. 5. 1 course credit; minimum of 20 hours/week. Required of all first-year Immunology/BBS students.

IBIO 612b, Research Rotation 2 Alfred Bothwell and faculty

See description under IBIO 611a. Course dates are Jan. 9–March 13.

IBIO 613b, Research Rotation 3 Alfred Bothwell and faculty

See description under IBIO 611a. Course dates are March 16–May 22.

INTERNATIONAL AND DEVELOPMENT ECONOMICS

Economic Growth Center

27 Hillhouse Avenue, 203.432.3610

www.yale.edu/ide

M.A.

Director

Dean Karlan

Director of Graduate Studies

Michael Boozer

The Department of Economics offers a one-year program of study in International and Development Economics, leading to the Master of Arts degree. IDE students are diverse in terms of their nationalities and their career paths. Many of our students now come directly from their undergraduate school or a few years of work experience, although we do not exclude any candidate on the basis of work experience or country of origin. After completion of the program, IDE students have gone into various paths, including working in research for academic and nonacademic agencies such as the World Bank, the United Nations, and the Poverty Action Lab. Other students have gone on to further academic work such as law school and to Ph.D. programs in economics, environmental sciences, public health, and similar programs. Many students have returned to their home countries to work for their government or for funding agencies there.

Some students entering the program are required to complete the summer program in English and Mathematics for Economists offered by Yale University. This requirement may be waived for applicants demonstrating exceptional training in economic analysis and a good command of English. The Graduate Record Examination (GRE) and the Test of English as a Foreign Language (TOEFL) examinations are also required. The TOEFL requirement is waived only for applicants who will have received a degree, prior to matriculation at Yale, from a college or university where English is the primary language of instruction.

Yale fellowship funds are not available for the IDE program, and students are required to produce certification of the necessary funding prior to enrollment.

The course program requires the completion of eight graduate-level courses, six of which make up the core elements of the IDE program and are required; the remaining two are graduate electives. The required courses are Microeconomics; Macroeconomics; Econometrics; Economics of Poverty Alleviation; Development Economics; Development Econometrics. These required courses are designed to provide a rigorous understanding of the economic theory necessary for economic policy analysis. In special circumstances, in consultation with the DGS, students may receive credit toward the degree for undergraduate language classes. An option of a second year of nondegree elective study is available via the special student registration status.

Joint-program options for study with the School of Forestry & Environmental Studies (F&ES) and the School of Public Health (YSPH) are also available. Application to F&ES or YSPH must be made simultaneously with the application to the IDE program.

Admission to these joint programs is determined by the participating professional school and must be obtained prior to beginning the program. Joint-degree students earn the Master of Arts degree in IDE and the Master of Environmental Studies (F&ES) or Master of Public Health (YSPH) degree.

Prospective applicants are encouraged to visit the IDE program Web site at www.yale.edu/ide. Program materials are available upon request to Louise Danishevsky, Senior Administrative Assistant, International and Development Economics Program, Yale University, PO Box 208269, New Haven CT 06520-8269; e-mail, ide@yale.edu.

INVESTIGATIVE MEDICINE

2 Church Street South, Suite 112, 203.785.6842
<http://medicine.yale.edu/investigativemedicine>
 Ph.D.

Director of Graduate Studies

Joseph Craft (joseph.craft@yale.edu)

Deputy Director

Eugene Shapiro

Professors Karen Anderson (*Pharmacology*), Henry Binder (*Internal Medicine*), Joseph Craft (*Internal Medicine; Immunobiology*), Thomas Gill (*Internal Medicine; Epidemiology*), Fred Gorelick (*Internal Medicine; Cell Biology*), Jeffrey Gruen (*Pediatrics; Genetics*), Harlan Krumholz (*Internal Medicine; Epidemiology*), Eugene Shapiro (*Pediatrics; Epidemiology*), George Tellides (*Surgery*), Mary Tinetti (*Internal Medicine; Epidemiology*)

Associate Professors David Fiellin (*Internal Medicine; Epidemiology*), Chirag Parikh (*Internal Medicine*)

Fields of Study

The Investigative Medicine program offers a training pathway for highly select physicians in clinical departments who are interested in careers in clinical research. The program is designed to develop a broad knowledge base, analytical skills, creative thinking, and the hands-on experience demanded of clinical researchers devoted to disease-oriented and patient-oriented investigation. The program provides the student with individualized experience encompassing formal course work and practical experience, under the supervision and mentorship of a senior faculty member.

Students will enter the program with a broad range of experience and interests. Students can undertake thesis work in a variety of disciplines. These include but are not limited to:

1. Evaluating risk factors and interventions for disease using modern concepts in quantitative methods and clinical study design.
2. Investigating the biochemical, physiologic, and genetic basis of disease in the setting of a Clinical Research Center.
3. Exploring the molecular basis of a disease from the laboratory standpoint.

Special Admissions Requirements

The Investigative Medicine program is designed for students with an M.D. or D.O. degree. To be eligible for admission, applicants must have completed two or more years of postgraduate clinical training. Prospective students who are already in a residency or subspecialty clinical fellowship program at Yale may apply to the Investigative Medicine program anytime during the first two years of that training (approximate). Application to the program also may be made concurrently with application for residency or fellowship

training in a clinical department at the Yale School of Medicine. Special arrangements will be made for a deferred acceptance by the Graduate School.

The most important criteria for selection into the program are commitment to rigorous training in clinical investigation and evidence of high academic achievement in undergraduate and medical school courses, and on scores from the USMLE. All applicants must be eligible to practice medicine in the United States.

Special Requirements for the Ph.D. Degree

The minimum overall course requirements for the doctorate program are completion of nine (9) courses. Intensive course work will extend for twelve months, starting in July. The majority of the course requirements are to be completed by the end of the first year of study. Prior to registering for a second year of study, students must successfully complete IMED 630a, Ethical Issues in Biomedical Research. In addition to IMED 655b, electives are often taken in the second year, with the expectation that they be completed by the end of the second year. To be eligible to take the comprehensive qualifying examination, students must achieve the grade of Honors in two courses (one course if a full-year course), have a minimum grade average of High Pass, and have completed a minimum of six courses. When requirements are met (typically by December 31 of the second year), students submit their thesis proposal and undertake the comprehensive qualifying examination. In order to be admitted to candidacy, students must pass both the written and oral comprehensive qualifying examinations and submit a thesis prospectus that has been approved by their qualifying committee. The remaining degree requirements include completion of the dissertation project, writing of the dissertation, and its oral defense. It is expected that most students will complete the program in three to five years. There is no foreign language requirement. The minimum required curriculum for each program of study is as follows:

COURSE REQUIREMENTS FOR LABORATORY-BASED PATIENT-ORIENTED RESEARCH

IMED 625a, Principles of Clinical Research
 IMED 630a, Ethical Issues in Biomedical Research
 IMED 635a or b, Directed Reading in Investigative Medicine
 IMED 645a, Introduction to Biostatistics in Clinical Investigation
 IMED 655b, Writing Your First Big Grant Proposal
 IMED 680b, Topics in Human Investigation
 CBIO 601, Molecular and Cellular Basis of Human Disease
 CB&B 740a, Clinical and Translational Informatics
 Elective (1)

COURSE REQUIREMENTS FOR CLINICALLY BASED PATIENT-ORIENTED RESEARCH

IMED 630a, Ethical Issues in Biomedical Research
 IMED 635a or b, Directed Reading in Investigative Medicine
 IMED 655b, Writing Your First Big Grant Proposal
 IMED 660c, Methods in Clinical Research, Part I

IMED 661a, Methods in Clinical Research, Part II
 IMED 662b, Methods in Clinical Research, Part III
 IMED 680b, Topics in Human Investigation
 Electives (2)

Courses

IMED 625a, Principles of Clinical Research Eugene Shapiro

The purpose of this intensive two-week course is to provide an overview of the objectives, research strategies, and methods of conducting patient-oriented clinical research. Topics include competing objectives of clinical research, principles of observational studies, principles of clinical trials, principles of meta-analysis, interpretation of diagnostic tests, prognostic studies, causal inference, qualitative research methods, and decision analysis. Sessions generally combine a lecture on the topic with discussion of articles that are distributed in advance of the sessions. Consent of instructor required. Two weeks, July 27–August 7, 2015. MTWTHF 2–4

IMED 630a, Ethical Issues in Biomedical Research Joseph Craft

This term-long course addresses topics that are central to the conduct of biomedical research, including the ethics of clinical investigation, conflicts of interest, misconduct in research, data acquisition, and protection of research subjects. Practical sessions cover topics such as collaborations with industry, publication and peer review, responsible authorship, and mentoring relationships. Satisfactory completion of this course fulfills the NIH requirement for training in Responsible Conduct of Research. Format consists of lecture presentation followed by discussion. Consent of instructor required. T 3:30–5

IMED 635a or b, Directed Reading in Investigative Medicine Joseph Craft

An independent study course for first-year students in the Investigative Medicine program. Topics are chosen by the student, and reading lists are provided by faculty for weekly meetings to discuss articles. Four sessions are required; dates/times by arrangement. Consent of instructor required.

IMED 645a, Introduction to Biostatistics in Clinical Investigation Eugene Shapiro

The course provides an introduction to statistical concepts and techniques commonly encountered in medical research. Previous course work in statistics or experience with statistical packages is not a requirement. Topics to be discussed include study design, probability, comparing sample means and proportions, survival analysis, and sample size/power calculations. The computer lab incorporates lecture content into practical application by introducing the statistical software package SPSS to describe and analyze data. Consent of instructor required. Two weeks, July 13–24, 2015. MTWTHF 8:30–11:15

IMED 655b, Writing Your First Big Grant Proposal Eugene Shapiro

In this term-long course, students gain intensive, practical experience in evaluating and preparing grant proposals, including introduction to NIH study section format. The course gives new clinical investigators the essential tools to design and to initiate their own proposals for obtaining grants to do research and to develop their own careers. The course is limited to students who plan to submit grant proposals (usually for a K-type

mentored career development award, but also for R-type awards). Attendance and active participation are required. Consent of instructor required. W 2–4

IMED 660c, Methods in Clinical Research, Part I Eugene Shapiro

IMED 661a, Methods in Clinical Research, Part II Eugene Shapiro

IMED 662b, Methods in Clinical Research, Part III Eugene Shapiro

This yearlong course, presented by the Robert Wood Johnson Clinical Scholars Program, presents in depth the methodologies used in patient-oriented research, including methods in biostatistics, clinical epidemiology, health services research, community-based participatory research, and health policy. Consent of instructor required.

IMED 680b, Topics in Human Investigation Joseph Craft, Karen Anderson

The course teaches students about the process through which novel therapeutics are designed, clinically tested, and approved for human use. It is divided into two main components, with the first devoted to moving a chemical agent from the bench to the clinic, and the second to outlining the objectives and methods of conducting clinical trials according to the FDA approval process. The first component describes aspects of structure-based drug design and offers insight into how the drug discovery process is conducted in the pharmaceutical industry. The format includes background lectures with discussions, labs, and computer tutorials. The background lectures include a historical perspective on drug discovery, the current paradigm, and important considerations for future success. The second component of the course provides students with knowledge of the basic tools of clinical investigation and how new drugs are tested in humans. A series of lectures and discussions provides an overview of the objectives, research strategies, and methods of conducting patient-oriented research, with a focus on design of trials to test therapeutics. Each student is required to participate (as an observer) in an HIC review, in addition to active participation in class. Consent of instructor required. TH 3–4:30

ITALIAN LANGUAGE AND LITERATURE

82-90 Wall Street, 203.432.0595

<http://italian.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Giuseppe Mazzotta

Director of Graduate Studies

Millicent Marcus (82-90 Wall St., Rm. 426, 203.432.0599)

Professors Luigi Ballerini (*Visiting* [Sp]), Millicent Marcus, Giuseppe Mazzotta, Jane Tylus (*Visiting* [F])

Associate Professor Angela Capodivacca

Assistant Professor Christiana Purdy Moudarres

Affiliated Faculty Francesco Casetti (*Film & Media Studies*), Roberto González Echevarría (*Spanish & Portuguese*), Gundula Kreuzer (*Music; on leave*), Alastair Minnis (*English*), David Quint (*English; on leave* [Sp]), Frank Snowden (*History; on leave* [F]), Gary Tomlinson (*Music; on leave* [Sp]), Francesca Trivellato (*History*)

Visiting faculty from other universities are regularly invited to teach courses in the department.

Fields of Study

The Italian department brings together several disciplines for the study of the Italian language and its literature. Although the primary emphasis is on a knowledge of the subject throughout the major historical periods, the department welcomes applicants who seek to integrate their interests in Italian with wider methodological concerns and discourses, such as history, rhetoric and critical theories, comparison with other literatures, the figurative arts, religious and philosophical studies, medieval, Renaissance, and modern studies, and the contemporary state of Italian writing. Interdepartmental work is therefore encouraged and students are accordingly given considerable freedom in planning their individual curriculum, once they have acquired a broad general knowledge of the field through course work and supplementary independent study.

Special Admissions Requirements

The department recognizes that good preparation in Italian literature is unusual at the college level and so suggests that applicants begin as soon as possible to acquire a broad general knowledge of the field through outside reading. At the end of the first and second years, students' progress is analyzed in an evaluative colloquium. Applicants who have had little or no experience in Italy are generally urged to do some work abroad during the course of their graduate program. For all students of Italian, a reading knowledge of Latin is essential. This may be acquired during the course of the first year, but applicants are reminded that it is difficult to schedule beginning language courses in addition to a

normal graduate program. Students are advised to acquire proficiency in the languages required for the doctoral program before matriculation.

Special Requirements for the Ph.D. Degree

Candidates must demonstrate a reading knowledge of a second Romance language, Latin, and a non-Romance language (German recommended). The Latin examination must be passed, usually before the beginning of the third term of study, and all language requirements must be fulfilled before the Ph.D. qualifying examination. Students are required to take two years of course work (as a rule sixteen courses), including two graduate-level term courses outside the Italian department. After consultation with the director of graduate studies (DGS), students who join the graduate program with an M.A. in hand may have up to four courses waived. The comprehensive qualifying examination must take place during the third year of residence. It is designed to demonstrate the student's mastery of the language and acquaintance with the literature. The examination, which is both written and oral, will be devised in consultation with members of the department. In the term following the qualifying examination, the student will discuss, in a session with the departmental faculty, a prospectus describing the subject and aims of the dissertation. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation requirements, including the prospectus. Admission to candidacy normally occurs by the end of the sixth term.

Teaching is considered to be an important component of the doctoral program in Italian. Students will be appointed as teaching fellows in the third and fourth years of study. Guidance in teaching is provided by the faculty of the department and specifically by the director of language instruction.

Combined Ph.D. Programs

ITALIAN AND FILM AND MEDIA STUDIES

The Department of Italian also offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. in Italian and Film and Media Studies. For further details, see Film and Media Studies. Applicants to the combined program must indicate on their application that they are applying both to Film and Media Studies and to Italian. All documentation within the application should include this information.

ITALIAN AND RENAISSANCE STUDIES

The Department of Italian also offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in Italian and Renaissance Studies.

Master's Degrees

Only candidates for the Ph.D. degree will be admitted to the program, but the department will, upon request, offer the M.A. and the M.Phil. degrees to students who have completed the general Graduate School requirements for those degrees (see Degree Requirements under Policies and Regulations). Additionally, students in Italian are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

Program materials are available upon request to the Director of Graduate Studies, Italian Language and Literature, Yale University, PO Box 208311, New Haven CT 06520-8311.

Courses

ITAL 530b, Dante in Translation Giuseppe Mazzotta

A critical reading of Dante's *Divine Comedy* and selections from the minor works, with an attempt to place Dante's work in the intellectual and social context of the late Middle Ages by relating literature to philosophical, theological, and political concerns.

TTH 1–2:15, 1 HTBA

ITAL 590a/CPLT 916a/FILM 830a, Literature into Film Millicent Marcus

We study a series of written works and their cinematic adaptations, considering first the texts in autonomous, literary terms, and then their transformation into audiovisual spectacles. In most cases we screen the film on Tuesday evening and do a comparative study in the Thursday class period, making extensive use of video clips to do close visual analysis of scenes in the light of their corresponding textual sources. Rather than develop a general theory of adaptation, we construct methodological approaches on an ad hoc basis, taking each instance of adaptation as a case study amenable to a variety of methodologies—psychoanalytic, feminist, ideological, generic, semiotic, and so forth. The class is conducted as a seminar, and active student participation is expected. There are two papers—one shorter one of a critical nature at midterm and a final research paper (approximately 15–20 pages). Films examined include (tentatively) Pasolini's *Medea* and *Decameron*, the Tavianis' *Padre padrone*, Visconti's *Death in Venice*, Rosi's *Three Brothers*, Salvatores's *I'm Not Afraid*, and De Sica's *Two Women*. Writing assignments comprise 75 percent of the final grade and class participation 25 percent. TH 3:30–5:20, screenings

T 7–10

ITAL 600a/CPLT 812a/HIST 563a/RNST 500a, Italian Renaissance David Quint

An introduction to the Renaissance in Italy, focused on reading and analyzing key texts.

TH 9:25–11:15

ITAL 647b, Ariosto and Machiavelli Angela Capodivacca

This course aims to challenge the Italian critic Francesco De Sanctis's description of Ariosto and Machiavelli as exemplary early modern authors confronted with a common set of crises, to which they propose antithetical coping strategies. For De Sanctis, Ariosto aims to maintain the status quo, even while bringing it to a culminating stage in its development; Machiavelli, instead, enacts a decisive break, a paradigm shift that anticipates a new era. By reading closely some of their defining works in dialogue with each other (*Orlando Furioso* and *Asino*; *Satire* and *Decennali*; *Cinque Canti* and *Principe*; *Suppositi* and *Mandragola*; *Lena* and *Clizia*), we can appreciate the complexities, textured approaches, and challenges that both Ariosto and Machiavelli pose to the modern age.

In Italian. M 3:30–5:20

ITAL 680a, Passions and Ideology of Romanticism Giuseppe Mazzotta

The dissolution of the neoclassical values and models of Europe experiences around the end of the eighteenth century inspired the new culture that has come to be known as Romanticism, which in Italy ranges from roughly 1790 to 1848. This course explores

the pivotal ideology of the new movement: the new aesthetics of Romanticism, ideas of political liberty, pursuit of the unification of the country, and, in general, the cultural mythology of Risorgimento (encompassing issues such as the cult of Rome, universal education, revolutionary ideals, new configurations of urban spaces, etc.). We discuss these questions by focusing on five leading figures of the time and reading with considerable attention their selected works: the tragedies by Vittorio Alfieri, the poetry and prose of Ugo Foscolo, selections by the lyrical poet/philosopher Giacomo Leopardi, the aesthetic and political writings of Giuseppe Mazzini, and essays, poetry, plays, and a novel by Alessandro Manzoni. In Italian. M 3:30–5:20

ITAL 691a/b, Directed Reading Millicent Marcus

1 HTBA

ITAL 781b, Boccaccio's *Decameron* Millicent Marcus

This course involves an in-depth study of Boccaccio's text as a journey in genre in which the writer surveys all the storytelling possibilities available to him in the current repertory of short narrative fiction – ranging from ennobling exempla to flamboyant fabliaux, including hagiography, aphorisms, romances, anecdotes, tragedies, and practical jokes – and self-consciously manipulates those forms to create a new literary space of astonishing variety, vitality, and subversive power. In the relationship between the elaborate frame-story and the embedded tales, theoretical issues of considerable contemporary interest emerge – questions of gendered discourse, narratology, structural pastiche, and reader response, among them. *The Decameron* will be read in Italian or in English for non-Italian readers. Close attention is paid to linguistic usage and rhetorical techniques in this foundational text of the vernacular prose tradition. In English. W 3:30–5:20

ITAL 940a, 1492: Before and After: Geographical and Linguistic Itineraries

Jane Tylus

Not simply the date of Columbus's landing, 1492 also marks Lorenzo de' Medici's death, the banishment of Jews from Spain and Sicily (and the arrival of hundreds of them in northern Italy, welcomed by Duke Ercole I d'Este and others), the election of a Borgia pope – Alexander VI, celebrated by Machiavelli – and the birth of Pietro Aretino. This course considers the shared cultural and religious history of Italy and Spain, even as it focuses largely on Italy's role as precursor. The Florentine Vespucci was the first to use the phrase “nuovo mondo,” and Columbus was inspired by the stories of Marco Polo and travels of Italian pilgrims to the Holy Land. While much of our focus is on pre-1492 Florence, we spend the latter part of the course thinking about aftermaths: Savonarola and Machiavelli, and the apocalyptic fervor that took over the late fifteenth century. In English. M 3:30–5:20

LAW

Sterling Law Building, 203.432.1696

www.law.yale.edu/phd

Ph.D.

Dean

Robert Post

Director of Graduate Studies

Daniel Markovits

Fields of Study

The three-year Ph.D. program prepares students who have earned a J.D. to enter law teaching or other careers that require a scholarly mastery of law. The program is designed to give students a broad foundation in the canonical texts and methods of legal scholarship and to support students in producing their own scholarship in the form of a dissertation. The program strongly encourages, but does not require, interdisciplinary approaches to the study of law.

Admissions Requirements

All applicants must have a J.D. from an accredited United States law school at the time they matriculate and begin the Ph.D. in Law program. Applicants must have taken the LSAT (Law School Admission Test). For other admissions requirements, please see the Ph.D. in Law program's Web site, www.law.yale.edu/phd.

Special Requirements for the Ph.D. Degree

Students will take up to six courses in their first year. A two-term proseminar on legal theory and methods is required of all students. Students may take other courses in the Law School or in other departments or schools at Yale University. Each student will have a faculty advisory committee, which will help select appropriate courses. The committee may waive up to four courses (subject to Graduate School approval). The proseminar may not be waived.

Each Ph.D. student will take two qualifying examinations. The first, administered during the first year, will be a written examination based on the proseminar. It will test the student's breadth of knowledge across the legal canon, including knowledge of canonical texts, methods, and principles. The second will be an oral examination that will be administered by the student's advisory committee at the end of the first summer. The oral examination will test whether the student has a sufficiently deep knowledge of the scholarship, theories, and methodologies relevant to the student's area of study. Both qualifying examinations will be graded on a pass/fail basis. If the student fails a qualifying examination, he or she may retake it the following term. In the interim, he or she will remain a student in good standing in the program.

After completion of the second qualifying examination, the student will assemble a dissertation committee and prepare a dissertation prospectus. Upon approval of the

prospectus, usually by the end of the third term, the student will devote the remaining time in the program to writing a dissertation, which may take the form of a traditional monograph or three publishable scholarly articles. The final dissertation must be approved by both the student's dissertation committee and the Ph.D. Policy Committee.

Graduate Research Assistant and Teaching Fellow Experience

As part of their training, Ph.D. students must complete two terms of teaching experience. There are a number of ways in which students can fulfill this requirement, which may vary by year. They include: (1) serving as a teaching assistant for a Law School course; (2) serving as a teaching fellow for a course in Yale College or another school at Yale; (3) co-teaching a class with a faculty member; and (4) in unusual situations, teaching their own class. In all cases, students engaged in teaching will have faculty supervision and feedback from their advisers.

Master's Degree

No master's degree is awarded en route to the Ph.D. in Law.

Program materials are available upon request to the Graduate Programs Office, Yale Law School, 127 Wall Street, New Haven CT 06511.

Courses

For Law School courses and their descriptions, see the Law School bulletin, online in both html and pdf versions at www.yale.edu/bulletin. For courses in other Schools at Yale University, please see their respective bulletins. Specific course selections will be approved by the student's advisory committee and by the director of graduate studies.

LINGUISTICS

370 Temple Street, Rm. 204, 203.432.2450

<http://ling.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Robert Frank

Director of Graduate Studies

Claire Bower

Professors Stephen Anderson, Robert Frank, Roberta Frank,* Laurence Horn (*Emeritus*), Frank Keil,* Zoltán Szabó (*on leave* [F]),* Petronella Van Deusen-Scholl (*Adjunct; Center for Language Study*), Raffaella Zanuttini

Associate Professors Claire Bower, Ashwini Deo, Maria Piñango, Kenneth Pugh (*Adjunct; Haskins Laboratory*)

Assistant Professor Ryan Bennett

Supporting faculty in other departments J. Joseph Errington (*Anthropology*)

*A joint appointment with primary affiliation in another department.

Fields of Study

Fields include phonetics, phonology, morphology, syntax, semantics, pragmatics, neuro- and psycholinguistics, computational linguistics, historical linguistics, and descriptive study of a variety of languages.

Special Requirements for the Ph.D. Degree

PROGRAM VISION

Linguistics at Yale has a long and storied history in traditional approaches to the study of language. Today the department takes a distinctively integrative and interdisciplinary approach in investigating the systems of knowledge that comprise our linguistic competence. We are convinced that an understanding of the human language faculty will arise only through the mutually informing relationship between formally explicit theories and insights from wide-ranging descriptive and experimental work. Thus at Yale, theoretical inquiry grounded in introspection proceeds in partnership with historical and comparative studies, fieldwork, experimental investigations of normal and impaired language processing, cognitive neuroscience, laboratory phonetic analysis, and computational and mathematical modeling. Students in the Ph.D. program are exposed to these methodological approaches, while receiving firm grounding in the traditional domains of linguistics. Ph.D. students participate in research in phonetics, phonology, morphology, syntax, semantics, pragmatics, and historical linguistics, and explore data from a wide variety of languages, both well studied and less well documented, with particular faculty expertise in the Slavic, Romance, Australian, and Indo-Aryan languages.

COURSE WORK

The conception of linguistics embraced by the Yale Ph.D. program requires that students receive training that is both deep in its coverage of areas of linguistic inquiry and broad in the range of methodological approaches. The course work requirements are designed to accomplish these complementary goals. This course work must include a set of core courses, designed to expose students to core theoretical ideas, together with courses exposing students to a range of methodologies in linguistic research.

During their first six terms, students must complete a minimum of fourteen term courses at the graduate level, of which seven must be completed during the first two terms, and twelve during the first four terms. During the initial two years of course work, students must receive at least three grades of H (= Honors). Two grades of F, or three of P or F, during the initial two-year period constitute grounds for dismissal from the Ph.D. program.

Core courses The core requirement ensures that students achieve expertise at the level of the following courses: LING 612, Linguistic Change; LING 620, General Phonetics; LING 635, Phonological Theory; LING 654, Syntax II; LING 663, Semantics; LING 680, Morphology.

The usual way to demonstrate this expertise will be to take all of these courses. Because several of these courses have prerequisites, students will typically need to take more basic courses in order to prepare themselves for the courses listed here. For example, LING 632, Introduction to Phonological Analysis, serves as a prerequisite for LING 635; and LING 653, Syntax I, is a prerequisite for LING 654; entering students usually take both of these prerequisite courses in the first term. However, students entering the Ph.D. program with sufficient background will be able to place out of antecedent courses. To facilitate placement, reading lists covering the material in the following basic courses will be provided, and students may request to take placement exams in areas in which their previous preparation is such that they could proceed directly to more advanced course work: LING 512, Historical Linguistics; LING 620, General Phonetics; LING 632, Introduction to Phonological Analysis; LING 653, Syntax I; LING 663, Semantics.

By August 1, entering students may send a request to the DGS for a placement exam in any of these five areas. The exams will be given during the week prior to the fall term. Passing an exam allows the student to place out of the corresponding course. Students placing out of courses are nonetheless expected to complete the same requirement of a minimum of fourteen term courses in the first three years.

Methodology courses For the methodology requirement, students must take three relevant courses. The following courses, which are offered regularly by the department, qualify, but other courses may as well, to be determined in consultation with the adviser and DGS: LING 600, Experimentation in Linguistics; LING 624, Formal Foundations of Linguistic Theories; LING 627, Language and Computation; LING 630, Techniques in Neurolinguistics; LING 631, Neurolinguistics; LING 641, Field Methods.

One of the methodology courses must be taken during the first year of the program, and two must be completed by the end of the second year.

Seminar courses Starting in year three and continuing until the prospectus is approved, students are expected to enroll in one seminar course for credit each term. Students should use such seminars as opportunities both for exploring new research areas and, especially, for pushing current research interests in novel directions.

RESEARCH

The primary focus of a Ph.D. program is independent research. In the course of our Ph.D. program, students will learn to carry out cutting-edge linguistic research, culminating in the completion of a dissertation. To help students in the transition from “consuming” to also “producing” linguistic research, there are a number of structures and requirements in place.

1. *Research adviser and first-year directed readings.* By the end of the first term of the program, students will need to find a department faculty member who is willing to serve as their research adviser. This choice should be made on the basis of compatibility of research interests and discussions between the student and faculty member. Starting from the spring term of the first year, the student will, with the help of his or her adviser, define a topic of research interest, meeting regularly (minimally once every three weeks) and carrying out a series of readings on this topic. Students are required to keep a research journal, describing their readings and how they fit in with work in the area, and chronicling the development of their thinking about the research topic. It is the faculty's expectation that this exploration will form the foundation for the research reported in the student's first qualifying paper (on which see below). Note however that the initial choice of research adviser is not set in stone: students who want to change their choice of topic or adviser for whatever reason may do so, so long as they are able to find a faculty member who is willing to serve as their adviser on a new topic. It is the student's responsibility to find a suitable adviser, and students are expected to have a faculty adviser at all times during their enrollment in the program.
2. *Portfolio.* At the conclusion of the first year of the program, students must submit to the faculty a portfolio of two research papers, in two distinct subfields from the following: syntax/semantics, phonology/phonetics, historical linguistics. These papers should demonstrate a student's mastery of the material in these fields to the level covered in the core courses in the area, as well as the ability to identify a significant research question and argue for a possible solution. In short, such papers should be at the level of an excellent term paper, representative of a student's best work during the first year of course work. The faculty do not expect students to write papers expressly for the portfolio. Rather, the portfolio will typically consist of versions of term papers from classes taken during the first year in the program, which are then lightly revised on the basis of comments received from the course instructors. The deadline for the submission of these papers is June 15.
3. *Annotated bibliography/research plan.* On the basis of the research journal begun during the first year in the program, students will prepare an annotated bibliography and research plan (ABRP) for their first qualifying paper. The ABRP, which should be approximately twenty pages in length, should lay out the question that the student wants to explore, motivating its importance through a presentation and synthesis

of relevant past literature on the topic. The deadline for submission of the ABRP is September 1.

4. *Qualifying papers.* Once the ABRP has been completed, the student will proceed to work on his or her qualifying papers (QPs). The goal of the QPs is to develop a student's ability to conduct independent research in linguistics at the level of current scholarship in two different areas of linguistics. The faculty expect a QP to report on the results of a substantial project, which are written up in a manner consistent with the standards of the field. Because the transition from student to scholar can be a difficult one, we have broken the process of writing the first QP into a number of smaller steps with specific deadlines for each (all during the second year of the program): (a) Students are required to make a presentation of their preliminary results in an appropriate venue (lab meeting, reading group, seminar, etc.) by no later than the end of the fall term. (b) Also by the end of the fall term, the student will send a request for a QP reader to the DGS. This request must include a title and abstract of the project, and may also request specific faculty members to be involved. On the basis of research area and faculty availability, the DGS will identify a faculty member other than the adviser to serve as a QP reader. This reader will be involved in the ultimate evaluation of the QP once it is completed. Because it is useful to get a range of feedback on one's work, we encourage students to make the best use of their QP reader by meeting with them and keeping them up to date on the progress of the project. (c) Students must submit a first draft of their QP to their adviser and reader no later than February 1. (d) Students must submit the final version of the paper to their adviser and reader by the first day of classes after Spring Break. (e) Once the QP has been submitted, the student must make an oral presentation of his or her work. This oral presentation may take place in the department (typically at a Friday Lunch Talk). Alternatively, the oral presentation requirement may be satisfied via a presentation at a professional conference, provided at least one member of the department faculty is in attendance.

Toward the end of the spring term of the second year, the student should begin to explore possible areas and advisers for the second QP, and must have identified an area and adviser by September 1 of the third year. Students must follow the same steps and deadlines listed above for the second QP, this time during the third year.

5. *Prospectus.* No later than the beginning of the seventh term, students must choose a dissertation topic and find a faculty member who is willing to serve as dissertation adviser. By the end of the seventh term, students will present a dissertation prospectus to the entire faculty. The prospectus should lay out clearly the student's proposed dissertation topic. It should motivate the importance of the topic, present the core idea of the proposed work together with its promise and viability, and demonstrate how this work fits into past research in the area. The prospectus should also identify a dissertation committee. The committee must include at least three faculty members (including the adviser), two of whom must be members of the Linguistics department. The prospectus document should be fifteen to twenty pages in length. After the document is submitted, the prospectus must be defended orally in front of the faculty. Upon successful completion of the prospectus defense, students advance to Ph.D. candidacy.

6. *Dissertation.* By the end of the eighth term, students must complete a chapter of the dissertation, together with a detailed outline of the dissertation and comprehensive bibliography. At this point (and at one-term intervals thereafter until the completion of the dissertation), the student will meet with the entire dissertation committee, to evaluate progress toward the dissertation. When this committee approves the chapter and dissertation outline, students are eligible for a University Dissertation Fellowship, which will support them in their fifth year of graduate study.

Students are expected to complete their dissertations by the end of the fifth year. At least one month prior to the dissertation filing date, the completed dissertation must be orally defended. This defense will typically involve a public presentation of the main results of the dissertation and oral examination by the members of the dissertation committee. Committee members must be given the completed dissertation no less than two weeks prior to the date of the defense.

FEEDBACK AND EVALUATION

At the conclusion of each academic year, all Ph.D. students will receive a written evaluation of their performance in the program, highlighting their strengths and accomplishments, as well as mentioning areas for improvement. Because of the fundamental role played by research in the Ph.D. program, we expect the completion of the research requirements to take highest priority. It is particularly important that students make satisfactory progress toward the first QP and complete all work by the deadlines given above. Failure to do so may result in being asked to leave the program.

LANGUAGE REQUIREMENT

Students are expected to exhibit some breadth in their knowledge of the languages of the world beyond those most commonly studied (including but not confined to Romance, Germanic, and Slavic languages) and those most similar in structure to the student's first language. LING 641, Field Methods, fulfills this requirement; alternatively, with the permission of the DGS, the student may instead take an appropriate language structure class, or one or more classes characterized as L3 or higher at Yale or the equivalent elsewhere. This requirement must be completed before the prospectus defense, when the student advances to Ph.D. candidacy.

TEACHING FELLOW/RESEARCH ASSISTANT REQUIREMENTS

The faculty regard teaching experience as an integral part of the graduate training program in Linguistics. All students are required to serve as Teaching Fellows for a minimum of two terms, usually beginning in the first term of the third year. In addition, students must complete two additional terms of assistantship. These may be either as a Teaching Fellow, or through participation in externally supported, supervised research as a Research Fellow. Research assistantships may be provided by the Linguistics faculty and by various Yale and Yale-affiliated units. Before accepting a research assistantship in fulfillment of this requirement, students must receive approval from the DGS. To be approved, a research assistantship must meet the following criteria:

1. It must be supervised by a Linguistics department faculty member or a faculty member from an affiliated unit, such as Haskins Laboratories or the Yale School of Medicine.

2. It must provide research experience that complements the student's academic plan of study.
3. It must provide at least ten hours of experience per week.

If an approved research assistantship is accepted that does not provide a stipend equal to the standard departmental stipend, a University Fellowship will be provided to augment the stipend so as to bring it up to the departmental standard.

Master's Degrees

M.Phil. Students in the doctoral program who complete all requirements for the Ph.D. apart from the submission of a completed dissertation (but including the presentation and successful defense of a dissertation prospectus) may petition for the M.Phil. degree.

M.A. (en route to the Ph.D.) Students in the doctoral program who successfully complete the course work, examinations, and work samples required by the end of the second year of graduate study (see above) may petition for the M.A. degree.

Program materials are available online at <http://ling.yale.edu>.

Courses

LING 500a/ENGL 500a, Introduction to Old English Language and Literature

Roberta Frank

The essentials of the language, some prose readings, and close study of several celebrated Old English poems. TTH 9–10:15

LING 501b/ENGL 501b, *Beowulf* and the Northern Heroic Tradition Roberta Frank

A close reading of the poem *Beowulf*, with some attention to shorter heroic poems. W 9:25–11:15

[LING 502a, Advanced Old English]

LING 510a^U, Introduction to Linguistics Jim Wood

The goals and methods of linguistics. Basic concepts in phonology, morphology, syntax, and semantics. Techniques of linguistic analysis and construction of linguistic models. Trends in modern linguistics. The relations of linguistics to psychology, logic, and other disciplines. MW 2:30–3:45

LING 512a^U, Historical Linguistics Claire Bown

Introduction to language change and language history. Types of change that a language undergoes over time: sound change, analogy, syntactic and semantic change, borrowing. Techniques for recovering earlier linguistic stages: philology, internal reconstruction, the comparative method. The role of language contact in language change. Evidence from language in prehistory. TTH 2:30–3:45, 1 HTBA

LING 515a^U/SKRT 510a^U, Introductory Sanskrit I David Brick

An introduction to Sanskrit language and grammar. Focus on learning to read and translate basic Sanskrit sentences in the Indian Devanagari script. No prior background in Sanskrit assumed. Credit only on completion of LING 525b/SKRT 520b. MTWTHF 9:25–10:15

LING 517a^U, Language and Mind Maria Piñango

Knowledge of language as a component of the mind: mental grammars, the nature and subdivisions of linguistic knowledge in connection with the brain. The logical problem of language acquisition. The “universal grammar hypothesis” according to which all humans have an innate ability to acquire language. The connection between language acquisition and general cognitive abilities. TTH 2:30–3:45

LING 525b^U/SKRT 520b^U, Introductory Sanskrit II David Brick

Continuation of LING 515a/SKRT 510a. Focus on the basics of Sanskrit grammar; readings from classical Sanskrit texts written in the Indian Devanagari script. Prerequisite: LING 515a/SKRT 510a. MTWTHF 9:25–10:15

LING 538a^U/SKRT 530a^U, Intermediate Sanskrit I David Brick

The first half of a two-term sequence aimed at helping students develop the skills necessary to read texts written in Sanskrit. Readings include selections from the *Hitopadesa*, *Kathasaritsagara*, *Mahabharata*, and *Bhagavadgita*. Prerequisite: LING 525b or equivalent. MTWTHF 10:30–11:20

[LING 540b^U/PSYC 506b, Computational Models in Cognitive Science]**[LING 546b^U, Language, Sex, and Gender]****LING 548b^U/SKRT 540b^U, Intermediate Sanskrit II** David Brick

Continuation of LING 538a, focusing on Sanskrit literature from the *kavya* genre. Readings include selections from the *Jatakamala* of Aryasura and the opening verses of Kalidasa's *Kumarasambhava*. Prerequisite: LING 538a or equivalent. MTWTHF 10:30–11:20

LING 564a, Principles of Language Teaching and Learning

Petronella Van Deusen-Scholl

Introduction to the basic principles of second-language acquisition theory, focusing on current perspectives from applied linguistics, sociolinguistics, and psycholinguistics. Topics include language teaching methodology, communicative and task-based approaches, learner variables, intercultural competence, and models of assessment. W 3:30–5:20

[LING 600b^U, Experimentation in Linguistics]**[LING 601a, Neurological Basis of Prosody and Meaning]****LING 611b, Grammatical Diversity in U.S. English** Raffaella Zanuttini

Study of differences among varieties of English spoken in North America, focusing in particular on morphosyntactic variation: double modals (“I might could go to the store”), negative inversion (“Don’t nobody want to ride the bus”), aspect marking (“Bruce be running,” “I done pushed it”), dramatic “so” (“I am *so* not going to study tonight”), personal datives (“I need me a new printer”), and positive “anymore” (“Gas is expensive anymore”). Emphasis on the grammatical richness and complexity of each variety. Debunking of the prejudice against examples of a natural grammatical diversity. Prerequisite: at least one 500-level course in Linguistics, or permission of the instructor. TH 9:25–11:15

LING 612b, Linguistic Change Stephen Anderson

Principles governing linguistic change in phonology and morphology. Status and independence of proposed mechanisms of change. Relations between the principles of historical change and universals of language. Systematic change as the basis of linguistic comparison; assessment of other attempts at establishing linguistic relatedness. Prerequisites: LING 512, 632, and 653. TTH 2:30–3:45

LING 619a^U, The Evolution of Language and Culture Claire Bower

Introduction to cultural and linguistic evolution. How diversity evolves; how innovations proceed through a community; who within a community drives change; how changes can be “undone” to reconstruct the past. Methods originally developed for studying evolutionary biology are applied to language and culture. T 9:25–11:15

LING 620b^U, General Phonetics Ryan Bennett

Investigation of possible ways of describing the speech sounds of human languages. Tools to be developed: acoustics and physiology of speech; computer synthesis of speech; practical exercises in producing and transcribing sounds. MW 1–2:15

[LING 621b^U, Topics in Phonetics: Intonation]

[LING 622b^U, Speech Timing]

LING 624a^U, Formal Foundations of Linguistic Theories

Study of formal systems that play an important role in the scientific study of language. Exploration of a range of mathematical structures and techniques; demonstrations of their application in theories of grammatical competence and performance including set theory, graphs and discrete structures, algebras, formal language, and automata theory. Evaluation of strengths and weaknesses of existing formal theories of linguistic knowledge. MW 1–2:15

LING 627b^U, Language and Computation

Design and analysis of computational models of language. Topics include finite state tools, computational morphology and phonology, grammar and parsing, lexical semantics, and the use of linguistic models in applied problems. Prerequisite: prior programming experience or permission of the instructor. TTH 1–2:15

LING 629a^U, Computational Linguistics II Robert Frank

Exploration of the computational and linguistic foundations of systems for natural language processing by computer. The course covers theoretical and practical issues involved in the construction of such systems, for problems including parsing, semantic interpretation, and machine translation. Prerequisite: LING 627. TTH 4–5:15

[LING 630b^U, Techniques in Neurolinguistics]

LING 631b^U, Neurolinguistics Maria Piñango

The study of language as a cognitive neuroscience. The interaction between linguistic theory and neurological evidence from brain damage, degenerative diseases (e.g., Alzheimer's disease), mental illness (e.g., schizophrenia), neuroimaging, and neurophysiology. The connection of language as a neurocognitive system to other systems such as memory and music. TTH 2:30–3:45

LING 632a^U, Introduction to Phonological Analysis Ryan Bennett

The structure of sound systems in particular languages. Phonemic and morphophonemic analysis, distinctive-feature theory, formulation of rules, and problems of rule interpretation. Emphasis on problem solving. Prerequisite: LING 510 or 620. TTH 1–2:15

LING 633b^U, The Literate Brain and Mind Kenneth Pugh

The neurobiological and cognitive foundations of reading and writing. Emerging research on gene-brain-behavior analyses of typically and atypically developing readers. The relationship between speech perception/production and individual differences in literacy learning; distributed brain circuits that support word reading, text comprehension, and second-language learning; the neurobiology of acquired and developmental reading and writing disorders. MW 9–10:15

LING 635b^U, Phonological Theory

Topics in the architecture of a theory of sound structure. Motivations for replacing a system of ordered rules with a system of ranked constraints. Optimality theory: universals, violability, constraint types, and their interactions. Interaction of phonology and morphology, as well as relationship of phonological theory to language acquisition and learnability. Opacity, lexical phonology, and serial versions of optimality theory. Prerequisite: LING 632 or permission of the instructor. TTH 4–5:15

[LING 636b^U, Articulatory Phonology]**LING 641a^U, Field Methods** Ryan Bennett

Principles of phonetics, phonology, morphology, syntax, and semantics applied to the collection and interpretation of novel linguistic data. Data are collected and analyzed by the class as a group, working directly with a speaker of a relatively undocumented language. TTH 4–5:15

[LING 642b^U, Topics in Phonology: Probability]**[LING 647b^U, The Indigenous Languages of Australia]****[LING 648b^U, Indo-Aryan Languages]****LING 651a^U, Learnability and Development**

An investigation of language learning from an integrated perspective of computational modeling and language development. The course explores the mutually informing relationships between computational modeling, linguistic theory, and language acquisition. Prerequisite: LING 632 or permission of the instructor; LING 627 recommended but not required. W 3:30–5:30

LING 653a^U, Syntax I Raffaella Zanuttini

An introduction to the syntax (sentence structure) of natural language. Introduction to generative syntactic theory and key theoretical concepts. Syntactic description and argumentation. Topics include phrase structure, transformations, and the role of the lexicon. MW 11:35–12:50

LING 654b^U, Syntax II Robert Frank

Recent developments in syntactic theory: government and binding, principles and parameters, and minimalist frameworks. In-depth examination of the basic modules

of grammar (lexicon, X-bar theory, theta-theory, case theory, movement theory). Comparison and critical evaluation of specific syntactic analyses. Prerequisite: LING 653. MW 11:35–12:50

[LING 655b^U, Subjects]

[LING 656a^U, Grammatical Relations]

[LING 657a^U, Classic Readings in Syntax]

[LING 660a^U, Topics in Syntax: The Mental Lexicon]

[LING 661a^U, Current Trends in Syntax]

LING 663a^U, Semantics Ashwini Deo

Introduction to truth-conditional compositional semantics. Set theory, first- and higher-order logic, and the lambda calculus as they relate to the study of natural language meaning. Some attention to analyzing the meanings of tense/aspect markers, adverbs, and modals. TTH 11:35–12:50

LING 664b^U, Semantics II Ashwini Deo

The model-theoretic approach to semantics and its treatment of core linguistic phenomena. Topics include quantification, tense/aspect/modality, context and interpretation, and the semantics-pragmatics interface. Prerequisite: LING 663 or permission of the instructor. TTH 1–2:15

[LING 666a^U, Cognitive Foundations of Meaning Change]

LING 667a^U, Aspectual Phenomena in Language Ashwini Deo

Introduction to core phenomena pertaining to lexical and grammatical aspect. Key aspectual properties and how they may be lexically present or derived through composition with arguments, adverbial modifiers, and grammatical aspect markers. The relation between aspectual properties and temporal reference. Prerequisite: after or concurrent with LING 663, or permission of the instructor. W 9:25–11:15

[LING 671a, Philosophy of Language]

LING 675b^U, Pragmatics Laurence Horn

Context-dependent aspects of meaning and inference. Speech act theory, presupposition, implicature. Role of pragmatics in the lexicon and in meaning change. The semantics-pragmatics distinction from different perspectives; the position of pragmatics in linguistic theory. TTH 11:35–12:50

LING 680b^U, Morphology Stephen Anderson

The theory of word structure within a formal grammar. Relation to other areas of grammar (syntax, phonology); basic units of word structure; types of morphology (inflection, derivation, compounding). Prerequisites: LING 632 and 653, or permission of the instructor. MW 2:30–3:45

[LING 710b, Predication]

[LING 720b, Origins of Sound Structure]

[LING 721a^U, Topics in Phonetics: Prosody]**LING 734b^U, Experimental Semantics** Maria Piñango

This seminar explores the structure of meaning as part of the human cognitive system. It asks the question of how language use — being serial and local in nature (occurs in real-time) — is able to package meaning, which by definition is multidimensional and atemporal. Addressing this question, the seminar explores two hypotheses: (1) that the constrained nature of linguistic semantic composition is intimately connected to the organizational properties of the human conceptual system, and (2) that such a connection (between linguistic semantics and conceptual structure) may ultimately be rooted in the dynamics of the memory system (episodic and semantic memory) and rational communication. Readings are drawn from the domains of neurocognition and cognitive psychology, model-theoretic and lexico-conceptual semantics, and pragmatics. Prerequisite: LING 510, 517, 663, or 761, or permission of the instructor. W 9:25–11:15

[LING 741b, Topics in Phonology: Prosody at the Interfaces]**LING 749b^U, Topics in Phonology: The Phonetics-Phonology Interface**

Ryan Bennett

The relationship between phonology (as the mental representation of speech) and phonetics (as the physical substance of speech). Universal and language-particular phonetics; phonetic knowledge as grammatical knowledge; phonetic detail in phonological representation and computation; unified vs. modular conceptions of the phonetics-phonology divide; how phonological systems are shaped by phonetic pressures; how phonetic patterning is shaped by phonological structure. Prerequisites: LING 620 and 635 or permission of the instructor. M 9:25–11:15

[LING 755b^U, Doubling in Syntax]**[LING 756b^U, The Syntax of Space]****[LING 760a, Compositional Syntax]****[LING 761a^U, Topics in Syntax: The Mental Lexicon]****[LING 762a^U, Imperatives and Politeness]****[LING 763a^U, Computational Models of Syntax]****LING 765b^U, Semantic Change** Ashwini Deo

Investigation of systematic change in the domain of semantics and pragmatics. Empirical phenomena include grammaticalization in the domain of tense, aspect, and modality markers, markers of location and possession, and negation, as well as intensifiers. Focus on reconciling grammaticalization and typological research with formal semantic studies. Prerequisite: LING 663 or permission of the instructor. W 2:30–4:20

[LING 772b, Meaning, Concepts, and Words]**[LING 777b, Case and Voice]****[LING 790a^U, Research Methods]**

LING 810a or b, Directed Research in Linguistics

By arrangement with faculty.

LING 812a or b, Directed Research in Historical Linguistics

By arrangement with faculty.

LING 820a or b, Directed Research in Computational Linguistics

By arrangement with faculty.

LING 830a or b, Directed Research in Neurolinguistics

By arrangement with faculty.

LING 840a or b, Directed Research in Phonetics

By arrangement with faculty.

LING 841a or b, Directed Research in Phonology

By arrangement with faculty.

LING 850a or b, Directed Research in Language Description

By arrangement with faculty.

LING 860a or b, Directed Research in Syntax

By arrangement with faculty.

LING 861a or b, Directed Research in Grammar

By arrangement with faculty.

LING 880a or b, Directed Research in Morphology

By arrangement with faculty.

LING 890a or b, Directed Research in Semantics

By arrangement with faculty.

MANAGEMENT

Edward P. Evans Hall, Rm. 5125A, 203.432.6002

<http://phd.som.yale.edu>

M.A., M.Phil., Ph.D.

Dean

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Director of Graduate Studies

Matthew Spiegel (Evans Hall, Rm. 4526, 203.432.6017, matthew.spiegel@yale.edu)

Professors Rick Antle, Nicholas Barberis, James Baron, Paul Bracken, Zhiwu Chen, Judith Chevalier, James Choi, Ravi Dhar, Jonathan Feinstein, Shane Frederick, William Goetzmann, Gary Gorton, Jonathan Ingersoll, Edward Kaplan, James Levinsohn, Andrew Metrick, A. Mushfiq Mobarak, Barry Nalebuff, Nathan Novemsky, Sharon Oster, Edieal Pinker, Benjamin Polak, Douglas Rae, K. Geert Rouwenhorst, Peter Schott, Fiona Scott-Morton, Subrata Sen, Robert Shiller, Jiwoong Shin, Edward Snyder, Olav Sorenson, Matthew Spiegel, K. Sudhir, Shyam Sunder, Arthur Swersey, Jacob Thomas, Heather Tookes, Amy Wrzesniewski, Gal Zauberman, X. Frank Zhang

Associate Professors Victoria Brescoll, Daylian Cain, Arthur Campbell, Rodrigo Canales, Lisa Kahn, Sang-Hyun Kim, Marissa King, Donald Lee, Justin Murfin

Participating Faculty from the School of Management Jason Abaluck, Saed Alizamir, Lorenzo Caliendo, Zoë Chance, Jason Dana, Joyee Deb, Florian Ederer, Constanca Esteves-Sorenson, Stanley Garstka, Jeffrey Garten, Roger Ibbotson, Ivana Katic, Ahmed Khwaja, Thomas Kolditz, Kalin Kolev, Balázs Kovács, Michael Kraus, Vineet Kumar, Alina Lerman, Vahideh Manshadi, Alan Moreira, Tyler Muir, George Newman, Marina Niessner, Amandine Ody-Brasier, Taly Reich, Jeffrey Sonnenfeld, Thomas Steffen, Kosuke Uetake, Victor Vroom, Kevin Williams

Fields of Study

Current fields include accounting, financial economics, marketing, operations, and organizations and management. Other applied management fields may be added in subsequent years.

Special Admissions Requirements

The GRE General Test or the GMAT Test is required by the Graduate School. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

Admission to candidacy will be based on the requirements of the Graduate School, which include the submission of a prospectus, duly approved by the faculty. Students must maintain a satisfactory grade record in the first year to remain in the program. Students shall, in addition, fulfill the requirements stated below. The process of admission to candidacy will include a faculty review of the student's entire academic record once all

requirements have been successfully completed, and must be concluded by the end of the third year.

CORE REQUIREMENTS

Two core courses are required of each student, General Economic Theory: Microeconomics, and Policy Modeling. During the first two years in the program, each student is required to complete a two-course sequence in empirical methods and a two-course sequence in one of the social sciences. Both of these sequences are usually taken during the first year. In addition, each student must prepare an original paper during his or her first summer and submit it to the faculty at the beginning of the third term in residence. Further, a second-year research paper must be submitted to the faculty by November 1 of the fifth term in residence.

IN-DEPTH REQUIREMENT

The in-depth requirement consists of five courses selected by the student with the consent of the area faculty and the director of graduate studies (DGS). This in-depth study is designed to focus on a particular research paradigm and to prepare the student for the dissertation. In addition, a qualifying examination prepared by the area faculty must be passed. Currently offered in-depth areas are accounting, financial economics, marketing, operations, and organizations and management.

BREADTH REQUIREMENT

The breadth requirement consists of one course that is outside of the student's depth area. The breadth course is selected by the student with the consent of the area faculty and the DGS.

COURSE REQUIREMENT

Each student must complete a total of fourteen courses, achieving a grade of Honors in at least two courses and a High Pass average in the other twelve courses.

TEACHING

Teaching is considered to be an important part of the doctoral program in Management. The program expects students to serve as teaching fellows, beginning in the spring term of the first year and continuing through the fifth year of study.

Master's Degrees

M.Phil. A student who is admitted to candidacy will be eligible to receive the M.Phil. upon the recommendation of the program's faculty and the approval of the Graduate School.

M.A. (en route to the Ph.D.) A student who completes the fourteen required courses with a High Pass average and the first-year paper will be eligible for the M.A. degree upon the recommendation of the program's faculty and the approval of the Graduate School.

Program materials are available upon request to the Director of Graduate Studies, Management, Yale University, PO Box 208200, New Haven CT 06520-8200. For information on the M.B.A. degree, please contact the admissions office at the School of Management.

Courses

MGMT 700a/MGT 910a, Seminar in Accounting Research I Rick Antle,
Shyam Sunder

Study of analytical modeling techniques in accounting research that covers topics such as performance measurement for incentives, the consequences of asymmetric information in economic relationships and the role of accounting therein, information sharing within and across firms, and the pricing of related-party transactions.

MGMT 702b, Seminar in Accounting Research III Alina Lerman

Study of empirical accounting research that covers topics such as valuation, pricing of accounting information, earnings management, reporting issues, accounting regulation, analyst forecasts, and auditing.

MGMT 703a, Experimental Economics Shyam Sunder

This term-long seminar introduces participants to experimental methods in economics research and conducts a survey of experimental results. Depending on the interests of the participants, we cover topics from auctions, asset markets, game theory, monetary theory, public goods, corporate finance, market microstructure, institutional economics, and so on. Participants are expected to design and conduct their own experiment, make class presentations, and write a term paper. Enrollment limited. Prerequisite: permission of the instructor.

MGMT 730, Organizations and Management Workshop Olav Sorenson

A series of presentations of their latest research by top organizations and Management scholars from the United States and abroad.

MGMT 731, Organizations and the Environment Marissa King

This course, offered every other year, reviews economic, psychological, and sociological perspectives of how organizations interact with one another. Sessions are generally organized around phenomena and jointly taught by two instructors from different perspectives.

MGMT 733, Theory Construction Olav Sorenson

Researchers in organizational behavior generally build their models in words (rather than with math). This course, offered every other year, focuses on how to build an internally consistent argument, and how to critique the logic of others' arguments.

MGMT 735b, Research Methods Balázs Kovács

This course is an introduction to the methods of the social sciences, focusing on issues raised by management research. The term "research methods" embraces all stages of the research process from how to identify and formulate interesting research problems to the design of appropriate research methods to investigate the chosen problem. This course is not intended to make students experts in research design or in any particular research method. Rather, it is a "sample platter" designed to acquaint them with the various approaches available. The course presumes that students will move on to more specialized and advanced methods courses as they develop clarity on the research questions that interest them and the methodologies appropriate to those questions and their field of study.

MGMT 736b, Inside the Organization James Baron, Amy Wrzesniewski**MGMT 740a/ECON 670a, Financial Economics I** Jonathan Ingersoll

Current issues in theoretical financial economics are addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area.

MGMT 741b/ECON 671b, Financial Economics II Alan Moreira

Continuation of MGMT 740a/ECON 670a.

MGMT 742a, Corporate Finance and Market Microstructure Matthew Spiegel

The course covers recent journal articles in the area of corporate finance, market microstructure, and asset pricing. Topics from corporate finance include optimal debt levels, bankruptcy, security design, initial public offerings, and mergers and acquisitions. The half of the course on market microstructure and asset pricing covers inventory models, trading with asymmetric information in the presence of strategic and competitive traders, the social welfare impact of informed trading, bid-ask spreads, and issues relating to delegated portfolio management.

MGMT 745b/ECON 672b, Behavioral Finance Nicholas Barberis

Much of modern financial economics works with models in which agents are rational, in that they maximize expected utility and use Bayes's law to update their beliefs. Behavioral finance is a large and active field that studies models in which some agents are less than fully rational. Such models have two building blocks: limits to arbitrage, which make it difficult for rational traders to undo the dislocations caused by less rational traders; and psychology, which catalogues the kinds of deviations from full rationality we might expect to see. We discuss these two topics and then consider a number of applications: asset pricing (the aggregate stock market and the cross-section of average returns); individual trading behavior; and corporate finance (security issuance, corporate investment, and mergers).

MGMT 746b/ECON 674b, Financial Crises Gary Gorton, Andrew Metrick

An elective doctoral course covering theoretical and empirical research on financial crises. The first half of the course focuses on general models of financial crises and historical episodes from the nineteenth and twentieth centuries. The second half of the course focuses on the recent financial crisis. Prerequisites: MGMT 740a and 741b and permission of the instructor.

MGMT 747b, Empirical Asset Pricing Tyler Muir

The class introduces the student to frontier research and methods in empirical asset pricing. It focuses on understanding the literature, surveying the current facts, and getting used to working with financial market data. Students go through empirical techniques, with an emphasis on how to use them in practice. This is not a theoretical econometrics course, though students should be familiar with running regressions and with basic time-series econometrics. The goal at the end of the class is for students to understand the frontier research in the field and what the main facts are. Topics include cross-sectional patterns in returns such as value and momentum, stock and bond return predictability, testing asset pricing models, the link between asset prices and the real economy, and the effect of the financial sector, market frictions, and financial crises on asset prices.

MGMT 748a, Empirical Corporate Finance Marina Niessner**MGMT 750b, Seminar in Marketing II** Jiwoong Shin

Current issues in marketing related to product planning, pricing, advertising, promotion, sales force management, channels of distribution, and marketing strategy are addressed through the study of state-of-the-art papers.

MGMT 751b, Quantitative Marketing K. Sudhir**MGMT 752a and b, Marketing Workshop** Kosuke Uetake

A series of presentations of their latest research by top marketing scholars from the United States and abroad.

[MGMT 753a/PSYC 553a, Behavioral Decision Making I: Choice]**MGMT 754a/PSYC 554a, Behavioral Decision Making II: Judgment**

Nathan Novemsky, Ravi Dhar

This seminar examines research on the psychology of judgment. We focus on identifying factors that influence various judgments and compare them to which factors individuals want and expect to drive their judgments. Topics of discussion include judgment heuristics and biases, confidence and calibration, issues of well-being including predictions and experiences, regret and counterfactuals. The goal is threefold: to foster a critical appreciation of existing research on individual judgment, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to existing knowledge. Students generally enroll from a variety of disciplines, including cognitive and social psychology, behavioral economics, finance, marketing, political science, medicine, and public health. T 4:10–7:10

MGMT 755b, Analytical Methods in Marketing Jiwoong Shin

This course provides exposure to the major streams of research regarding analytical methods in marketing strategy. The primary goal is to prepare students to read, appreciate, and critique the literature on analytical marketing models. The course is designed to provide a broad introduction to topics and industries that current researchers are studying as well as to expose students to a wide variety of techniques. Prerequisite: familiarity with microeconomic theory, basic game theory, and some econometrics.

MGMT 757b, Designing and Conducting Experimental Research Gal Zauberman**MGMT 758b, Foundations of Behavioral Economics** Shane Frederick

The course explores foundational topics in behavioral economics and discusses the dominant prescriptive models (which propose what decision makers should do) and descriptive models (which aim to describe what decision makers actually do). The course incorporates perspectives from economics, psychology, philosophy, decision theory, and finance, and engages long-standing debates about rational choice.

MGMT 780a and b, Ph.D. Student Research Workshop Subrata Sen**MGMT 781-01a and b, Accounting/Finance Workshop****MGMT 781-03a and b, Marketing Workshop**

MGMT 781-04a and b, Organizations and Management Workshop

MGMT 781-05a and b, Operations Workshop

MGMT 782-01a and b, Accounting Doctoral Student Pre-Workshop Seminar

MGMT 782-02a and b, Financial Economics Doctoral Student Pre-Workshop Seminar

MGMT 782-03a and b, Marketing Doctoral Student Pre-Workshop Seminar
Kosuke Uetake

MGMT 782-04a and b, Organizations and Management Doctoral Student Pre-Workshop Seminar

MGMT 782-05a and b, Operations Doctoral Student Pre-Workshop Seminar

MGMT 791a or b, Independent Reading and Research

By arrangement with individual faculty.

MGMT 792a or b, Predissertation Research

By arrangement with individual faculty.

MATHEMATICS

10 Hillhouse Avenue, 203.432.4172

<http://math.yale.edu>

M.S., M.Phil., Ph.D.

Chair

Igor Frenkel

Director of Graduate Studies

Hee Oh

Professors Andrew Casson, Ronald Coifman, Michael Frame (*Adjunct*), Igor Frenkel, Alexander Goncharov, Roger Howe, Peter Jones, Gil Kalai (*Adjunct*), Mikhail Kapranov, Alexander Lubotzky (*Adjunct*), Gregory Margulis, Yair Minsky, Vincent Moncrief (*Physics*), Hee Oh, David Pollard (*Statistics*), Nicholas Read (*Physics; Applied Physics*), Vladimir Rokhlin (*Computer Science*), Daniel Spielman (*Computer Science*), Van Vu, Gregg Zuckerman

Associate Professor Sam Payne

Fields of Study

Fields include real analysis, complex analysis, functional analysis, classical and modern harmonic analysis; linear and nonlinear partial differential equations; dynamical systems and ergodic theory; geometric analysis; kleinian groups, low dimensional topology and geometry; differential geometry; finite and infinite groups; geometric group theory; finite and infinite dimensional Lie algebras, Lie groups, and discrete subgroups; higher Teichmüller theory and cluster varieties; representation theory; automorphic forms, L-functions; algebraic number theory and algebraic geometry; derived algebraic geometry, and periods and motives; tropical algebraic geometry; tomography and integral geometry; mathematical physics, quantum field theory, relativity, numerical analysis; combinatorics and discrete mathematics.

Special Requirements for the Ph.D. Degree

All students are required to: (1) complete eight term courses at the graduate level, at least two with Honors grades; (2) pass qualifying examinations on their general mathematical knowledge; (3) submit a dissertation prospectus; (4) participate in the instruction of undergraduates; (5) be in residence for at least three years; and (6) complete a dissertation that clearly advances understanding of the subject it considers. The normal time for completion of the Ph.D. program is five years. Requirement (1) normally includes basic courses in algebra, analysis, and topology; these should be taken during the first year. A sequence of three qualifying examinations (algebra and number theory, real and complex analysis, topology) is offered each term, at intervals of about one month. All qualifying examinations must be taken by the end of the third term. The thesis is expected to be independent work, done under the guidance of an adviser. This adviser should be contacted not long after the student passes the qualifying examinations. A student is admitted to candidacy after completing requirements (1)–(5) and obtaining an adviser.

In addition to all other requirements, students must successfully complete MATH 991a, Ethical Conduct of Research, prior to the end of their first year of study. This requirement must be met prior to registering for a second year of study.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study.

Teaching

Teaching is regarded as an integral part of the graduate training process in Mathematics. We provide our graduate students the essential skills and experience without impeding their progress toward the Ph.D. degree. During the first two years, teaching duties are kept light, i.e., calculus or problem-solving tutors, and grading assignment in one term of each year. In the second year, graduate students attend a seminar devoted to issues of teaching that provides an opportunity to practice teaching. In the third, fourth, and fifth years of study, graduate students are responsible for teaching a section of calculus or the equivalent during one term of each year. Generally, Math requires four terms of teaching. The department allows students with outside support to request a waiver for one term. Teaching is a necessary requirement for the completion of the Ph.D. degree in Mathematics.

Master's Degrees

M.Phil. In addition to the Graduate School's Degree Requirements (see under Policies and Regulations), a student must undertake a reading program of at least two terms' duration in a specific significant area of mathematics under the supervision of a faculty adviser and demonstrate a command of the material studied during the reading period at a level sufficient for teaching and research.

M.S. (en route to the Ph.D.) A student must complete six term courses with at least one Honors grade, perform adequately on the general qualifying examination, and be in residence at least one year. The M.S. degree is conferred only en route to the Ph.D.; there is no separate master's program in Mathematics.

Program materials are available upon request to the Director of Graduate Studies, Mathematics Department, Yale University, PO Box 208283, New Haven CT 06520-8283.

Courses

MATH 500a^U, Modern Algebra I Sam Payne

MATH 501b^U, Modern Algebra II You Qi

MATH 515b^U, Intermediate Complex Analysis You Qi

MATH 520a^U, Measure Theory and Integration

MATH 525b^U, Introduction to Functional Analysis Giulio Tiozzo

MATH 544a, Introduction to Algebraic Topology I

MATH 545b, Introduction to Algebraic Topology II

MATH 573a^u, Algebraic Number Theory Alexander Goncharov

MATH 991a/CPSC 991a, Ethical Conduct of Research Vladimir Rokhlin

MECHANICAL ENGINEERING & MATERIALS SCIENCE

Dunham Laboratory, 203.432.4252

M.S., M.Phil., Ph.D.

Chair

Udo Schwarz

Director of Graduate Studies

Jan Schroers (jan.schroers@yale.edu)

Professors Charles Ahn, Ira Bernstein (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Shun-Ichiro Karato, Marshall Long, Brian Scassellati, Jan Schroers, Udo Schwarz, Mitchell Smooke

Associate Professors Aaron Dollar, Eric Dufresne, Sohrab Ismail-Beigi, Corey O'Hern, Nicholas Ouellette

Assistant Professors Eric Brown, Judy Cha, Madhusudhan Venkadesan

Lecturers Beth Anne Bennett, Kailasnath Purushothaman, Joseph Zinter

Fields of Study

Fluids and thermal sciences Dynamics and stability of drops and bubbles; dynamics of thin liquid films; macroscopic and particle-scale dynamics of emulsions, foams, and colloidal suspensions; electrospray theory and characterization; electrical propulsion applications; combustion and flames; computational methods for fluid dynamics and reacting flows; turbulence; particle tracking in fluid mechanics; laser diagnostics of reacting and nonreacting flows; and magnetohydrodynamics.

Soft matter/complex fluids Jamming and slow dynamics in gels, glasses, and granular materials; mechanical properties of soft and biological materials; and structure and dynamics of macromolecules. Several faculty in Mechanical Engineering are also affiliated with the Integrated Graduate Program in Physical and Engineering Biology (<http://peb.yale.edu>).

Materials science Studies of thin films; nanoscale effects on electronic properties of two-dimensional layered materials; amorphous metals and nanomaterials including nanocomposites, characterization of crystallization and other phase transformations; nanoimprinting; atomic-scale investigations of surface interactions and properties; classical and quantum nanomechanics; nanotribology; nanostructured energy applications; combinatorial materials science; and in situ transmission electron and scanning probe microscopy.

Robotics/mechatronics Machine and mechanism design; dynamics and control; robotic grasping and manipulation; human-machine interface; rehabilitation robotics; haptics; electromechanical energy conversion; biomechanics of human movement; and human-powered vehicles.

For admissions and degree requirements, and for course listings, see Engineering & Applied Science.

MEDIEVAL STUDIES

53 Wall Street, Rm. 310, 203.432.0672

<http://medieval.yale.edu>

M.A., M.Phil., Ph.D.

Chair and Director of Graduate Studies

R. Howard Bloch

Executive Committee R. Howard Bloch, Jessica Brantley (*on leave*), Ardis Butterfield (*on leave* [F]), Stephen Davis, Roberta Frank, Paul Freedman, Dimitri Gutas, Ivan Marcus (*on leave* [Sp]), Giuseppe Mazzotta, Alastair Minnis, Robert Nelson, Anders Winroth (*on leave* [F])

Faculty associated with the program R. Howard Bloch, Gerhard Böwering, Jessica Brantley (*on leave*), Ardis Butterfield (*on leave* [F]), Walter Cahn (*Emeritus*), Marcia Colish (*Emerita*), Ian Cornelius, Stephen Davis, Roberta Frank, Paul Freedman, Creighton Gilbert (*Emeritus*), Walter Goffart (*Emeritus*), Harvey Goldblatt, Frank Griffel (*on leave* [F]), Dimitri Gutas, Valerie Hansen, Peter Hawkins, Jacqueline Jung, Traugott Lawler (*Emeritus*), Ivan Marcus (*on leave* [Sp]), Vasileios Marinis, Giuseppe Mazzotta, Mary Miller, Alastair Minnis, Robert Nelson, Henry Parkes, Fred Robinson (*Emeritus*), Barbara Shailor, Denys Turner (*Emeritus*), Anders Winroth (*on leave* [F]), Mimi Hall Yiengpruksawan, Anna Zayaruznaya

Lecturers Adel Allouche, Raymond Clemens

Fields of Study

Fields in this interdisciplinary program include history, history of art, history of music, religious studies, languages and literatures, linguistics, and philosophy.

Special Admissions Requirements

The General Test of the GRE is required. A writing sample of ten to twenty pages should be included with the application.

Special Requirements for the Ph.D. Degree

Languages required are Latin, French, and German. Latin may be replaced with Arabic, Greek, or Hebrew when appropriate. Proficiency in Latin, Arabic, Greek, and Hebrew is tested with an examination administered and evaluated by the program during the first term. Proficiency in French and German is demonstrated by passing the departmental examinations and should be achieved by the third term. Students will design their programs in close contact with the director of graduate studies (DGS). During the first two years students take fourteen term courses, and must receive an Honors grade in at least four term courses the first year. Students take an oral examination, usually in the fifth term, on a set of three topics worked out in consultation with the DGS. Then, having nurtured a topic of particular interest, the student submits a dissertation prospectus that must be approved by the end of the third year. Upon completion of all predissertation

requirements, including the prospectus, students are admitted to candidacy for the Ph.D. degree. What remains, then, is the writing, submission, and approval of the dissertation during the final two years.

Students in Medieval Studies participate in the Teaching Fellows Program in the third and fourth years.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. In addition to its own Ph.D. degree, the program offers an M.Phil. in Medieval Studies for students enrolled in the Ph.D. programs of relevant humanities departments. Requirements for this degree are (1) eight courses in the medieval area, six of which must be from departments other than that in which the student is enrolled (two of these will normally be the Medieval Studies interdisciplinary seminar and a course in either research methodology or paleography); (2) proficiency in Latin, Arabic, Greek, or Hebrew as tested by an examination administered and evaluated by the department; and (3) an oral examination. The M.Phil. in Medieval Studies requires an additional year of course work in addition to the requirements of the student's home department. Fellowships that provide support for this extra year are available from the Graduate School; application forms may be obtained from the program in Medieval Studies.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program may qualify for the M.A. degree upon satisfactory completion of three terms of course work. Minimum requirements include a High Pass average in courses and passing the examination in Latin, Arabic, Greek, or Hebrew.

Terminal Master's Degree Program For the terminal master's degree, students must take at least eight term courses with a general average of High Pass and with at least one term course of Honors. Two languages are required: Latin, Arabic, Greek, or Hebrew, and either French or German. No thesis is required.

Courses

MDVL 550a or b, Directed Reading

By arrangement with faculty.

MDVL 555b/HIST 542b, Law in Medieval Europe Anders Winroth

This seminar explores the creation in the twelfth and thirteenth centuries of a sophisticated system of law, the European Common Law (*ius commune*). All late medieval and much modern legislation is based on this legal system. The course focuses on its roots in the Roman law of Emperor Justinian and in ecclesiastical legislation. We also study the influence of the *ius commune* on national and local medieval law. The emphasis is on using law in historical research and in learning the technical skills necessary. Prerequisite: facility with Latin or another relevant medieval language. M 9:25–11:15

MICROBIOLOGY

Boyer Center for Molecular Medicine 354A, 203.737.1087

<http://medicine.yale.edu/micropath>

M.S., M.Phil., Ph.D.

Director of Graduate Studies

Walther Mothes

Student Services Officer

Riold Furtuna

Professors Serap Aksoy (*Public Health; on leave [F]*), Susan Baserga (*Therapeutic Radiology*), Michael Cappello (*Pediatrics*), Yung-chi Cheng (*Pharmacology*), Daniel DiMaio (*Genetics*), Erol Fikrig (*Internal Medicine*), Durland Fish (*Public Health*), Jorge Galán (*Microbial Pathogenesis*), Eduardo Groisman (*Microbial Pathogenesis*), Jo Handelsman (*Molecular, Cellular & Developmental Biology*), Christine Jacobs-Wagner (*Molecular, Cellular & Developmental Biology*), K. Brooks Low (*Therapeutic Radiology*), Diane McMahon-Pratt (*Public Health*), I. George Miller (*Pediatrics*), John Rose (*Pathology*), Craig Roy (*Microbial Pathogenesis*), Nancy Ruddle (*Public Health*), Clifford Slayman (*Cellular & Molecular Physiology*), Dieter Söll (*Molecular Biophysics & Biochemistry*), William Summers (*Therapeutic Radiology; on leave [Sp]*), Joann Sweasy (*Therapeutic Radiology*), Peter Tattersall (*Laboratory Medicine*), Paul Turner (*Ecology & Evolutionary Biology; on leave*), Sandra Wolin (*Cell Biology; Molecular Biophysics & Biochemistry*)

Associate Professors Choukri Ben Mamoun (*Internal Medicine*), Akiko Iwasaki (*Public Health*), Susan Kaech (*Immunobiology*), Barbara Kazmierczak (*Internal Medicine*), Brett Lindenbach (*Microbial Pathogenesis*), John MacMicking (*Microbial Pathogenesis*), Walther Mothes (*Microbial Pathogenesis*), Melinda Pettigrew (*Public Health*), Richard Sutton (*Internal Medicine*), Jeffrey Townsend (*Public Health; on leave [F]*), Christian Tschudi (*Public Health; Internal Medicine*), Yong Xiong (*Molecular Biophysics & Biochemistry*)

Assistant Professors Murat Acar (*Molecular, Cellular, & Developmental Biology*), Andrew Goodman (*Microbial Pathogenesis*), Priti Kumar (*Internal Medicine*)

Fields of Study

The Graduate Program in Microbiology is a multidepartmental, interdisciplinary Ph.D. program in training and research in the study of microorganisms and their effects on their hosts. The faculty of the program share the view that understanding the biology of microorganisms requires a multidisciplinary approach; therefore, the Microbiology graduate program emphasizes the need for strong multidisciplinary training. The program is designed to provide individualized education in modern microbiology and to prepare students for independent careers in research and teaching. Students can specialize in various areas, including bacteriology, virology, microbe-host interactions, microbial pathogenesis, cell biology and immunobiology of microbial infections, microbial genetics and physiology, parasitology, and microbial ecology and evolution.

Special Admissions Requirements

To enter the Ph.D. program, students apply to the Microbiology track within the inter-departmental graduate program in the Biological and Biomedical Sciences. An undergraduate major in biology, biophysics, biochemistry, microbiology, or molecular biology is recommended; the GRE General Test or MCAT is required.

Special Requirements for the Ph.D. Degree

Course work generally occupies the first two years of study. Each student, together with a faculty committee, outlines a course of study tailored to the individual's background and career goals. A program of course work may include general microbiology, virology, parasitology, and/or microbial genetics, as well as complementary courses in such areas as epidemiology, cell biology, immunology, biochemistry, and genetics. Students must take a minimum of four courses, three of which have to be in microbiology. Students must receive a grade of Honors in two full-term courses. All students participate in three laboratory rotations (MBIO 670, 671, and 672), with different faculty members, in their area of interest. Laboratory rotations ensure that students quickly become familiar with the variety of research opportunities available in the program. An individualized qualifying exam on topics selected by each student, in consultation with the faculty, is given before the end of the second year. Students then undertake an original research project under the direct supervision of a faculty member. In the third year, students organize their thesis committee and prepare a dissertation prospectus, which is submitted to the Graduate School after approval by their committee. The student is then admitted to candidacy. Upon completion of the student's research project, the Ph.D. requirements conclude with the writing of a dissertation and its oral defense.

An important aspect of graduate training in microbiology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school levels. Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Students are not permitted to teach during their first year.

In addition to all other requirements, students must successfully complete IBIO 601b, Fundamentals of Research: Responsible Conduct of Research, prior to the end of their first year of study. This requirement must be met prior to registering for a second year of study. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

Master's Degree

M.Phil. The M.Phil. degree can be awarded to Ph.D. students who have been admitted to candidacy. See Degree Requirements under Policies and Regulations.

M.S. This degree may only be granted to students who are withdrawing from the Ph.D. program. To be eligible for this degree, a student must have completed at least four graduate-level term courses at Yale, chosen from a number of main courses including, but not limited to: MBIO 685a, MBIO 685b, IBIO 530a, CBIO 602a, MBIO 734a, PATH 690a, MBIO 680a, and MBIO 547b. Two of these four courses must be related to microbiology.

Students must have received at least one Honors or two High Pass grades. In addition, students must have received a Satisfactory grade in the following eight courses: IBIO 601b, MBIO 701a,b, MBIO 702a,b, MBIO 670, MBIO 671, and MBIO 672.

Courses

MBIO 547b/EMD 547b, Vaccines: Concepts in Biology Diane McMahon-Pratt

Vaccines are one of the major public health preventive approaches for disease control. However, the underlying biological mechanisms are still being explored, with the purpose of designing better and more efficacious vaccines. Vaccine-preventable diseases now include many infectious diseases as well as cancer. This course briefly reviews the immunological basis of immunity to infection and disease. Topics then include the basic science underlying vaccine development, current vaccine-preventable diseases, as well as vaccines under development. MW 10–11:20

MBIO 670, 671, 672, Laboratory Rotations Walter Mothes

Rotation in three laboratories. Required of all first-year graduate students.

MBIO 680a/EMD 680a, Advanced Topics in Tropical Parasitic Diseases

Diane McMahon-Pratt

An introductory topic-based course in modern parasitology. For each topic there is an introductory lecture followed by a journal club-like discussion session of relevant papers selected from the literature. The course provides an introduction to basic biological concepts of parasitic eukaryotes causing diseases in humans. Topics include strategies used by parasitic eukaryotes to establish infections in the host and approaches to disease control, through either chemotherapy, vaccines, or genomics. In addition, emphasis is placed on evaluating the quality and limitation of scientific publications and developing skills in scientific communication. Prerequisite: permission of the instructor. MW 10:45–12

MBIO 685b, Molecular Mechanisms of Microbial Pathogenesis John MacMicking

This interdisciplinary course focuses on current topics related to host-pathogen interactions. Each week a lecture is given on the topic, followed by student presentations of seminal papers in the field. All participants are required to present a paper. TTH 10–11:30

MBIO 686a, Bacterial Determinants of Pathogenesis Eduardo Groisman

The course provides an introduction to basic principles in bacterial pathogenesis. Topics focus on the bacterial determinants mediating infection and pathogenesis, as well as strategies to prevent and treat diseases. Each week a lecture is given on the topic, followed by student presentations of seminal papers in the field. All participants are required to present a paper. TTH 10–11:30

MBIO 701a,b, Research in Progress Walter Mothes

All students, beginning in their third year, are required to present their research once a year at the Graduate Student Research in Progress. These presentations are intended to give each student practice in presenting his or her own work before a sympathetic but critical audience and to familiarize the faculty with the research. M 2

MBIO 702a,b, Microbiology Seminar Series Walter Mothes

All students are required to attend all Microbiology seminars scheduled throughout the academic year. Microbiologists from around the world are invited to describe their research. TH 4

MBIO 734a/GENE 734a/MB&B 734a, Molecular Biology of Animal Viruses

Brett Lindenbach

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions.

MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

301 J. W. Gibbs Laboratories, 203.432.5662

<http://medicine.yale.edu/mbb>

M.S., M.Phil., Ph.D.

Chair

Mark Hochstrasser

Director of Graduate Studies

Mark Solomon [F] (301 JWG, 203.432.5662, nessie.stewart@yale.edu)

Yong Xiong [Sp] (301 JWG, 203.432.5662, nessie.stewart@yale.edu)

Professors Karen Anderson (*Pharmacology*), Susan Baserga, Ronald Breaker (*Molecular, Cellular & Developmental Biology*), Gary Brudvig (*Chemistry*), Enrique De La Cruz, Daniel DiMaio (*Genetics; Therapeutic Radiology*), Donald Engelman, Alan Garen, Mark Gerstein, Nigel Grindley (*Emeritus*), Mark Hochstrasser, Jonathon Howard, Anthony Koleske, William Konigsberg, Peter Lengyel (*Emeritus*), J. Patrick Loria (*Chemistry*), I. George Miller (*Pediatric Infectious Diseases; Public Health*), Andrew Miranker, Peter Moore (*Emeritus, Chemistry*), Karla Neugebauer, Thomas Pollard (*Molecular, Cellular & Developmental Biology; on leave* [F]), Lynne Regan, David Schatz (*Immunobiology*), Robert Shulman (*Emeritus*), Dieter Söll, Mark Solomon, Joan Steitz, Thomas Steitz, Scott Strobel, William Summers (*Therapeutic Radiology; on leave* [Sp]), Patrick Sung, Kenneth Williams (*Adjunct; Research*), Sandra Wolin (*Cell Biology*)

Associate Professors Michael Koelle, Christian Schlieker, Corey Wilson (*Chemical & Environmental Engineering*), Yong Xiong

Assistant Professors Richard Baxter (*Chemistry*), Julien Berro, Nikhil Malvankar, Matthew Simon, Charles Sindelar

Fields of Study

The principal objective of members of the department is to understand living systems at the molecular level. Laboratories in MB&B focus on a diverse collection of problems in biology. Some specialize in the study of DNA dynamics, including replication, recombination, transposition, and/or functional genomics. Others focus on transcriptional regulation, from individual transcription factors to the control of lymphocyte activation, the interferon response, and organismal development. Other groups study RNA catalysis, RNA-protein interactions, and ribonucleoproteins including spliceosomes and the ribosome. Additionally there are those that emphasize protein folding and design, transmembrane signaling, and control of the cell cycle. Structural and computational biology is a strong component of many of these research efforts.

Special Admissions Requirements

Courses in introductory biology, general chemistry, organic chemistry, physical chemistry, mathematics through differential equations, and one year of physics with calculus are required for admission. Biochemistry is strongly recommended. Applicants must take the GRE General Test, which is preferred, or the MCAT.

To enter the Ph.D. program, students apply to an interest-based track within the interdepartmental graduate program in the Biological and Biomedical Sciences.

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to one of four tracks of the Biological and Biomedical Sciences program may simultaneously apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Special Requirements for the Ph.D. Degree

All first-year students (except M.D./Ph.D.) perform three laboratory rotations (MB&B 650, Lab Rotation for First-Year Students). All students are required to take, for credit, seven one-term science courses. To obtain the desired breadth and depth of education, students are required to take two courses in molecular biophysics (one of which must be MB&B 720a), one course in critical thinking (MB&B 730a), and one course in molecular biology (MB&B 743 is recommended but not required). The second credit in molecular biophysics and the molecular biology credit may be satisfied by taking appropriate courses from an approved list available each fall. Additional courses, chosen from within MB&B or from related graduate programs, should form a coherent background for the general area in which the student expects to do dissertation research. All students also attend MB&B 676b, Responsible Conduct of Research. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students. Students with an extensive background in biochemistry or biophysics are permitted to substitute advanced courses for the introductory courses. There is no foreign language requirement. The student's research committee (see below) makes the final decision concerning the number and selection of courses required of each student. All students are required to assist in teaching two terms at the TF-10 level during their graduate careers, usually during the second and third years. The student selects a research adviser by the end of the second term of residence. At that time two additional faculty members are chosen to form a research committee, with the total committee including at least two members of MB&B. Students are required to meet with this committee in the spring of years two and three, and in both the fall and spring of subsequent years. The qualifying examination, usually taken in the fall of the second year, is an oral defense of two short written research proposals, one in the same area as the student's thesis research and one in a different area; the three-member oral examination committee usually includes at least one of the two members of the research committee excluding the thesis adviser. Requirements for admission to candidacy, which usually takes place after four terms of residence, include (1) completion of course requirements; (2) completion of the qualifying examination; (3) certification of the student's research abilities by vote of the faculty upon recommendation from the student's research committee; and (4) submission of a brief prospectus of the proposed thesis research. Completion of the teaching requirement is not required for admission to candidacy. Once final drafts of the thesis chapters have

been approved by the research committee, the student presents a dissertation seminar to the entire department, and only afterward may the thesis be submitted. Students must have written at least one first-author paper that is submitted, in press, or published by the time of the thesis seminar.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study; see Degree Requirements under Policies and Regulations. Students must also maintain an overall High Pass average. Student progress toward these goals is reviewed at the ends of the first and second terms.

M.D./Ph.D. Students

M.D./Ph.D. students must satisfy the requirements listed above for the Ph.D. with the following modifications: Laboratory rotations are not required but are available. Assisting in teaching of one lecture course is required. Students are required to take MB&B 800a as part of their medical curriculum in addition to the two courses in molecular biophysics described above. Students with weak backgrounds in molecular biology will need to take MB&B 743b.

Master's Degree

M.Phil. See Degree Requirements under Policies and Regulations. Awarded only to students admitted to candidacy who are continuing for the Ph.D. Students need not have completed their teaching requirement to receive the M.Phil. Students are not admitted for this degree.

M.S. Students are not admitted for this degree. It may only be awarded to a student in the Ph.D. program who is in good standing upon completion of at least two terms of graduate study and who will not continue in the Ph.D. program. A student must receive grades of Pass or higher in at least five courses approved by the DGS as counting toward a graduate degree, exclusive of seminars or research. Students must have taken at least ten courses. A typical schedule would consist of six traditional courses, two terms of MB&B 650, and one term each of MB&B 675a and 676b. A student must also meet the Graduate School's Honors requirement for the Ph.D. program and maintain a High Pass average.

More detailed program materials are available upon request to the Director of Graduate Admissions, Department of Molecular Biophysics and Biochemistry, Yale University, PO Box 208114, New Haven CT 06520-8114.

Courses

MB&B 500b^U/MCDB 500b^U, Biochemistry Ronald Breaker, Nicole Clay

An introduction to the biochemistry of animals, plants, and microorganisms, emphasizing the relations of chemical principles and structure to the evolution and regulation of living systems.

MB&B 517b3/ENAS 517b/MCDB 517b3/PHYS 517b3, Methods and Logic in Interdisciplinary Research Lynne Regan, Julien Berro, Enrique De La Cruz, Eric Dufresne, Thierry Emonet, Paul Forscher, Jonathon Howard, Megan King, Simon Mochrie, Corey O'Hern, Thomas Pollard, Yongli Zhang, and staff

This half-term PEB class is intended to introduce students to integrated approaches to research. Each week, the first of two sessions is student-led, while the second session is led by faculty with complementary expertise and discusses papers that use different approaches to the same topic (for example, physical and biological or experiment and theory). Counts as 0.5 credit toward MB&B graduate course requirements. MW 5–7

MB&B 520a1, Boot Camp Biology Lynne Regan and staff

An intensive introduction to biological nomenclature, systems, processes, and techniques for graduate students with previous backgrounds in non-biological fields including physics, engineering, and computer science who wish to perform graduate research in the biological sciences. Counts as 0.5 credit toward MB&B graduate course requirements.

MB&B 523b/ENAS 541b/PHYS 523b, Biological Physics Corey O'Hern

An introduction to the physics of several important biological phenomena including transport in the cell cytoplasm, protein folding, DNA packaging, and thermodynamics of protein binding and aggregation. The material and approach are positioned at the interface of the physical and biological sciences, and involve significant computation. This course teaches the basics of computer programming necessary for quantitative studies of biological systems. We start with the foundations of programming in MATLAB. During the course, students perform sophisticated data analyses, view and analyze protein structures, and perform Monte Carlo and molecular dynamics simulations. No prior programming experience is needed. TTH 1–2:15

MB&B 545b^U, Methods and Logic in Molecular Biology Mark Hochstrasser, Jonathon Howard, Dieter Söll

An examination of fundamental concepts in molecular biology through analysis of landmark papers. Development of skills in reading the primary scientific literature and in critical thinking. Open only to MB&B students pursuing the B.S./M.S. degree. TH 7–8:50

MB&B 562a^U/AMTH 765a/CB&B 562a/ENAS 561a/MCDB 562a^U/PHYS 562a, Dynamical Systems in Biology Damon Clark, Jonathon Howard

This course covers advanced topics in computational biology. How do cells compute, how do they count and tell time, how do they oscillate and generate spatial patterns? Topics include time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form; mechanics of cell shape and motion; spatially heterogeneous processes; diffusion. Prerequisite: MCDB 561b or equivalent, or a 200-level biology course, or permission of the instructor. TTH 2:30–3:45

MB&B 570a or 571b, Intensive Research for B.S./M.S. Candidates Michael Koelle, Mark Solomon

Required of students in the joint B.S./M.S. program with Yale College.

MB&B 591b/ENAS 991b/MCDB 591b/PHYS 991b, Integrated Workshop

Lynne Regan, Joerg Bewersdorf, Stuart Campbell, Kathryn Miller-Jensen,
Simon Mochrie, Corey O'Hern

This required course for students in PEB involves hands-on laboratory modules with students working in pairs. A biology student is paired with a physics or engineering student; a computation/theory student is paired with an experimental student. The modules are devised so that a range of skills is acquired, and students learn from each other. Modules are hosted in faculty laboratories. Receives no course credit toward MB&B graduate course requirements. With permission of the DGS, can be used by PEB students to replace the third rotation of MB&B 650b but will receive no separate course credit toward MB&B course requirements.

MB&B 600a^U, Principles of Biochemistry I Michael Koelle, Matthew Simon

Discussion of the physical, structural, and functional properties of proteins, lipids, and carbohydrates, three major classes of molecules in living organisms. Energy metabolism, hormone signaling, and muscle contraction as examples of complex biological processes whose underlying mechanisms can be understood by identifying and analyzing the molecules responsible for these phenomena. TTH 11:35–12:50

MB&B 601b^U, Principles of Biochemistry II Christian Schlieker, Karla Neugebauer

A continuation of MB&B 600a that considers the chemistry and metabolism of nucleic acids, the mechanism and regulation of protein and nucleic acid synthesis, and selected topics in macromolecular biochemistry. TTH 11:35–12:50

MB&B 602a/CBIO 602a/MCDB 602a, Molecular Cell Biology Sandra Wolin,

Michael Caplan, Topher Carroll, Craig Crews, Pietro De Camilli, Megan King,
Thomas Melia, In-Hyun Park, James Rothman, Martin Schwartz

A comprehensive introduction to the molecular and mechanistic aspects of cell biology for graduate students in all programs. Emphasizes fundamental issues of cellular organization, regulation, biogenesis, and function at the molecular level. MW 1:45–3

MB&B 625a^U/GENE 625a/MCDB 625a^U, Basic Concepts of Genetic Analysis

Tian Xu and staff

The universal principles of genetic analysis in eukaryotes are discussed in lectures. Students also read a small selection of primary papers illustrating the very best of genetic analysis and dissect them in detail in the discussion sections. While other Yale graduate molecular genetics courses emphasize molecular biology, this course focuses on the concepts and logic underlying modern genetic analysis. MW 11:35–12:50

MB&B 630b/MCDB 630b, Biochemical and Biophysical Approaches in Molecular and Cellular Biology Thomas Pollard and staff

This graduate course introduces the theory and application of biochemical and biophysical methods to study the structure and function of biological macromolecules. The course considers the basic physical chemistry required in cellular and molecular biology but does not require a previous course in physical chemistry. One class per week is a lecture introducing a topic. The second class is a discussion of one or two research papers utilizing those methods. Does not count for graduate course credit for BBSB graduate students. TTH 2:30–3:45

MB&B 635a^U/ENAS 518a, Mathematical Methods in Biophysics Yong Xiong, Julien Berro

Applied mathematical methods relevant to analysis and interpretation of biophysical and biochemical data are covered. Students apply these methods (statistics and error analysis, differential equations, linear algebra, and Fourier transforms) to analyze data from research groups in MB&B. Prerequisites: MATH 120 (or equivalent) and MB&B 600a (or equivalent), or permission of the instructors. MWF 10:30–11:20

MB&B 650, Lab Rotation for First-Year Students

Required of all first-year BBSB graduate students. Credit for full year only.

MB&B 675a, Seminar for First-Year Students Karla Neugebauer, Yong Xiong

Required of all first-year BBSB graduate students.

MB&B 676b, Responsible Conduct of Research Susan Baserga and staff

Designed for students who are beginning to do scientific research. The course seeks to describe some of the basic features of life in contemporary research and some of the personal and professional issues that researchers encounter in their work. Approximately six sessions, run in a seminar/discussion format. Required of all first-year BBSB graduate students. F 3

MB&B 710b4/C&MP 710b, Electron Cryo-Microscopy for Protein Structure

Determination Fred Sigworth, Charles Sindelar

Understanding cellular function requires structural and biochemical studies at an ever-increasing level of complexity. The course is an introduction to the concepts and applications of high-resolution electron cryo-microscopy. This rapidly emerging new technique is the only method that allows biological macromolecules to be studied at all levels of resolution from cellular organization to near atomic detail. Counts as 0.5 credit toward MB&B graduate course requirements. TTH 9–10:15

[**MB&B 715b/ENAS 705b/PHYS 705b, Numerical Simulations of Liquids**]

MB&B 720a^U, Macromolecular Structure and Biophysical Analysis

Andrew Miranker, Jonathon Howard, Yong Xiong

An in-depth analysis of macromolecular structure and its elucidation using modern methods of structural biology and biochemistry. Topics include architectural arrangements of proteins, RNA, and DNA; practical methods in structural analysis; and an introduction to diffraction and NMR. Prerequisites: physical chemistry (may be taken concurrently) and biochemistry. TTH 11:35–12:50

[**MB&B 722b3, Optical Spectroscopy of Biomolecules**]

MB&B 723a2, Macromolecular Interactions: Atoms to Networks Lynne Regan

The course examines the nature of the intricate networks of macromolecular interactions that underlie the functioning of every cell and the modern biophysical methods available for their study across multiple length, time, and energy scales. Counts as 0.5 credit toward MB&B graduate course requirements. MW 11:35–12:50

MB&B 730a, Methods and Logic in Molecular Biology Matthew Simon,

Anthony Koleske, Christian Schlieker

The course examines fundamental concepts in molecular biology through intense critical analysis of the primary literature. The objective is to develop primary literature reading and critical thinking skills. Required of and open only to first-year graduate students in BBSB. TTH 5–8

MB&B 734a/GENE 734a/MBIO 734a, Molecular Biology of Animal Viruses

Brett Lindenbach

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions.

MB&B 743b^U/GENE 743b/MCDB 743b, Advanced Eukaryotic Molecular Biology

Mark Hochstrasser, Karla Neugebauer, Matthew Simon, Patrick Sung

Selected topics in transcriptional control, regulation of chromatin structure, mRNA processing, mRNA stability, RNA interference, translation, protein degradation, DNA replication, DNA repair, site-specific DNA recombination, somatic hypermutation. Prerequisite: biochemistry or permission of the instructor. TTH 11:35–12:50

MB&B 749a^U/GENE 749a, Medical Impact of Basic Science Joan Steitz,I. George Miller, Andrew Miranker, Karla Neugebauer, David Schatz,
Thomas Steitz, and staff

Consideration of examples of recent discoveries in basic science that have elucidated the molecular origins of disease or that have suggested new therapies for disease. Emphasis is placed on the fundamental principles on which these advances rely. Reading is from the primary scientific and medical literature, with emphasis on developing the ability to read this literature critically. Aimed primarily at undergraduates. Prerequisite: biochemistry or permission of the instructor. May not be taken by MB&B B.S./MS. students for graduate course credit. MW 1–2:15

MB&B 750a2, Biological Membranes Donald Engelman

Biological membranes and their resident proteins are essential for cellular function; yet comparatively little is known about their structure and dynamics. This class provides an introduction to the biochemistry and biophysics of lipids, lipid bilayers, and lipid-derived second messengers. In addition, structural as well as functional aspects of the different classes of membrane proteins are discussed along with an outline of experimental approaches used to achieve an understanding of membrane protein structure and function at a molecular level. Counts as 0.5 credit toward MB&B graduate course requirements. Prerequisite: biochemistry. MW 9–10:15

MB&B 752b^U/CB&B 752b/CPSC 752b^U/MCDB 752b^U, Bioinformatics: Practical**Application of Simulation and Data Mining** Mark Gerstein

Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. Specific topics to be covered include sequence alignment, large-scale processing, next-generation sequencing data, comparative genomics, phylogenetics, biological database design, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, normalization

of microarray data, mining of functional genomics data sets, and machine-learning approaches to data integration. Prerequisites: biochemistry and calculus, or permission of the instructor. MW 1–2:15

MB&B 753b3, Bioinformatics: Practical Application of Data Mining Mark Gerstein
Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. This module focuses on the first of these techniques, data mining. Specific topics to be covered include sequence alignment, comparative genomics and phylogenetics, biological databases, microarray normalization, and machine-learning approaches to data integration. Counts as 0.5 credit toward MB&B graduate course requirements. Prerequisites: biochemistry and calculus, or permission of the instructor. MW 1–2:15

MB&B 754b4, Bioinformatics: Practical Application of Simulation Mark Gerstein
Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. This module focuses on the second of these techniques, simulation. Specific topics to be covered include geometric analysis of protein structure, molecular-dynamics simulation, and biological networks. Counts as 0.5 credit toward MB&B graduate course requirements. Prerequisites: biochemistry and calculus, or permission of the instructor. MW 1–2:15

MB&B 760a2, Principles of Macromolecular Crystallography Thomas Steitz,
Yong Xiong

Rigorous introduction to the principles of macromolecular crystallography, aimed at students who are planning to carry out structural studies involving X-ray crystallography or who want to obtain in-depth knowledge for critical analysis of published crystal structures. Counts as 0.5 credit toward MB&B graduate course requirements. Prerequisites: physical chemistry and biochemistry. TTH 9–10:15

[**MB&B 761b4, X-ray Crystallography Workshop**]

MB&B 800a, Advanced Topics in Molecular Medicine Susan Baserga,
William Konigsberg, and staff

The seminar, which covers topics in the molecular mechanisms of disease, illustrates timely issues in areas such as protein chemistry and enzymology, intermediary metabolism, nucleic acid biochemistry, gene expression, and virology. M.D. and M.D./Ph.D. students only. Prerequisite: biochemistry (may be taken concurrently).

MB&B 900a or 901b, Reading Course in Biophysics

Directed reading course in biophysics. Term paper required. By arrangement with faculty. Open only to graduate students in MB&B. Please see syllabus for additional requirements.

MB&B 902a or 903b, Reading Course in Molecular Genetics

Directed reading course in molecular genetics. Term paper required. By arrangement with faculty. Open only to graduate students in MB&B. Please see syllabus for additional requirements.

MB&B 904a or 905b, Reading Course in Biochemistry

Directed reading course in biochemistry. Term paper required. By arrangement with faculty. Open only to graduate students in MB&B. Please see syllabus for additional requirements.

MOLECULAR, CELLULAR, AND DEVELOPMENTAL BIOLOGY

Kline Biology Tower, 203.432.3538

<http://mcdb.yale.edu>

M.S., Ph.D.

Chair

Ronald Breaker

Director of Graduate Studies

Scott Holley

Professors Ronald Breaker, John Carlson (*on leave* [Sp]), Lynn Cooley (*Genetics*), Craig Crews, Stephen Dellaporta, Paul Forscher, Jo Handelsman, Mark Hochstrasser (*Molecular Biophysics & Biochemistry*), Vivian Irish, Akiko Iwasaki (*Immunobiology*), Christine Jacobs-Wagner, Douglas Kankel, Paula Kavathas (*Immunobiology*), Haig Keshishian, Perry Miller (*Anesthesiology*), Mark Mooseker, Jon Morrow (*Pathology*), Thomas Pollard (*on leave* [F]), Anna Pyle, Joel Rosenbaum, Alanna Schepartz (*Chemistry*), Hugh Taylor (*Obstetrics/Gynecology*), Robert Wyman

Associate Professors Scott Holley, Thierry Emonet, Weimin Zhong (*on leave* [F])

Assistant Professors Murat Acar, Shirin Bahmanyar, Damon Clark, Nicole Clay, Joshua Gendron, Valerie Horsley, Farren Isaacs, Kathryn Miller-Jensen (*Biomedical Engineering*), Matthew Rodeheffer (*Comparative Medicine*)

Fields of Study

Research in genetics and molecular biology encompasses studies of non-coding RNAs, genome engineering, genome organization and regulation, gene dosage, aging, bacterial chemotaxis, and oncogenes. Research topics in cellular and developmental biology include structure and dynamics of the cell cytoskeleton, molecular motors, chemical biology, the nuclear envelope, microRNAs, limb regeneration, developmental biomechanics, vertebral column development, neural and epidermal stem cells, and systems developmental biology. Research in neurobiology focuses on growth cone motility, neural differentiation, synaptogenesis, visual perception, olfaction, and the formation of topographic maps. A Special Program in Plant Sciences provides research and training in the molecular genetics of flowering, epigenetics, the physiology of hormone action, pathogen defense systems, sex determination, and the circadian clock. Because of the breadth of the department, students are provided with unique opportunities for interdisciplinary studies.

To enter the Ph.D. program, students apply to the Molecular Cell Biology, Genetics, and Development (MCGD) track within the interdepartmental graduate program in the Biological and Biomedical Sciences (BBS).

Special Admissions Requirements

Applicants should have obtained training in the structure, development, and physiology of organisms; the structure, biochemistry, and physiology of cells; genetics; elementary calculus; elementary physics; inorganic and organic chemistry; statistics or advanced mathematics. Lack of some prerequisites can be made up in the first year of graduate study. Students having different science training, such as degrees in chemistry, physics, or engineering, are encouraged to apply. In addition to the GRE General test, a Subject Test is recommended, preferably in Biology, or in Biochemistry, Cell and Molecular Biology.

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to the MCGD track of the Biological and Biomedical Sciences program may simultaneously apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Special Requirements for the Ph.D. Degree

Each student is expected to take at least three courses, in addition to MCDB 900/901, First-Year Introduction to Research. With the help of a faculty committee, each student will plan a specific program that includes appropriate courses, seminars, laboratory rotations, and independent reading fitted to individual needs and career goals. There is no foreign language requirement. Late in the third term of study, the student meets with a faculty committee to decide on a preliminary topic for dissertation work and to define the research areas in which he or she is expected to demonstrate competence. By the end of the fall term of the second year, each student prepares a dissertation prospectus outlining the research proposed for the Ph.D. The student is admitted to candidacy for the Ph.D. when (1) the prospectus is accepted by a dissertation committee of faculty members, (2) the committee is satisfied that the student has demonstrated competence in the areas necessary to conduct the proposed work, and (3) the other requirements indicated above are fulfilled. The student should complete the requirements for admission to candidacy no later than the end of the second year of study. Following admission to candidacy, each student is required to meet with his/her thesis advisory committee at least once a year. The remaining requirements include completion of the dissertation research, presentation and defense of the dissertation, and submission of acceptable copies of the dissertation to the Graduate School and to the Kline Science Library. All students are required to teach in two one-term (TF-10) courses during their Ph.D. study, but not during the first year of graduate study. Requirements for M.D./Ph.D. students are the same as for Ph.D. students, except that a single term of teaching is required. During their first year of study, students must successfully complete MCDB 901b, First-Year Introduction to Research – Ethics: Scientific Integrity in Biomedical Research, to fulfill the responsible conduct and ethics in research requirement. This requirement must be met prior to registering for a second year of study. Further, in the fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see Course and Honors Requirements under Policies and Regulations).

Master's Degree

M.S. (en route to the Ph.D.) The minimum requirements for award of the Master of Science degree are (1) two academic years registered and in residence full-time in the graduate program; (2) satisfactory completion of the first two years of study and research leading to the Ph.D.; this requirement may be met either (a) by completing a minimum of five courses with an average grade of High Pass and at least one Honors grade, in addition to satisfactory performance in MCDB 900/901, or (b) by (i) successfully completing at least three courses with an average grade of High Pass and at least one Honors grade, (ii) satisfactory performance in MCDB 900/901, and (iii) passing the prospectus examination; (3) recommendation by the department for award of the degree, subject to final review and approval by the appropriate degree committee. No courses that were taken prior to matriculation in the graduate program, or in Yale College, or in summer programs may be applied toward these requirements.

Prospective applicants are encouraged to visit the BBS Web site (<http://bbs.yale.edu>), MCGD Track.

Courses

MCDB 500b^U/MB&B 500b^U, Biochemistry Ronald Breaker, Nicole Clay

An introduction to the biochemistry of animals, plants, and microorganisms, emphasizing the relations of chemical principles and structure to the evolution and regulation of living systems.

MCDB 517b3/ENAS 517b/MB&B 517b3/PHYS 517b3, Methods and Logic in

Interdisciplinary Research Lynne Regan, Julien Berro, Enrique De La Cruz, Eric Dufresne, Thierry Emonet, Paul Forscher, Jonathon Howard, Megan King, Simon Mochrie, Corey O'Hern, Thomas Pollard, Yongli Zhang, and staff

This half-term PEB class is intended to introduce students to integrated approaches to research. Each week, the first of two sessions is student-led, while the second session is led by faculty with complementary expertise and discusses papers that use different approaches to the same topic (for example, physical and biological or experiment and theory). Counts as 0.5 credit toward graduate course requirements. MW 5–7

MCDB 530a^U/IBIO 530a, Biology of the Immune System Carla Rothlin,

Peter Cresswell, Kevan Herold, Akiko Iwasaki, Susan Kaeck, Ruslan Medzhitov, Eric Meffre, João Pereira, David Schatz

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens. Immunologic memory and vaccines. Human diseases including allergy, autoimmunity, cancer, immunodeficiency, HIV/AIDS. MWF 9:25–10:15

MCDB 550a^U/C&MP 550a^U/ENAS 550a^U/PHAR 550a, Physiological Systems

Emile Boulpaep, W. Mark Saltzman

The course develops a foundation in human physiology by examining the homeostasis of vital parameters within the body, and the biophysical properties of cells, tissues, and organs. Basic concepts in cell and membrane physiology are synthesized through exploring the function of skeletal, smooth, and cardiac muscle. The physical basis of blood flow, mechanisms of vascular exchange, cardiac performance, and regulation of overall circulatory function are discussed. Respiratory physiology explores the mechanics of ventilation, gas diffusion, and acid-base balance. Renal physiology examines the formation and composition of urine and the regulation of electrolyte, fluid, and acid-base balance. Organs of the digestive system are discussed from the perspective of substrate metabolism and energy balance. Hormonal regulation is applied to metabolic control and to calcium, water, and electrolyte balance. The biology of nerve cells is addressed with emphasis on synaptic transmission and simple neuronal circuits within the central nervous system. The special senses are considered in the framework of sensory transduction. Weekly discussion sections provide a forum for in-depth exploration of topics. Graduate students evaluate research findings through literature review and weekly meetings with the instructor. MWF 9:25–10:15

[MCDB 551a^U, Experimental Strategies in Molecular Cell Biology][MCDB 555a^U, Molecular Basis of Development]**MCDB 560b^U/C&MP 560b^U/ENAS 570b^U/PHAR 560b, Cellular and Molecular****Physiology: Molecular Machines in Human Disease** Emile Boulpaep,
Fred Sigworth

The course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiological levels. Students learn about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed on the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiological behaviors of cells and tissues are also stressed. Molecular motors are introduced and their mechanical relationship to cell function is explored. Students read papers from the scientific literature that establish the connections between mutations in genes encoding membrane proteins and a wide variety of human genetic diseases. MWF 9:25–10:15

MCDB 561b^U/PHYS 561b, Introduction to Dynamical Systems in Biology

Thierry Emonet, Kathryn Miller-Jensen

An introduction to quantitative methods in biology, emphasizing numerical and analytical modeling of static and dynamical processes in biological systems. Topics include switches, cooperativity, regulatory networks, feedback, signal transduction, and noise in gene expression. For each topic, the relationship between system architecture, dynamical properties, and behavior is examined. Includes instruction in the use of MATLAB and the transformation of a cartoon model into a mathematical model that can be simulated in a computer. Students read and present research papers from the primary literature. Prerequisite: PHYS 170 or equivalent, or permission of the instructor. TTH 2:30–3:45

MCDB 562a^U/AMTH 765a/CB&B 562a/ENAS 561a/MB&B 562a^U/PHYS 562a,**Dynamical Systems in Biology** Damon Clark, Jonathon Howard

This course covers advanced topics in computational biology. How do cells compute, how do they count and tell time, how do they oscillate and generate spatial patterns? Topics include time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form; mechanics of cell shape and motion; spatially heterogeneous processes; diffusion. Prerequisite: MCDB 561b or equivalent, or a 200-level biology course, or permission of the instructor. TTH 2:30–3:45

MCDB 570b^U, Biotechnology Craig Crews, Kenneth Nelson, Joseph Wolenski

The principles and applications of cellular, molecular, and chemical techniques that advance biotechnology. Topics include the most recent tools and strategies used by government agencies, industrial labs, and academic research to adapt biological and chemical compounds as medical treatments, as industrial agents, or for the further study of biological systems. MW 11:35–12:50

MCDB 585b, Research in MCDB for B.S./M.S. Candidates

A two-credit course taken in the third-to-last term (typically the second term of the junior year). At the start of this course, each student forms a committee composed of his or her adviser and two faculty members that meets to discuss the research project. At the end of this course, students complete a detailed prospectus describing their thesis project and the work completed thus far. The committee evaluates an oral and written presentation of this prospectus; the evaluation determines whether the student may continue in the combined program. Required of students in the joint B.S./M.S. program with Yale College.

MCDB 591b/ENAS 991b/MB&B 591b/PHYS 991b, Integrated Workshop

Lynne Regan, Joerg Bewersdorf, Stuart Campbell, Kathryn Miller-Jensen,
Simon Mochrie, Corey O'Hern

This required course for students in PEB involves hands-on laboratory modules with students working in pairs. A biology student is paired with a physics or engineering student; a computation/theory student is paired with an experimental student. The modules are devised so that a range of skills is acquired, and students learn from each other. Modules are hosted in faculty laboratories.

MCDB 595, Intensive Research in MCDB for B.S./M.S. Candidates

A four-credit, yearlong course (two credits each term) that is similar to MCDB 495 and is taken during the senior year. During this course, students give an oral presentation describing their work. At the end of the course, a student is expected to present his or her work to the department in the form of a poster presentation. In addition, the student is expected to give an oral thesis defense, followed by a comprehensive examination of the thesis conducted by the thesis committee. Upon successful completion of this examination, as well as other requirements, the student is awarded the combined B.S./M.S. degree. Required of students in the joint B.S./M.S. program with Yale College.

MCDB 602a/CBIO 602a/MB&B 602a, Molecular Cell Biology Sandra Wolin,
Michael Caplan, Topher Carroll, Craig Crews, Pietro De Camilli, Megan King,
Thomas Melia, In-Hyun Park, James Rothman, Martin Schwartz

A comprehensive introduction to the molecular and mechanistic aspects of cell biology for graduate students in all programs. Emphasizes fundamental issues of cellular organization, regulation, biogenesis, and function at the molecular level. MW 1:45–3

MCDB 603a/CBIO 603a, Seminar in Molecular Cell Biology Megan King,
Michael Caplan, Topher Carroll, Craig Crews, Pietro De Camilli, Thomas Melia,
James Rothman, Martin Schwartz, Sandra Wolin

A graduate-level seminar course in modern cell biology. The class is devoted to the reading and critical evaluation of classical and current papers. The topics are coordinated with the MCDB 602a lecture schedule. Thus, concurrent enrollment in MCDB 602a is required. TH 9–11

MCDB 625a^U/GENE 625a/MB&B 625a^U, Basic Concepts of Genetic Analysis

Tian Xu and staff

The universal principles of genetic analysis in eukaryotes are discussed in lectures. Students also read a small selection of primary papers illustrating the very best of genetic analysis and dissect them in detail in the discussion sections. While other Yale graduate molecular genetics courses emphasize molecular biology, this course focuses on the concepts and logic underlying modern genetic analysis. MW 11:35–12:50

MCDB 630b/MB&B 630b, Biochemical and Biophysical Approaches in Molecular and Cellular Biology Thomas Pollard and staff

This graduate course introduces the theory and application of biochemical and biophysical methods to study the structure and function of biological macromolecules. The course considers the basic physical chemistry required in cellular and molecular biology but does not require a previous course in physical chemistry. One class per week is a lecture introducing a topic. The second class is a discussion of one or two research papers utilizing those methods. TTH 2:30–3:45

MCDB 660a/F&ES 654a, Structure, Function, and Development of Trees and Other Vascular Plants Graeme Berlyn

Morphogenesis and adaptation of vascular plants considered from seed formation and germination to maturity. Physiological and developmental processes associated with structural changes in response to environment discussed from both a phylogenetic and an adaptive point of view. MW 4–5:20

MCDB 670a, Advanced Seminar in Biochemistry and Genetics Ronald Breaker,
Stephen Dellaporta

New aspects of the molecular biology of RNA, ribonucleoproteins, and prions. Topics include the localization and function of RNA and ribonucleoproteins; siRNAs and microRNAs; the role of RNA in dosage compensation, chromosome silencing, and gene regulation; novel ribozymes and RNA technology; prions. Discussion; involvement and attendance are required. W 1:30–3:30

MCDB 677b/GENE 777b, Mechanisms of Development Valerie Reinke and staff

An advanced course on mechanisms of animal development focusing on the genetic specification of cell organization and identity during embryogenesis and somatic differentiation. The use of evolutionarily conserved signaling pathways to carry out developmental decisions in a range of animals is highlighted. Course work includes student participation in critical analysis of primary literature and a research proposal term paper. W 1:30–3:20

MCDB 720a^U/NBIO 720a/NSCI 720a, Neurobiology Haig Keshishian, Paul Forscher
Examination of the excitability of the nerve cell membrane as a starting point for the study of molecular, cellular, and intercellular mechanisms underlying the generation and control of behavior. MWF 11:35–12:25

MCDB 721La^U, Laboratory for Neurobiology Haig Keshishian, Robert Wyman
Optional laboratory. Introduction to the neurosciences. Projects include the study of neuronal excitability, sensory transduction, CNS function, synaptic physiology, and neuroanatomy. T or W 1:30–5:30

[MCDB 730b^U/NSCI 502b, Cell Biology of the Neuron]

[MCDB 735b^U/NBIO 504b/NSCI 504b, Seminar in Brain Development and Plasticity]

MCDB 743b/GENE 743b/MB&B 743b^U, Advanced Eukaryotic Molecular Biology

Mark Hochstrasser, Karla Neugebauer, Matthew Simon, Patrick Sung
Selected topics in transcriptional control, regulation of chromatin structure, mRNA processing, mRNA stability, RNA interference, translation, protein degradation, DNA replication, DNA repair, site-specific DNA recombination, somatic hypermutation. Prerequisite: biochemistry or permission of the instructor. TTH 11:35–12:50

MCDB 752b^U/CB&B 752b/CPSC 752b^U/MB&B 752b^U, Bioinformatics: Practical

Application of Simulation and Data Mining Mark Gerstein
Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. Specific topics to be covered include sequence alignment, large-scale processing, next-generation sequencing data, comparative genomics, phylogenetics, biological database design, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, normalization of microarray data, mining of functional genomics data sets, and machine-learning approaches to data integration. Prerequisites: biochemistry and calculus, or permission of the instructor. MW 1–2:15

MCDB 861b^U, The Human Population Explosion Robert Wyman

Global population growth in its human, environmental, and economic dimensions. Social and sociobiological bases of reproductive behavior. Population history and the causes of demographic change. Interactions of population growth with economic development and environmental alteration. Overconsumption of the rich and overpopulation of the poor. “Hot-button” issues surrounding fertility: contraception, abortion, infanticide, and the status of women.

MCDB 900a/CBIO 900a/GENE 900a, First-Year Introduction to Research – Grant Writing and Scientific Communication Scott Holley and faculty

Grant writing, scientific communication, and laboratory rotation talks for Molecular Cell Biology, Genetics, and Development track students. M 4–5:30

MCDB 901b/CBIO 901b/GENE 901b, First-Year Introduction to Research – Ethics: Scientific Integrity in Biomedical Research Joerg Bewersdorf

Ethics and laboratory rotation talks for Molecular Cell Biology, Genetics, and Development track students. TH 4:15–5:45

MCDB 902a and 903b, Advanced Graduate Seminar Matthew Rodeheffer, Damon Clark

The course allows students to hone their presentation skills through yearly presentation of their dissertation work. Two students each give thirty-minute presentations in each class session. Students are required to present every year beginning in their third year in the MCDB program. Each MCDB graduate student is expected to attend at least 80 percent of the class sessions. Two faculty members co-direct the course, attend the seminars, and provide feedback to the students.

MCDB 911a/CBIO 911a/GENE 911a, First Laboratory Rotation Craig Crews

First laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

MCDB 912b/CBIO 912b/GENE 912b, Second Laboratory Rotation Craig Crews

Second laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

MCDB 913b/CBIO 913b/GENE 913b, Third Laboratory Rotation Craig Crews

Third laboratory rotation for Molecular Cell Biology, Genetics, and Development track students.

MCDB 950a and 951b, Second-Year Research

By arrangement with faculty.

MUSIC

Stoeckel Hall, 203.432.2986
<http://yalemusic.yale.edu>
 M.A., M.Phil., Ph.D.

Chair

James Hepokoski

Director of Graduate Studies

Daniel Harrison (Stoeckel, 203.432.2986, dgs.music@yale.edu)

Professors Kathryn Alexander (*Adjunct*), Ardis Butterfield (*on leave* [F]), Richard Cohn (*on leave* [F]), Michael Friedmann (*Adjunct*), Daniel Harrison, Paul Hawkshaw (*Adjunct*), James Hepokoski, Richard Lalli (*Adjunct*), Patrick McCreless, Ian Quinn, Gary Tomlinson (*on leave* [Sp]), Michael Veal, Craig Wright

Associate Professors Robert Holzer (*Adjunct*), Brian Kane, Gundula Kreuzer (*on leave*), Markus Rathey (*Adjunct*)

Assistant Professors Rebekah Ahrendt (*on leave*), Henry Parkes, Anna Zayaruznaya

Fields of Study

Fields include music history, music theory, and ethnomusicology. (Students interested in degrees in performance, conducting, or composition should apply to the Yale School of Music.)

Special Admissions Requirements

Previous training in music theory or music history is required. Samples of the applicant's previous work such as extended papers, advanced exercises, and analyses must be submitted. The GRE General Test is required by the Graduate School. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

Two years of course work, comprising a minimum of fourteen courses. All students must take the proseminars in ethnomusicology, music history, and music theory. In addition, students in the theory program must take both of the history of theory seminars; students in the music history program must take one history of theory seminar; and students in the ethnomusicology program must take at least two but no more than five graduate seminars or non-introductory undergraduate courses in other departments or schools within the University. In consultation with the DGS, history and theory students may elect to take up to two graduate seminars or non-introductory undergraduate courses outside the department. Consult the Music Graduate Student Handbook for further details specific to each program.

A student must receive at least four Honors grades in departmental seminars in order to proceed to the qualifying examination, administered in August following the second year. Reading proficiency in two languages—for historians and theorists, German and

usually either French or Italian; for ethnomusicologists, two languages relevant to their research, one of which must be a European language – is demonstrated by examinations (with dictionary access) offered once per term. A style and repertory examination must be taken upon entering in August, and retaken every term until passed before the end of the third year. Third-year students attend a weekly prospectus/dissertation colloquium. Approval of the dissertation prospectus admits a student to candidacy, provided that all other requirements are met. Only students admitted to candidacy can continue into the fourth year of study. Fourth- and fifth-year students attend the dissertation colloquium in the spring terms.

The faculty considers teaching to be essential to the professional preparation of graduate students in Music. Students in Music participate in the Teaching Fellows Program in their third and fourth years.

Combined Ph.D. Program: Music and Renaissance Studies

The Department of Music offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in Music and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. (en route to the Ph.D.) Students enrolled in the Ph.D. program qualify for the M.A. degree upon the successful completion of seven courses, at least six of which are seminars given in the department, along with the passing of the style and repertory examination and an examination in one foreign language. Of the six departmental seminars, at least two grades must be Honors; the remaining five grades must average High Pass.

Terminal Master's Degree Program The department offers admission to a small number of students in a terminal M.A. program. Candidates must pass seven term courses achieving an average of High Pass and at least one Honors, complete a special project, and pass an examination in one foreign language.

Courses

MUSI 699a, Proseminar: Musicology Gary Tomlinson

A historiographical survey of major topics, issues, and techniques of musicological research. We consider the position of musicology in the broader context of historical thought and provide a conceptual foundation for further work in the field.

MUSI 721b, History of Theory II Daniel Harrison

This seminar surveys the history of music theory in the eighteenth, nineteenth, and early twentieth centuries. Readings are drawn from the writings of Rameau, Heinichen, Kirnberger, C.P.E. Bach, Koch, Reicha, A.B. Marx, Fétis, Choron, Förster, Weber, Richter, Sechter, Hauptmann, von Oettingen, Helmholtz, Riemann, Hanslick, Louis and Thuille, Schoenberg, Hindemith, and Schenker. Overarching themes include the relationship between speculative and practical traditions; the institutional sites of music theory; interactions among theory, analysis, and composition pedagogy; the role of oral teaching

traditions; the position of music theory in the academy; the scientific status of music theory; and the historiography of music theory.

MUSI 803b, Rondeau, Ballade, Virelai Anna Zayaruznaya

This seminar focuses on musical settings of the three French *formes fixes*: the ballade, rondeaux, and virelai. We follow these from their origins in a variety of late-thirteenth-century practices through their maturation at the hands of Machaut and his contemporaries, the *ars subtilior*, and finally into the fifteenth century, where they continued to be set in French and Burgundian orbits. Experimenting with an array of analytical approaches, we explore the ways in which the formal demands of text and music interact within these repertoires. Other areas of focus are practices of citation and allusion and the social functions of songs and their sources.

MUSI 812, Directed Studies: Ethnomusicology

MUSI 814, Directed Studies: History of Music

MUSI 820a, Ethnomusicology and Gender Michael Veal

A survey of the influence of feminist scholarship within ethnomusicology encompassing musical practices specific to women, as well as a more critical and systematic examination of gender themes in relation to several world music traditions.

MUSI 821b, Polyphonies East and West Henry Parkes, John Graham

Medieval and ethnomusicological perspectives are brought into dialogue in this exploration of polyphonic singing traditions within the Christian Church, written and unwritten, East and West. Detailed case studies of Anglo-Saxon and Georgian (Kartvelian) repertoires provide the platform for discussion about the social and ritual functions of polyphony, vocal pedagogy, and oral transmission; the role of writing and recording as mediators of tradition; problems of transcription and recovery; the relationship between melody and harmony; questions of improvisation and fixity; vocal production, tuning, and timbre; as well as the implications of reform and revival.

MUSI 824a/MUS 618a, Intimacy, Love, and Devotion in Seventeenth-Century Music

Markus Rathey

Musical development in the seventeenth century, the freer use of the dissonance in Monteverdi's "seconda prattica," the liberation of the solo voice through the introduction of the basso continuo, and finally the "invention" of opera as one of the leading genres for musical innovation provided the composer with a vast array of new possibilities to express human emotions. These developments in music went along with a paradigm shift in theology and piety in the seventeenth century: contemporary theologians emphasized the individual and his/her relationship with the divine. There was a revival of medieval mysticism, and metaphors of love and emotion were frequently used in religious poetry and devotional prose. The image of bridegroom (Christ) and bride (believer) was especially popular and led numerous composers to set sacred dialogues between the two "lovers" to music. The course examines the theological and musical developments in the seventeenth century and analyzes the relationship among the musical, literary, philosophical, and theological discourses during the Baroque.

MUSI 903a, The Voice Brian Kane

The seminar is intended as a general introduction to the emerging field of voice studies. Students develop an overview of the field and acquire familiarity with the central topics, problems, and thinkers about the voice, both historical and contemporary. In addition to weekly readings, writing assignments, and presentations, students are involved in the selection of topics and texts, depending on their interests. Special emphasis is placed on the interaction of voice studies with music, philosophy, and media studies.

MUSI 914, Directed Studies: Theory of Music**MUSI 925b, Recent Mathematical Models of Musical Systems** Richard Cohn**MUSI 930b, Tonality in Seventeenth-Century Music** Ian Quinn

Composers of the seventeenth century, perhaps more than at any other time, wrote music against the grain of contemporaneous music theory. While modal and contrapuntal concepts predominated in the theoretical literature, composers developed a new set of harmonic practices later codified under the rubric of tonality. We survey general approaches to tonal structure in seventeenth-century music and music theory (Dahlhaus, Beswick, Lester, Powers, Taruskin). We give close consideration to work on the hermeneutics of the Italian madrigal (Chafe, McClary), though we also consider music from a wider variety of genres from the Continent and England (Harley, Barnett).

MUSI 950a, Shostakovich Patrick McCreless

The course aims to develop a rich understanding of Shostakovich's musical oeuvre, focusing on a number of central works. We try to achieve a balance between critical and analytical approaches, between consideration of the composer's whole output and detailed consideration of individual pieces, and between a study of the music's Russian and Soviet context and a study of the music itself.

MUSI 998a, Prospectus Workshop Daniel Harrison**MUSI 999b, Dissertation Colloquium** Daniel Harrison

NEAR EASTERN LANGUAGES AND CIVILIZATIONS

314 Hall of Graduate Studies, 203.432.2944

<http://nelc.yale.edu>

M.A., M.Phil., Ph.D.

Acting Chair

Christina Kraus

Director of Graduate Studies

Eckart Frahm

Professors John Darnell, Benjamin Foster, Eckart Frahm, Dimitri Gutas (*on leave*), Harvey Weiss

Lecturers Karen Foster, Enrique Jiménez-Sánchez, Kathryn Slanski

Senior Lectors II Ayala Dvoretzky, Shiri Goren

Senior Lectors Sarab al-Ani, Muhammad Aziz, Jonas Elbousty, Etem Erol, Dina Roginsky, Farkhondeh Shayesteh

Fields of Study

Fields include Arabic and Islamic studies (also with interdisciplinary minor), Greco-Arabic studies, Assyriology, and Egyptology.

Special Admissions Requirements

Applicants should state their specific field of study and intended specialization. Evidence of a reading knowledge of both French and German is required of all Ph.D. students. Proficiency in one of these languages is normally prerequisite for admission and deficiency in the second language must be rectified before admission to a second year of study. Proficiency will be certified by passing a departmental examination upon registration at Yale. Ph.D. students admitted with only one of the two required languages or who fail the departmental examination are expected to enroll in an appropriate full-year course given by the French or German department at Yale. Completion of such a course with a grade of A or B will be accepted as fulfilling the proficiency requirement in either language; exceptions, for instance, for native speakers of French or German, may be made by the department upon recommendation of the director of graduate studies (DGS). For students in the M.A. program, evidence of a reading knowledge of either French or German is sufficient.

*Special Requirements for the Ph.D. Degree***COURSE WORK**

The department normally requires three full years of course work, four year courses or eight term courses per year being considered a full load. This may be reduced to two years in cases of exceptional background in Near Eastern languages. Normal progress in course work is considered to be consistent achievement of grades of High Pass or better, and at least four term courses or two year courses with Honors per year.

Of the twenty-four required courses for graduate study, at least eighteen should be taken within the department, usually within the student's primary field of study. Courses taken outside of the department should be clearly related to the student's primary field or constitute a coherent second field. For students who take no courses outside of the department, minimum competence in a second field within NELC is required, defined as follows: at least two terms of a Near Eastern language to be evaluated either by examination or a course grade of High Pass or better, or at least two terms of nonlanguage courses outside the area of specialization.

Advanced standing In rare cases, upon presenting evidence of successful completion of graduate courses at other universities or at Yale prior to their matriculation in the Ph.D. program, students with significant prior knowledge in their primary fields of study may apply for a waiver of up to eight courses toward the twenty-four required for candidacy. The faculty adviser and the DGS will normally present such applications to the faculty of the department, with a recommendation, no later than the end of the second year.

Interdisciplinary minor In Arabic-Islamic Studies, up to eight courses taken in one outside department and inclusion of that department's subject in the comprehensive exams constitute an interdisciplinary track.

COMMITTEES

While doing course work, students are mentored by a faculty adviser from their field and by the DGS. Students writing dissertations may, if they so wish, be mentored by a committee headed by a primary adviser from NELC (not necessarily the faculty adviser from the course work years) and staffed with one, two, or more additional members, from either inside or outside the department, depending on the student's specific needs. Committees are to be approved by the DGS. Interested students are encouraged to seek out suitable and willing faculty to serve on their advisory committees.

SPECIAL LANGUAGE AND COURSE REQUIREMENTS

Course work should be planned to meet two departmental general standards: core languages for the primary fields of study, and minimum competence in a secondary field. The core languages in each of the major fields of study are as follows: *Arabic and Islamic Studies*: Arabic, Persian (Farsi) or Syriac or Greek; *Assyriology*: Sumerian and Akkadian; *Egyptology*: Egyptian and at least four terms of Demotic or Coptic. Minimum competence in a secondary field of study is defined as follows: at least two terms of a Near Eastern language to be evaluated either by examination or with a course grade of High Pass or better, or at least two terms of nonlanguage courses outside the area of specialization. A minimum grade of High Pass in these courses will be considered successful fulfillment of this requirement.

In Arabic and Islamic Studies, the minimum competence can be extended to an interdisciplinary course of study in a minor field. Minors may include six to eight term courses in the following departments and programs: Anthropology, Comparative Literature, French, German Studies, Classics, History, History of Science and Medicine, Italian, Judaic Studies, Linguistics, Medieval Studies, Philosophy, Political Science and Sociology, Religious Studies, Spanish and Portuguese, or others, by permission of the DGS.

Students in all programs of the department will be expected to declare their choice of a secondary language or area, or a minor field, by their third term of study.

TRAINING IN TEACHING

NELC students normally acquire four terms of teaching experience, between their second and fourth years in residence. Once faculty have determined the courses that they plan to teach in the upcoming academic year, they will inform the DGS of courses that may require Teaching Fellows. The DGS will compile a list of these courses and circulate it among NELC graduate students who have completed the first year of study. Students may then inform the DGS of those courses for which they would prefer to serve as Teaching Fellows. The faculty members in charge, in consultation with the DGS, will subsequently choose the Teaching Fellows for their courses.

EXAMINATIONS AND THE DISSERTATION

The comprehensive examination is normally taken at the end of the third year of study or no later than the beginning of the fourth year of study. When advanced standing has been granted, the comprehensive examination could be taken at the end of the second year. Comprehensive examinations normally include three written and one oral examination including language, literature, history, and other topics to be determined by the DGS in consultation with the student and the relevant faculty. Comprehensive examinations may be based in part on reading lists of primary core texts and secondary literature compiled well in advance by the student and the relevant faculty. Primary texts and secondary literature studied by the students during their years of course work may also become topics of the examination. For language examinations, texts that the student has not seen may also be included. In the case of the program in Arabic and Islamic Studies with an interdisciplinary minor, the written portion will consist of two language examinations and one subject in the minor field, and the oral of two subjects in Arabic studies and one in the minor field. The written examinations will be set by the individual faculty members responsible for particular areas of study, but the oral portion will be conducted by the full staff of the department. The dissertation proposal is normally submitted one month following the completion of the qualifying examination.

In their final term of course work, students may, with the permission of the DGS and the instructor, enroll in a Directed Readings course related to the general field of the prospective dissertation topic. Course work should include preparation of a comprehensive, annotated bibliography for the prospective topic and exploration of some aspects of the topic in a research paper. Students availing themselves of this option should also present some of their work at the NELC Roundtable.

The dissertation prospectus may comprise up to thirty pages, excluding the bibliography. A two-page summary of the prospectus will normally be circulated among and voted upon by the faculty, though the full prospectus will be available for consideration.

Successful completion of the comprehensive examination and submission of an acceptable prospectus will qualify the student for admission to candidacy for the Ph.D. degree. After completion of the dissertation, the candidate may receive a final examination concerned primarily with the defense of the thesis.

YISAP Graduate Qualification

Students can participate in the Yale Initiative for the Study of Antiquity and the Pre-modern World (YISAP) and receive a graduate qualification by fulfilling the necessary requirements.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in Near Eastern Languages and Civilizations are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

Terminal Master's Degree Program Applicants who do not enroll in the Ph.D. program may pursue a Master of Arts degree. Students enrolled in the M.A. program should complete a minimum of twelve term courses with at least two term grades of Honors and an average of High Pass in the remaining courses, and will be required to submit a master's thesis no later than April 1 of the fourth term of study. No financial aid is available. Students enrolled in the Ph.D. program are also eligible for this degree by meeting the same requirements. Because of the thesis requirement, the Graduate School procedure of automatic petitions for the M.A. degree is not available to students in Near Eastern Languages and Civilizations.

Courses

AKKD 501^U, Elementary Akkadian Shana Zaia

Introduction to the language of ancient Babylonia and its cuneiform writing system, with exercises in reading, translation, and composition. MW 9–10:15

[AKKD 502a^U, Intermediate Akkadian]

[AKKD 503a, Advanced Akkadian: Akkadian Literary Texts]

[AKKD 505, Historical and Archival Texts from First-Millennium Assyria]

AKKD 545a, Historical and Archival Texts from Neo-Babylonian and Late Babylonian Times Eckart Frahm

Study and interpretation of royal inscriptions, chronicles, letters, and contracts from seventh- to second-century B.C.E. Babylonia.

ARBC 501^U, Elementary Modern Standard Arabic Jonas Elbousty, Sarab al-Ani [Sp]

A two-term course for students who have no previous background in Arabic. Students learn the Arabic alphabet, basic vocabulary and expression, and basic grammatical structures and concepts, and concentrate on developing listening and speaking skills. The course aims at developing the following skills: reading to extract the gist of written Modern Standard Arabic texts; speaking with increased ease, good pronunciation, sound grammatical forms, and correct usage; writing to respond to simple daily life issues; forming and recognizing grammatically correct Modern Standard Arabic.

501a: MTWTHF 9:25–10:15, 10:30–11:20, 11:35–12:25, or HTBA

501b: MTWTHF 9:25–10:15, 10:30–11:20, or 11:35–12:25

ARBC 502^U, Intermediate Modern Standard Arabic Sarab al-Ani

A two-term course for students with previous background in Arabic. It is designed to improve proficiency in aural and written comprehension as well as in speaking and writing skills. The course aims to develop the following skills: reading to extract the gist as well as key details of written Modern Standard Arabic texts on a variety of academic, social, cultural, economic, and political topics; speaking with greater fluency and enhanced engagement in conversations on a variety of topics; mastering writing, easily forming and recognizing grammatically correct Arabic sentences. Prerequisite: ARBC 501 or successful completion of a placement test.

502a: MTWTHF 10:30–11:20 or 11:35–12:25

502b: MTWTHF 9:25–10:15 or 10:30–11:20

ARBC 503^U, Advanced Modern Standard Arabic Muhammad Aziz

A two-term course for students with an intermediate to high level of Arabic who wish to reach an advanced level. The course emphasizes contemporary Arabic culture through reading and discussing modern texts, in addition to oral presentations on present-day issues (all in Modern Standard Arabic). The course is designed to improve proficiency in aural and written comprehension as well as in speaking and writing skills. Through text comprehension strategies and vocabulary enrichment, complex sentence structures as well as common written phrasal expressions are tackled, with the aim of usage mastery through writing, speaking, and listening. Prerequisites: ARBC 501 and 502 or successful completion of a placement test.

503a: MWF 10:30–11:20 or 11:35–12:25

503b: MWF 11:35–12:25

[ARBC 505a^U or b^U, Arabic Seminar]

[ARBC 507b^U, Modern Arabic Seminar]

ARBC 510a^U or b^U, Intermediate Classical Arabic Michael Rapoport

Introduction to classical Arabic, with emphasis on analytical reading skills, grammar, and prose composition. Readings from the Qur'an, Islamic theology, and literature and history of the Middle East, as well as Jewish and Christian religious texts in Arabic. MW 11:35–12:50

[ARBC 511^U, Advanced Classical Arabic]

ARBC 513a^U, Modern Arabic Political Thought Sarab al-Ani

An advanced course in Arabic language. The main objective is to offer a comprehensive introduction to selected original writings of some of the most influential leaders, politicians, and scholars who have shaped contemporary intellectual trends in political theory/philosophy in the Arab world. Conducted in Arabic. MW 1–2:15

[ARBC 514a, The Maqāmāt]

[ARBC 520a^U, Egyptian Arabic]

[ARBC 522^U, Business Arabic]

ARBC 523b^U, Arabic Prose Narrative Muhammad Aziz

Close reading of some of Naguib Mahfouz's novels. Attention to idiomatic expressions, structural patterns, literary analysis, and discussions. Students write a brief report on their weekly reading and discuss the main ideas of the assigned reading. Short midterm paper relevant to Mahfouz (to be discussed with the instructor) and a final paper. Prerequisite: ARBC 503 or permission of the instructor. MW 1–2:15

[ARBC 524b^U, Iraqi and Gulf Arabic]

[ARBC 832b, Introduction to Classical Arabic Literary Criticism]

EGYP 501^U, Introduction to Classical Hieroglyphic Egyptian Christina Geisen

A two-term introduction to the language of ancient pharaonic Egypt (Middle Egyptian) and its hieroglyphic writing system, with short historical, literary, and religious texts. Grammatical analysis with exercises in reading, translation, and composition. TTH 9–10:15

[EGYP 502a, Historical Texts of Egypt and Nubia]

EGYP 510^U, Elementary Biblical Coptic Scott Davis

The native Egyptian language in the Roman and Byzantine periods. Thorough grounding in grammar and vocabulary of the Sahidic dialect as a basis for reading biblical, monastic, and Gnostic texts. MWF 1:30–2:20

[EGYP 511a, Introduction to Coptic Literature]

[EGYP 512a^U, Egyptian Monastic Literature in Coptic]

[EGYP 513a, Research Seminar on the Monastic Federation of Shenoute]

[EGYP 514b^U, Gnostic Texts in Coptic]

[EGYP 516b, Coptic Prose Texts: Apa Shenoute]

[EGYP 531a^U, Intermediate Egyptian I: Texts Relating to Egypt and Nubia]

EGYP 533a^U, Intermediate Egyptian I: Literary Texts John Darnell

Close reading of Middle Egyptian literary texts; introduction to the hieratic (cursive) Egyptian script. Readings include the Middle Kingdom stories of "Sinuhe" and the "Eloquent Peasant" and excerpts from wisdom literature. Prerequisite: EGYP 501. W 2:30–4:20

[EGYP 535b^U, Intermediate Egyptian II: Late Egyptian Stories]

[EGYP 539b, Intermediate Egyptian: Cosmogonic Texts]

[EGYP 540a, Ancient Egyptian Epistolography]

[EGYP 550a^U, Introduction to Demotic]

[EGYP 568b, Texts from the Amarna Period]

[EGYP 577a^U, Egyptian Rock Inscriptions]

[EGYP 578b, The Egyptian Netherworld Books]**EGYP 579, Directed Readings: Egyptology** John Darnell**[EGYP 580b, Temple Inscriptions: Medinet Habu]****EGYP 590b^U, Egyptian Coffin Texts** John Darnell

Readings of the religious texts of Middle Kingdom coffins. Focus on creation accounts, the Shu texts, spells of transformation, and the *Book of the Two Ways*. Readings in both normalized hieroglyphic transcription and original cursive hieroglyphic writing. Study of coffin panels in the collection of the Yale Art Gallery. Prerequisite: EGYPT 501. W 2:30–4:20

[EGYP 591a^U, Ancient Egyptian Love Poetry]**HEBR 501^U, Elementary Modern Hebrew** Ayala Dvoretzky [F], Shiri Goren [Sp]

A two-term introduction to the language of contemporary Israel, both spoken and written. Fundamentals of grammar; extensive practice in speaking, reading, writing, and comprehension under the guidance of a native speaker. No previous knowledge required.

501a: MTWTHF 10:30–11:20 or 11:35–12:25

501b: MTWTHF 10:30–11:20 or 11:35–12:25

HEBR 502^U, Intermediate Modern Hebrew Dina Roginsky [F],

Ayala Dvoretzky [Sp]

A two-term review and continuation of grammatical study leading to a deeper comprehension of style and usage. Focus on selected readings, writing, comprehension, and speaking skills. Prerequisite: HEBR 501 or equivalent. TTH 11:35–12:50 or 2:30–3:45

[HEBR 503b^U, Advanced Modern Hebrew: Israeli Society]**[HEBR 504b^U, Introduction to Modern Israeli Literature]****[HEBR 505b^U, Contemporary Israeli Society in Film]****HEBR 506a^U, Dynamics of Israeli Culture** Shiri Goren

The course explores contemporary controversies of Israeli society by examining recent cultural production such as novelistic writing, films, poetry, newspaper articles, new media, advertisement, and television shows. Discussions include migration and the construction of the Sabra character; ethnicity and race: the emergence of Mizrahi voice; women in Israeli society; private and collective memory; minority discourse: Druze, Russian Jews; Israeli masculinity and queer culture. Conducted in Hebrew. Prerequisite: HEBR 502 or permission of the instructor. TTH 11:35–12:50

HEBR 509b^U/JDST 689b^U, Reading Academic Texts in Modern Hebrew

Dina Roginsky

The course addresses the linguistic needs of English-speaking students who would like to be able to read with ease and accuracy contemporary Hebrew-language scholarship in the fields of Judaic studies, religious studies, history, political science, sociology, Near Eastern studies, and other related fields. Particularly, this course confronts comprehension problems through straightforward exposition of the grammar supported by examples from scholarly texts. Conducted in Hebrew. Prerequisite: two years of modern or biblical Hebrew, or permission of the instructor. TTH 11:35–12:50

HEBR 510a^U, Conversational Hebrew: Israeli Media Shiri Goren

An advanced Hebrew course for students interested in practicing and enhancing conversational skills. The course aims to improve the four language skills while stressing listening comprehension and various forms of discussions including practical situations, online interactions, and content analysis. Prerequisite: HEBR 502 or permission of the instructor. TTH 2:30–3:45

[HEBR 511^U, Elementary Biblical Hebrew]**HEBR 512^U, Intermediate Biblical Hebrew** Edmond Zuckier

A two-term review and continuation of instruction in grammar and vocabulary, supplemented by readings from the Bible. Prerequisite: HEBR 510 or equivalent. TTH 11:35–12:50

HEBR 516b^U, Israeli Popular Music Dina Roginsky

Changes in the development of popular music in Israel explored as representations of changing Israeli society and culture. The interaction of music and cultural identity; the role of modern popular music in representing, shaping, challenging, and criticizing social conventions; songs of commemoration and heroism; popular representation of the Holocaust; Mizrahi and Arab music; feminism, sexuality, and gender; class and musical consumption; criticism, protest, and globalization. Prerequisite: HEBR 502 or equivalent. MW 1–2:15

[HEBR 517a^U, Hebrew in a Changing World]**[HEBR 519b^U, Israel in Ideology and Practice]****HEBR 563^U/JDST 695, From Biblical to Modern Hebrew** Dina Roginsky

This course aims to support students who have reading knowledge of Biblical Hebrew but cannot read or converse in Modern Hebrew. The course concentrates on reading and aims at enabling students to use Modern Hebrew for research purposes. The texts chosen are tailored to students' particular areas of interest. Prerequisite: two years of Biblical or Modern Hebrew studies, or permission of the instructor. Conducted in English.

[MESO 505a, Mesopotamian History in the Late Bronze Age]**[MESO 506a, Selected Mesopotamian Texts: Scholarly Texts]****[MESO 506b, Selected Mesopotamian Texts: Bilingual Texts]****[MESO 507a, History of Mesopotamia: 2nd Millennium]****MESO 507b, Mesopotamian Humorous Texts** Eckart Frahm

Study and interpretation of humorous cuneiform texts, including “The Poor Man of Nippur” and “The Doctor from Isin.”

[MESO 508b, History of Mesopotamia: 2000–1550 B.C.E.]**[MESO 510b, Transitions in Mesopotamian History]****[MESO 512, Women in Assyria and Babylonia]****[MESO 531, Beginning Sumerian]**

[MESO 532a,b, Intermediate Sumerian]

[MESO 533a, Advanced Sumerian]

[MESO 543a, Neo-Assyrian History]

MESO 544a, Mesopotamian Selected Texts: Sumerian Benjamin Foster

MESO 559b, Directed Readings: Assyriology Benjamin Foster

[MESO 560a, Historical Horizons in Ancient Mesopotamia]

MESO 572a, Prophecy in Mesopotamia Eckart Frahm

Study and interpretation of Akkadian texts related to prophets and prophecy, with a focus on the evidence from Mari and Neo-Assyrian Nineveh.

MESO 574b, Reading, Editing, and Copying Cuneiform Tablets

Enrique Jiménez-Sánchez

Students work with previously unpublished Akkadian texts and learn how to copy tablets both manually and in digital form. They are also introduced to new electronic aids in Assyriology. Prerequisite: knowledge of Akkadian.

[NELC 502b^U, Worlds of Homer]

[NELC 503a^U, Art of Ancient Palaces]

[NELC 504b^U, Art of the Ancient Near East and Aegean]

[NELC 507a^U, Modern Arab Thought]

[NELC 508a^U, Ancient Painting and Mosaics]

NELC 509b^U/ARCG 744b^U, The Age of Akhenaton John Darnell

Study of the period of the Egyptian pharaoh Akhenaton (reigned 1353–1336 B.C.E.), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives. Consideration of the wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. Examination of the international diplomacy, solar theology, and artistic developments of the period. Reading of primary source material in translation. MW 9–10:15

[NELC 512b, Egyptian Religion through the Ages]

[NELC 513a, Readings in Egyptian History]

NELC 514a^U, Buried Cities: Thera, Pompeii, and Herculaneum Karen Foster

Study of three ancient cities buried by volcanic eruptions—Thera in ca. 1530 B.C.E. and Pompeii and Herculaneum in 79 C.E.—with emphasis on their architecture, wall paintings, and small finds in cultural and historical context. MW 2:30–3:45

[NELC 515b, The Bible in Its Ancient Near Eastern Setting]

NELC 516b^U, Myth and Ritual in the Ancient Near East Eckart Frahm

Introduction to ancient Near Eastern tales about gods, heroes, and demons. Topics include creation, the cosmic order, sacred marriage, divine battles, death, and the

interaction between gods and humans. Focus on myths from Mesopotamia, with comparison to Egyptian, biblical, and classical traditions. TTH 10:30–11:20, 1 HTBA

[NELC 518b^U, *Assyria: The First Near Eastern Empire (Seminar)*]

[NELC 519a^U, *Religion and Politics in the Ancient Near East*]

NELC 520a, *Mesopotamian History of the Third Millennium* Benjamin Foster

[NELC 524b^U, *Egyptian Literature through the Ages*]

[NELC 525a, *Toward an Art History for Ancient Egypt: Issues, Approaches, and Object Study*]

[NELC 531b^U, *Antiquity into Islam*]

[NELC 534b^U, *The Making of Monasticism*]

NELC 547b, *Survey of Mesopotamian Literature* Benjamin Foster

[NELC 554a^U, *Israeli Identity and Culture: 1948 to the Present*]

[NELC 555a, *Classical Arabic Literature in Translation*]

[NELC 556a^U, *Classics: The Arabic-Islamic World*]

NELC 557b^U, *Israeli Narratives* Shiri Goren

Close reading of major Israeli novels in translation with attention to how their themes and forms relate to the Israeli condition. Focus on topics and theories of war and peace, migration, nationalism, and gender. Authors include Oz, Yehoshua, Grossman, Matalon, Castel-Bloom, Shalev, and Kashua. TH 1:30–3:20

[NELC 561a^U, *Jewish Sectarianism in the Middle Ages*]

[NELC 563b, *From Pictograph to Pixel: Changing Ways of Human Communication*]

[NELC 566b, *Prehistory of Nubia*]

[NELC 567a^U/ARCG 746a^U, *Ancient Civilizations of Nubia*]

[NELC 580a, *Settlement Archaeology in Egypt*]

[NELC 587b^U, *Environmental History of the Near East*]

NELC 588b^U/ANTH 773b^U/ARCG 773b^U/F&ES 793b, *Abrupt Climate Change and Societal Collapse* Harvey Weiss

Collapse documented in the archaeological and early historical records of the Old and New Worlds, including Mesopotamia, Mesoamerica, the Andes, and Europe. Analysis of politicoeconomic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict. TH 3:30–5:20

[NELC 589a^U, *Archaeologies of Empire*]

[NELC 590b^U, *Identity in Modern Turkey*]

NELC 592a^U/JDST 785a^U, State and Society in Israel Dina Roginsky

The interplay between state and society in Israel; current Israeli discourse on controversial issues such as civil rights in a Jewish-democratic state, Jewish-Arab relations, right and left politics, orthodoxy, military service, globalization, and multiculturalism. Sociopolitical changes that have taken place in Israel since the establishment of the state led to the reshaping of Israeli Zionist ideology. Conducted in English. MW 11:35–12:50

NELC 720b^U/ANTH 720b^U/ARCG 720b^U, Babylon to Bush Harvey Weiss

Analysis of the archaeological and paleoenvironmental data for rain-fed and irrigation agriculture settlement, subsistence, and politicoeconomic innovation from the earliest sedentary agriculture villages, to the earliest cities and states, to the earliest empire. What combinations of dynamic social and environmental forces drove these developments in these regions during this ten thousand year span? TH 3:30–5:20

[NELC 735a^U, Gnostic Religion and Literature]**NELC 774a^U/F&ES 774a, Agriculture: Origins, Evolution, Crises** Harvey Weiss

Analysis of the societal and environmental causes and effects of plant and animal domestication, the intensification of agro-production, and the crises of agro-production: population pressure, land degradation, societal collapses, technological innovation, transformed social relations of production, sustainability, and biodiversity. From the global field, the best-documented eastern and western hemisphere trajectories are selected for analysis.

[NELC 829b, History of the Arabic Language]**NELC 830a/HIST 860a, From Medina to Constantinople: The Middle East from 600 to 1517** Adel Allouche

The seminar discusses the religious and political events that shaped the Middle East from the rise of Islam to the Ottoman conquest of Egypt. It encompasses Arab lands, Iran, and Turkey. TH 1:30–3:20

[NELC 831b, Greco-Arabic Seminar]**NELC 841b/ANTH 741b/ARCG 741b/CLSS 841b/HIST 502b, Frontier and Province in the Premodern World** Andrew Johnston, William Honeychurch

From Achaemenid India to Han China to Roman Gaul and Egypt to Iraqi Kurdistan, the province and its organizational equivalents (e.g., nomes in Egypt, commanderies in China) have long constituted one of the fundamental building blocks of states, ancient and modern, and a fascinatingly complex site of cultural and political negotiation in imperial encounters. The aim of this year's core seminar is to explore social equilibria between governance and the governed in the premodern world, via the interaction—religious, artistic, linguistic, administrative, economic—between local units and large imperial frameworks. As an object of comparative study, the province, representing the intersection of imperial power and local communities, allows us to combine “top-down” and “bottom-up” approaches to the ancient world, to investigate some of the key practices and discourses of empire while attempting to recover the agency and voices of subaltern provincial actors. It offers as well a chance to reconsider the “center-periphery” paradigm taken over from world-systems theory, and to propose new models for understanding the complex relationships between an imperial “center” and the governance of territories.

This interdisciplinary seminar examines a wide range of aspects of the province as a trans-historical phenomenon — law, economy, art, literature, religion, monumentality, urbanism, and politics — across the ancient Mediterranean world and beyond, making use of the unique resources and collections at Yale, especially the Art Gallery and Beinecke Library.

[NELC 844b, *Arabic Textual Criticism and Editorial Technique*]

[NELC 845, *Seminar in Arabic Philosophy: Plato's *Laws* in Arabic*]

[NELC 846b, *Seminar in the Philosophy of Avicenna*]

[NELC 849a or b, *Directed Readings: Arabic*]

[NELC 850a^U, *Introduction to Arabic and Islamic Studies*]

PERS 501^U, Elementary Persian Farkhondeh Shayesteh

A two-term introduction to modern Persian with emphasis on all four language skills: reading, writing, listening, and speaking. The objective is to allow students to develop the foundational knowledge necessary for further language study. Designed for nonnative speakers. MTWTHF 10:30–11:20

PERS 502^U, Intermediate Persian Farkhondeh Shayesteh

This two-term course is a continuation of PERS 501 with emphasis on expanding vocabulary and understanding of more complex grammatical forms and syntax. Designed for nonnative speakers. Prerequisite: PERS 501 or permission of the instructor. MW 11:35–12:50, 1 HTBA

[PERS 503b, *Persian Seminar: Identity and Change*]

[PERS 504b^U, *Thematic Survey of Modern Persian Literature*]

[PERS 505/JDST 670, *Introduction to Pahlavi (Middle Persian)*]

PERS 560a^U, Classical Persian Literature Farkhondeh Shayesteh

Reading, discussion, and analysis of Persian classical literary works to further develop language skills and cultural knowledge. Topics include classical poetry and prose from different centuries. Students write essays using advanced vocabulary, grammar, and literary expressions. Designed for nonnative speakers. Prerequisites: PERS 561 and permission of the instructor.

PERS 561b^U, Persian Culture and Media Farkhondeh Shayesteh

Advanced study of Persian grammar, vocabulary, and culture, with a focus on the media. Examination of daily media reports on cultural, political, historical, and sporting events in Iran, Afghanistan, Tajikistan, and other Persian-speaking regions. Prerequisite: PERS 502.

PERS 589a^U or b^U, Directed Readings: Persian

[SMTC 501b, *Introduction to Comparative Semitics*]

[SMTC 502a, *Linguistic Topics in Akkadian*]

[SMTC 520, *Introduction to Ugaritic*]

[SMTC 521, Elementary Syriac]**SMTC 522/RLST 792, Intermediate Syriac** Adam Becker

This two-term course is a continuation of SMTC 521. Reading and analysis of Syriac texts from various genres and time periods. Prerequisite: SMTC 521 or knowledge of Syriac.

[SMTC 523a, Intermediate Syriac: Prose Texts]**[SMTC 524b, Intermediate Syriac: Poetic Texts]****[SMTC 525a, Introduction to Syriac Christianity]****[SMTC 531, Introduction to Aramaic]****SMTC 542a, Introduction to Classical Ethiopic** James Nati

An introduction to the Classical Ethiopic language, focusing on acquiring the essentials of grammar and vocabulary. Prerequisite: knowledge of a Semitic language or permission of the instructor.

SMTC 543b, Readings in Classical Ethiopic James Nati

Reading and analysis of texts in Classical Ethiopic. Prerequisite: SMTC 542a or knowledge of Classical Ethiopic.

SMTC 793a/RLST 793a, Biblical Aramaic David Marcus

An introduction to the morphology and syntax of Biblical Aramaic. Readings from the Aramaic passages of the Books of Daniel and Ezra. No previous knowledge of Aramaic is assumed.

SMTC 794b/RLST 794b, Aramaic of the Dead Sea Scrolls David Marcus

An introduction to the morphology and syntax of the Aramaic dialect found in the Dead Sea Scrolls. Reading of selected texts including the Genesis Apocryphon, the Targum of Job, the Book of Enoch, letters and contracts. No previous knowledge of Aramaic is assumed.

TKSH 501^U, Elementary Turkish Etem Erol

Development of a basic knowledge of modern Turkish, with emphasis on grammatical analysis, vocabulary acquisition, and the training of reading and writing skills. This is a two-term course. MTWTHF 10:30–11:20

TKSH 502^U, Intermediate Turkish Etem Erol

Continued study of modern Turkish, with emphasis on advanced syntax, vocabulary acquisition, and the beginnings of free oral and written expression. This is a two-term course. Prerequisite: TKSH 501 or permission of the instructor. TTH 11:35–12:50, 1 HTBA

TKSH 503a^U or b^U, Advanced Turkish Etem Erol

Emphasis on advanced oral and written expression. Prerequisite: TKSH 502 or permission of the instructor. MW 1–2:15

[TKSH 505a^U, Structure of Modern Turkish]**TKSH 560b, Beginning Ottoman Turkish** Etem Erol**TKSH 570a or b, Directed Readings and Research** Etem Erol

NEUROBIOLOGY

Sterling Hall of Medicine C303, 203.785.4323

<http://medicine.yale.edu/neurobiology>

M.S., M.Phil., Ph.D.

Chair

Pasko Rakic

Director of Graduate Studies

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Professors Amy Arnsten, Hal Blumenfeld (*Neurology*), Marvin Chun (*Psychology*), Michael Crair, Pietro De Camilli (*Cell Biology*), Nihal de Lanerolle (*Neurosurgery*), Sabrina Diano (*Obstetrics, Gynecology & Reproductive Sciences*), Ronald Duman (*Psychiatry*), Joel Gelernter (*Psychiatry*), Charles Greer (*Neurosurgery*), Murat Gunel (*Neurosurgery*), Joy Hirsch (*Psychiatry*), Tamas Horvath (*Comparative Medicine*), Jeffery Kocsis (*Neurology*), Anthony Koleske (*Molecular Biophysics & Biochemistry*), John Krystal (*Psychiatry*), Robert LaMotte (*Anesthesiology*), Daeyeol Lee, Csaba Leranth (*Obstetrics, Gynecology & Reproductive Sciences*), Paul Lombroso (*Child Study Center*), David McCormick, Godfrey Pearlson (*Psychiatry*), Marina Picciotto (*Psychiatry*), Vincent Pieribone (*Cellular & Molecular Physiology*), Marc Potenza (*Psychiatry*), Pasko Rakic, Joseph Santos-Sacchi (*Surgery*), Nenad Sestan, Gordon Shepherd, Rajita Sinha (*Psychiatry*), Stephen Strittmatter (*Neurology*), Flora Vaccarino (*Child Study Center*), Christopher van Dyck (*Psychiatry*), Stephen Waxman (*Neurology*), Z. Jimmy Zhou (*Ophthalmology & Visual Science*)

Associate Professors Meenakshi Alreja (*Psychiatry*), Charles Bruce, Kelly Cosgrove (*Psychiatry*), Ralph DiLeone (*Psychiatry*), Jaime Grutzendler (*Neurology*), Elizabeth Jonas (*Internal Medicine/Endocrinology*), Chiang-Shan Ray Li (*Psychiatry*), Angeliki Louvi (*Neurosurgery*), James Mazer, Dhasakumar Navaratnam (*Neurology*), Michael Schwartz, Justus Verhagen

Assistant Professors Jessica Cardin, Steve Chang (*Psychology*), Bo Chen (*Ophthalmology & Visual Science*), Marcelo de Oliveira Dietrich (*Comparative Medicine*), George Dragoi (*Psychiatry*), Jason Gerrard (*Neurosurgery*), Michael Higley, In-Jung Kim (*Ophthalmology & Visual Science*), Alex Kwan (*Psychiatry*), Ifat Levy (*Comparative Medicine*)

Fields of Study

Fields include the development, neuronal organization, and function of the mammalian central nervous system. The range of methods includes molecular-genetic and cellular neurobiology, neuroanatomy, biochemistry, neuropharmacology, computational modeling, neurophysiology, neuroimaging and behavior. An integrative, multidisciplinary approach is encouraged.

Special Requirements for the Ph.D. Degree

COURSE REQUIREMENTS

Six courses are required, and students must obtain a grade of Honors in two of these courses and maintain an HP average or better. Students not achieving this will be put on academic probation and may be dismissed from the graduate program. Without exception, students are required to earn two Honors by the end of the second year of enrollment. All students will be reviewed academically at the end of the year. For purposes of calculating an overall High Pass or above average, Honors=3, High Pass=2, Pass=1, and Fail=0.

Required courses are Principles of Neuroscience (NBIO 501a), Neurobiology (NBIO 720a), and Structural and Functional Organization of the Human Nervous System (NBIO 500b). In addition, three more elective graduate-level courses are required. Additional degree requirements are successful completion of both terms of Lab Rotation for First-Year Students (NBIO 512a/b) and both terms of Second-Year Thesis Research (NBIO 513a/b). This will ensure that degree candidates obtain a solid background in systems, cellular, and molecular approaches to neuroscience. In addition to all other requirements, students must successfully complete NBIO 580b, Bioethics in Neuroscience, prior to the end of their first year of study. This requirement must be met prior to registering for a second year of study. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

LABORATORY ROTATIONS

Two rotations are required; they are typically completed in the first year. Rotations outside the Neuroscience track will count toward this requirement upon approval of the Neuroscience track directors.

TEACHING REQUIREMENTS

An important aspect of graduate training in Neurobiology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses at the undergraduate, graduate, and medical school levels. Ph.D. students are required to serve as Teaching Fellows (TF) for two terms. First-year students may not serve as a TF without written permission from the Neuroscience track directors. It is recommended that one term of teaching should be completed by the end of the third year, and both requirements be completed by the end of the fourth year.

Specifically, it is recommended that the first requirement be met by teaching in either Principles of Neuroscience (NBIO 501a), Neurobiology (NBIO 720a), Brain and Thought (CGSC 201a), or Structural and Functional Organization of the Human Nervous System (NBIO 500b). The second course may be chosen from the list of neuroscience-related courses in the Graduate School of Arts and Sciences bulletin, or from the INP Bioethics course. A course not directly related to neuroscience must have the approval of the director of graduate studies (DGS).

QUALIFYING EXAM

Ph.D. students must complete their qualifying exam by June 1 of their second year as a graduate student. The student must choose four faculty members to read with in

consultation with the DGS and the student's Ph.D. mentor; it is strongly encouraged that these faculty represent interests spanning from molecular to systems/cognitive neuroscience and not include the Ph.D. mentor. The student and faculty should devise a reading list of about fifteen papers on a defined topic. They should meet regularly (at least three or four meetings) to discuss the papers in depth. For the written exam, the student is given two questions from each faculty member. The student has three hours to write an answer to one of the two questions for each faculty member, i.e., a twelve-hour written exam spread over two days. The exam is performed on a laptop observing the honor system and is proctored by the DGS. The student may refer to the papers and his/her notes but not to the Internet. The answers are distributed to the faculty, and several days later an oral exam is held to further evaluate the student's knowledge. A fifth faculty member (a reader) chosen by the student may also be present at the oral exam, along with the DGS. If the student fails the qualifying exam, he/she may have one more attempt at passage; this must be completed within one term of taking the original exam. A unanimous Pass vote from the Qualifying Examination committee is required. Students who do not pass the Qualifying Examination will be put on academic probation and will be required to either retake parts of the qualifier and/or complete additional course work. They will receive a letter from the DGS explaining why their performance was marginal, and they may be dismissed from the graduate program if they do not show improvement within one term. Areas of weakness will be outlined, as well as specific guidelines as to how they can demonstrate improvement. Proof of timely continual academic progress will be required.

PROSPECTUS

Ph.D. students must complete and submit their dissertation prospectus (also called thesis proposal) by June 1 of the third year as a graduate student. The guidelines are as follows:

1. The student should discuss with his/her mentor an appropriate topic and research plan for the thesis proposal, as well as discuss likely names of faculty to serve on the thesis committee. The thesis committee is required to have four members: the mentor and three other faculty, with at least one of those three faculty with a primary appointment in the Department of Neurobiology and one member with a primary appointment outside the Department of Neurobiology. Faculty outside of Yale can be included if they can attend on a regular basis. Non-Yale faculty are often best included as a fifth member, so that a meeting can officially be held in their absence if needed. One member of the thesis committee (not the mentor) is appointed chair.
2. The student should write a proposal of approximately seven (7) pages (following the format of an NIH/NRSA application). This should include (a) the hypothesis to be addressed (specific aims), (b) a few pages of background and significance, (c) preliminary data to demonstrate feasibility, and (d) a research plan including strategies in case proposed experiments fail. It is highly recommended that the thesis include a core of conservative experiments, i.e., very feasible, well-controlled studies. High-risk/high-payoff studies should only be included as "halo" research; i.e., if these fail, the student should still be able to graduate.
3. The mentor should approve the thesis proposal.

4. The student should distribute the proposal to his/her thesis committee members at least one week before the thesis committee meeting, and optimally discuss the proposal with each member individually prior to the meeting to ensure that there are no major problems.
5. The student meets with the thesis committee to approve the thesis proposal. It is at this time that the proposal is often modified, for instance by the suggestion of an additional control experiment. Goals should be realistic and in the interest of the student completing his/her degree in a timely manner. The finalized approved protocol is then provided to the Neurobiology business office, where the registrar will complete the paperwork for advancement to candidacy, obtain the DGS's signature, and then send it to the Graduate School. As this must be completed before June 1, students should convene the thesis committee meetings prior to mid-May.

The student is required to meet with his/her thesis committee on at least a yearly basis to update progress and problems. A one-page summary of this meeting, written by the student and signed by the student, the chair of the thesis committee, the adviser, and the DGS, should also be given to the registrar to reside in the student's file.

ADMISSION TO CANDIDACY

Ph.D. students are required to have been admitted to candidacy by June 1 of the third year as a graduate student. Generally, the submission of the thesis prospectus is the final requirement for admission to candidacy. The paperwork for both is submitted to the Graduate School at the same time. Students who do not meet this standard may be required to petition the Graduate School for permission to register for the following term and can be placed on academic probation until these requirements have been met.

OTHER REQUIREMENTS

All graduate students who are admitted to candidacy are required to have an annual thesis committee meeting; more frequent meetings are encouraged. All graduate students are required to give a student research presentation annually (a brief INP rotation talk early in the graduate career, followed by a longer Neurobiology Student Research Talk as the student's research advances). All students are expected to attend rotation/student research talks.

THESIS DEFENSE

There are several parts to the thesis defense: (1) The student gives the full thesis document to the thesis committee with sufficient time (approximately two weeks) for the committee to read and comment on this large document before the thesis defense. (2) The student defends the thesis in front of the thesis committee in a private setting. It is expected that small changes to the thesis document will be made before submission to the Graduate School. Major changes to the thesis may require additional meetings between the student and the thesis committee before a public defense can be scheduled. (3) The student gives the public defense no less than one month following the private (thesis committee) defense, following approval of the DGS. The public defense is a one-hour seminar summarizing the research and open to the community.

VACATION POLICY

Students making satisfactory progress toward the completion of their Ph.D. degree will have two weeks of vacation in addition to the stated Yale University holidays and the break from Christmas Eve through New Year's Day. Additional vacation time will require permission from the thesis adviser. Although classes are not held, Fall and Spring recesses are not considered Yale University holidays. Proposed exceptions must be discussed with the DGS.

Special Requirements for the M.D./Ph.D.

COURSE REQUIREMENTS

Five courses are required; students must obtain a grade of Honors in two of these courses, and this must be achieved in the first two years of the combined program. Required courses are Principles of Neuroscience (NBIO 501a) and Structural and Functional Organization of the Human Nervous System (NBIO 500b). Three more elective graduate-level courses are required. The following courses taken during the first two years of medical school will count toward the student's elective requirements in the Neurobiology program, provided the student has registered to receive a graduate grade in the course: CBIO 502, CBIO 601, GENE 500b, IBIO 530a, MB&B 800a. In the case of students accepted into the M.D./Ph.D. program during their first year of medical school, a letter from the faculty member in charge of the first-year course indicating the grade achieved in the course is required, and an official transcript from the School of Medicine must be submitted to the Graduate School. In their fourth year of study, all students must successfully complete B&BS 503b, RCR Refresher for Senior BBS Students.

LABORATORY ROTATIONS

Two rotations are required; rotations in another department/program will count toward this requirement upon approval of the Neuroscience track directors.

TEACHING REQUIREMENTS

M.D./Ph.D. students are required to serve as Teaching Fellows (TF) for one term; two terms are preferred. Previous teaching (as TF) in the histology labs or courses in MCDB does count toward this requirement as long as the student has taught while enrolled at Yale as an M.D./Ph.D. student.

QUALIFYING EXAM

M.D./Ph.D. students must complete their qualifying exam before the end of their first year as an affiliated graduate student. Thus, if the student affiliates at the customary 2½-year point (beginning of the spring term of the third year of matriculation at Yale), he/she must complete the examination before registering for the spring term of the fourth year at Yale.

PROSPECTUS

M.D./Ph.D. students must complete and submit their dissertation prospectus (i.e., thesis proposal) by the end of the second year as an affiliated graduate student. Thus, if the student affiliates at the customary 2½-year point, he/she must submit the approved

prospectus before registering for the spring term of the fifth year (at the beginning of year three as an affiliated graduate student).

Please note that every dissertation prospectus must be approved by the thesis committee.

ADMISSION TO CANDIDACY

M.D./Ph.D. students are required to have been admitted to candidacy by the end of the second year as an affiliated graduate student. Generally, the submission of the dissertation prospectus is the final requirement for admission to candidacy, and paperwork for both is submitted to the Graduate School at the same time. Students who do not meet this standard will be required to petition the Graduate School for permission to register for the following term and will be placed on academic probation until these requirements have been met.

OTHER REQUIREMENTS

All M.D./Ph.D. students who are admitted to candidacy are required to have an annual thesis committee meeting; more frequent meetings are encouraged. All M.D./Ph.D. students are required to give a student research presentation annually (a brief INP rotation talk early in the graduate career, followed by a longer Neurobiology Student Research Talk as the student's research advances). All students are expected to attend rotation/student research talks.

Affiliation requirement A copy of the student's application to the M.D./Ph.D. program, a copy of the student's current transcript, and notation of rotations completed must be submitted to the Neurobiology program business office. The DGS must have this information in hand before the official M.D./Ph.D. student affiliation form can be approved. The Neurobiology program business office requests that copies of transcripts for all affiliated M.D./Ph.D. students be forwarded when they are received by the M.D./Ph.D. office.

TIMELINE

Year one M.D./Ph.D. students complete courses in the School of Medicine and register for selected courses in the Graduate School. Most who identify Neuroscience as their probable Ph.D. field will take the required course, Principles of Neuroscience, in the fall term. This is the recommended timing. M.D./Ph.D. students should take NBIO 500b in the spring for Graduate School credit/grade. Other electives as listed above may be taken for Graduate School credit to fulfill our requirements, and indeed, it is recommended that this be done. Two laboratory rotations should be completed in the summer. The DGSs of both the Neurobiology program and the INP may be of assistance in identifying appropriate laboratories based on the student's interests.

Year two Courses in the School of Medicine are typically taken. Part 1 of the Boards is taken.

Year three By January of the third year, a thesis lab should be identified and all paperwork should be completed (affiliation form completed and copy of student's academic record including application transferred to the Neurobiology business office). Student's stipend is supplemented by PI/PI's primary department at time of affiliation.

Year four The Qualifying Examination must be completed within one year of laboratory/program affiliation. Registration for the following term will be denied if this requirement is not fulfilled in a timely manner. Typically this will be fulfilled before the spring term of the fourth year.

Year five The dissertation prospectus must be approved and submitted to the Graduate School by the end of the second year of laboratory/PI affiliation. Typically, this is by the end of the fall term of year five. Registration for the following term will be denied if this requirement is not fulfilled in a timely manner. The Thesis Committee approves the prospectus, and required paperwork is then delivered to the Neurobiology program business office by the student. The Neurobiology program business office will then complete the Admission to Candidacy paperwork and submit it to the Graduate School. The prospectus must be submitted to the Graduate School at least six months before the dissertation is submitted.

Year six Typically an M.D./Ph.D. student will complete and defend his/her dissertation at the end of the fall term or the beginning of the spring term. We require that M.D./Ph.D. students defend their dissertations before returning to fulfill the remaining School of Medicine requirements.

Year seven Student completes all remaining requirements and graduates in May.

While this is considered a guideline for a typical M.D./Ph.D. student, we recognize that not every student will follow this path. Any digression from this timeline must be discussed and approved by the DGS, with appropriate notes to the student's file and copies to the M.D./Ph.D. office. Continued participation in the Neurobiology program is subject to the satisfactory completion of requirements in a timely fashion. If any question arises about the satisfactory progress of a student, and the qualifying examination committee or the thesis committee cannot agree on an appropriate resolution, then the Neurobiology faculty will meet to determine a course of action.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Awarded only to students who are continuing for the Ph.D. degree. Students are not admitted for this degree.

M.S. Awarded only to students who are not continuing for the Ph.D. Students must have successfully completed our equivalent of 30 credit hours in the doctoral program. This includes a passing grade in the four required courses plus two elective courses, a minimum of two Honors grades, and successful completion of both terms of Lab Rotation for First-Year Students (NBIO 512a/b) and both terms of Second-Year Thesis Research (NBIO 513a/b). Students are not admitted for this degree.

Program materials are available upon request to the Director of Graduate Studies, Department of Neurobiology, Yale University, PO Box 208001, New Haven CT 06520-8001.

Courses

NBIO 500b/NSCI 510b, Structural and Functional Organization of the Human

Nervous System Michael Schwartz, Pasko Rakic, and staff

An integrative overview of the structure and function of the human brain as it pertains to major neurological and psychiatric disorders. Neuroanatomy, neurophysiology, and clinical correlations are interrelated to provide essential background in the neurosciences. Lectures in neurocytology and neuroanatomy survey neuronal organization in the human brain, with emphasis on long fiber tracts related to clinical neurology. Weekly three-hour laboratory sessions in close collaboration with faculty members. Lectures in neurophysiology cover various aspects of neural function at the cellular level, with a strong emphasis on the mammalian nervous system. Clinical correlations consist of five sessions given by one or two faculty members representing both basic and clinical sciences. These sessions relate neurological symptoms to cellular processes in various diseases of the brain. Variable class schedule; contact course instructors. This course is offered to graduate and M.D./Ph.D. students only and cannot be audited.

NBIO 501a/NSCI 501a, Principles of Neuroscience Ralph DiLeone, Angeliki Louvi

General neuroscience seminar: lectures, readings, and discussion of selected topics in neuroscience. Emphasis is on how approaches at the molecular, cellular, physiological, and organismal levels can lead to understanding of neuronal and brain function. WF 3:15–4:45

[NBIO 504b/MCDB 735b^U/NSCI 504b, Seminar in Brain Development and Plasticity]

NBIO 507b/NSCI 507b, Cellular and Molecular Mechanisms of Neurological Disease

Sreemanga Chandra, William Cafferty

The course focuses on those diseases (Alzheimer's, Parkinson's, ALS, and other neurodegenerative diseases, triplet repeat induced diseases, multiple sclerosis, epilepsy, etc.) in which modern neuroscience has advanced mechanistic explanations for clinical conditions. It highlights recent molecular, electrophysiological, and imaging experiments in parsing disease mechanisms. The application of pathophysiologic understanding to therapeutics is considered. TTH 4–5

NBIO 510a, Introduction to Methods in Cellular and Molecular Neurobiology

Independent study providing firsthand insight into various techniques and approaches used in neuroscience. Light microscopic techniques include various metallic impregnation methods, autoradiography, anterograde and retrograde axonal transport methods, hybridoma and recombinant DNA technology, deoxyglucose metabolic method, fluorescent and immunocytochemical methods. Electron microscopy encompasses transmission, electronmicroscopic autoradiography, and immuno-peroxidase methodology. Choice of techniques and hours to be arranged with individual faculty or staff members of the Department of Neurobiology.

NBIO 511, Introduction to Techniques Used in Electrophysiological Analysis at the Cellular Level

Independent study providing practical training in in vivo and in vitro nervous system preparations, extracellular and intracellular recordings, sensory stimulation, dye

injections, and selected neuropharmacological procedures. Choice of techniques and hours to be arranged with individual faculty of the Department of Neurobiology.

NBIO 512a/b/NSCI 512a/b, Lab Rotation for First-Year Students Charles Greer
Required of all first-year Neurobiology and Neuroscience graduate students. Rotation period is one term. Both terms required. Grading is Satisfactory/Unsatisfactory.

NBIO 513a/b, Second-Year Thesis Research Michael Crair
Required of all second-year Neurobiology graduate students. Both terms required. Grading is Satisfactory/Unsatisfactory.

[NBIO 532a/NSCI 532a, **Neurobiology of Cortical Systems**]

[NBIO 535b/NSCI 535b, **History of Modern Neuroscience**]

NBIO 540b/NSCI 540b, How to Give a Talk Jessica Cardin
This course is a practical introduction to the art and science of giving a data-based seminar. The ability to give a clear, convincing, and engaging talk about your work is one of the key career skills of successful scientists. Content, visual presentation, body language, and delivery all combine to determine your impact on your audience. The focus in class is on student presentation skills and detailed feedback, interspersed with short example talks by invited guests from Yale and other institutions. Students give at least two talks over the course of the term and participate in weekly Q&A and feedback. Grading is based on class participation. Enrollment limited to ten.

NBIO 570b/C&MP 570b, Sensory Physiology David Zenisek, Joseph Santos-Sacchi, Z. Jimmy Zhou
The course provides an overview of the mammalian special sensory systems, including molecular and cellular bases of vision, audition, taste, olfaction, and somatosensation. Faculty with focus in those areas lead presentations and discussions on peripheral and central mechanisms. Psychophysical aspects of sensation are introduced. TTH 2:30–3:45

NBIO 580b/NSCI 580b, Bioethics in Neuroscience Charles Greer
This course is an introduction to ethics and ethical decision making in the neurosciences. Format for the course is an informal discussion. Each week we are joined by members of the Yale faculty and community who can share their experiences and expertise as it relates to the topic of the week. This course is mandatory for first-year graduate students in the Interdepartmental Neuroscience Program (INP). Grading is Satisfactory/Unsatisfactory and is based on attendance/participation, weekly reaction papers, and a final term paper. The successful (Satisfactory) completion of this course is worth one full graduate course credit. TH 4–5:15

NBIO 590a, Sensory Neuroethology: Bats and Owls, Electric Fish, and Beyond
James Mazer

In this course we review the neurophysiology of sensory processing with particular attention to animal behavior (ethology) and computation. We begin with the classic neuroethology literature and end with current work on neocortical circuits underlying sensory processing in higher vertebrates. This seminar course meets once per week to read and discuss (mostly) primary research papers selected and presented by the students.

[NBIO 595a/NSCI 595a, Seminar in Visuomotor Neurophysiology]

[NBIO 596a/NSCI 596a, Seminar in Neurophysiology of Decision Making]

[NBIO 597b/NSCI 597b, Neuroeconomics Offered every other year]

NBIO 602a/b, Topics in Cortical Development and Evolution Pasko Rakic

This advanced tutorial course involves extensive reading, discussion, and pilot experiments on the topic.

NBIO 610b/C&MP 620b, Fundamentals in Neurophysiology Vincent Pieribone,
Fred Sigworth

The course is designed for students who wish to gain a theoretical and practical knowledge of modern neurophysiology. Graduate students specializing in neurophysiology and non-neurophysiology are encouraged to attend, as the course begins at a very basic level and progresses to more complicated topics. Topics include properties of ion channels, firing properties of neurons, synaptic transmission, and neurophysiology methodology.

NBIO 720a/MCDB 720a^U/NSCI 720a, Neurobiology Haig Keshishian,
Paul Forscher

Examination of the excitability of the nerve cell membrane as a starting point for the study of molecular, cellular, and intracellular mechanisms underlying the generation and control of behavior. MWF 11:35–12:25

NEUROSCIENCE

Sterling Hall of Medicine L-200, 203.785.5932

<http://medicine.yale.edu/neuroscience>

M.S., M.Phil., Ph.D.

Directors of Graduate Studies

Haig Keshishian (*Molecular, Cellular & Developmental Biology*)

(KBT 640, 203.432.3478, haig.keshishian@yale.edu)

Charles Greer (*Neurosurgery; Neurobiology*)

(FMB 412, 203.785.4034, charles.greer@yale.edu)

Professors Amy Arnsten (*Neurobiology; Psychology*), Anton Bennett (*Pharmacology; Comparative Medicine*), Hal Blumenfeld (*Neurology; Neurobiology; Neurosurgery*), Angélique Bordey (*Neurosurgery; Cellular & Molecular Physiology*), Tyrone Cannon (*Psychology*), John Carlson (*Molecular, Cellular & Developmental Biology; on leave [Sp]*), Marvin Chun (*Psychology*), Lawrence Cohen (*Cellular & Molecular Physiology*), Michael Crair (*Neurobiology; Ophthalmology & Visual Science*), Pietro De Camilli (*Cell Biology; Neurobiology*), Nihal de Lanerolle (*Neurosurgery; Neurobiology*), Sabrina Diano (*Obstetrics, Gynecology & Reproductive Sciences; Neurobiology*), Ronald Duman (*Psychiatry; Neurobiology; Pharmacology*), Barbara Ehrlich (*Pharmacology; Cellular & Molecular Physiology*), Paul Forscher (*Molecular, Cellular & Developmental Biology*), Charles Greer (*Neurosurgery; Neurobiology*), Murat Gunel (*Neurosurgery; Genetics; Neurobiology*), David Hafler (*Neurology; Immunobiology*), Joy Hirsch (*Psychiatry*), Tamas Horvath (*Comparative Medicine; Neurobiology*), Jonathon Howard (*Molecular Biophysics & Biochemistry; Physics*), James Howe (*Pharmacology*), D.S. Fahmeed Hyder (*Diagnostic Radiology; Biomedical Engineering*), Marcia Johnson (*Psychology*), Leonard Kaczmarek (*Pharmacology; Cellular & Molecular Physiology*), Haig Keshishian (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics; Ecology & Evolutionary Biology; Psychiatry*), Jeffery Kocsis (*Neurology; Neurobiology*), Anthony Koleske (*Molecular Biophysics & Biochemistry; Neurobiology*), Robert LaMotte (*Anesthesiology; Neurobiology*), Daeyeol Lee (*Neurobiology*), Paul Lombroso (*Child Study Center; Neurobiology*), Laura Manuelidis (*Neuropathology*), Gregory McCarthy (*Psychology*), David McCormick (*Neurobiology*), Mark Mooseker (*Molecular, Cellular & Developmental Biology; Cell Biology; Pathology*), Angus Nairn (*Psychiatry; Pharmacology*), Marina Piccioletto (*Psychiatry; Pharmacology; Neurobiology*), Vincent Pieribone (*Cellular & Molecular Physiology; Neurobiology*), Pasko Rakic (*Neurobiology; Neurology*), Robert Roth, Jr. (*Psychiatry; Pharmacology*), Gary Rudnick (*Pharmacology*), W. Mark Saltzman (*Biomedical Engineering; Cellular & Molecular Physiology; Chemical & Environmental Engineering*), Laurie Santos (*Psychology*), Joseph Santos-Sacchi (*Surgery; Cellular & Molecular Physiology; Neurobiology*), Nenad Sestan (*Neurobiology*), Gordon Shepherd (*Neurobiology*), Fred Sigworth (*Cellular & Molecular Physiology; Biomedical Engineering*), Stephen Strittmatter (*Neurology; Neurobiology*), Jane Taylor (*Psychiatry; Psychology*), Flora Vaccarino (*Child Study Center; Neurobiology*), Christopher van Dyck (*Psychiatry; Neurobiology; Neurology*), Allan Wagner (*Psychology*), Stephen Waxman (*Neurology; Pharmacology; Neurobiology*), Robert Wyman (*Molecular, Cellular &*

Developmental Biology), Z. Jimmy Zhou (*Ophthalmology & Visual Science; Cellular & Molecular Physiology; Neurobiology*), Steven Zucker (*Computer Science; Biomedical Engineering*)

Associate Professors Meenakshi Alreja (*Psychiatry; Neurobiology*), Charles Bruce (*Neurobiology*), Daniel Colon-Ramos (*Cell Biology*), Jonathan Demb (*Ophthalmology & Visual Science; Cellular & Molecular Physiology*), Ralph DiLeone (*Psychiatry; Neurobiology*), Thierry Emonet (*Molecular, Cellular & Developmental Biology; Physics*), Jaime Grutzendler (*Neurology; Neurobiology*), Elizabeth Jonas (*Internal Medicine; Neurobiology*), Michael Koelle (*Molecular Biophysics & Biochemistry*), Chiang-shan Ray Li (*Psychiatry; Neurobiology*), Angeliki Louvi (*Neurosurgery; Neurobiology*), James Mazer (*Neurobiology; Psychology*), Evan Morris (*Diagnostic Radiology; Biomedical Engineering; Psychiatry*), Dhasakumar Navaratnam (*Neurology; Neurobiology*), Michael Nitabach (*Cellular & Molecular Physiology; Genetics*), Kevin Pelphrey (*Child Study Center; Psychology*), Maria Piñango (*Linguistics*), Christopher Pittenger (*Psychiatry; Psychology*), Michael Schwartz (*Neurobiology*), Dana Small (*Psychiatry*), Susumu Tomita (*Cellular & Molecular Physiology*), Justus Verhagen (*Neurobiology*), David Zenisek (*Cellular & Molecular Physiology; Ophthalmology & Visual Science*), Weimin Zhong (*Molecular, Cellular & Developmental Biology; on leave [F]*)

Assistant Professors Nii Addy (*Psychiatry; Cellular & Molecular Physiology*), Sviatoslav Bagriantsev (*Cellular & Molecular Physiology*), William Cafferty (*Neurology*), Jessica Cardin (*Neurobiology*), Sreeganga Chandra (*Neurology; Molecular, Cellular & Developmental Biology*), Steve Chang (*Psychology*), Damon Clark (*Molecular, Cellular & Developmental Biology*), Jason Gerrard (*Neurosurgery*), Elena Gracheva (*Cellular & Molecular Physiology*), June Gruber (*Psychology*), Marc Hammarlund (*Genetics*), Michael Higley (*Neurobiology*), Erdem Karatekin (*Cellular & Molecular Physiology*), In-Jung Kim (*Ophthalmology & Visual Science; Neurobiology*), Hedy Kober (*Psychiatry; Psychology*), Alex Kwan (*Psychiatry*), Ifat Levy (*Comparative Medicine; Neurobiology*), Janghoo Lim (*Genetics*), Timothy Newhouse (*Chemistry*), Satinder Singh (*Cellular & Molecular Physiology*)

Fields of Study

The Interdepartmental Neuroscience Program offers flexible but structured interdisciplinary training for independent research and teaching in neuroscience. The goal of the program is to ensure that degree candidates obtain a solid understanding of cellular and molecular neurobiology, physiology and biophysics, neural development, systems and behavior, and neural computation. In addition to course work, graduate students participate in a regular journal club, organize the Interdepartmental Neuroscience Program Seminar Series, and attend other seminar programs, named lectureships, symposia, and an annual research retreat.

Special Admissions Requirements

Applicants to the Neuroscience Program should have a B.S. or B.A. Most applicants have had course work in neuroscience, psychobiology, physiological psychology, mathematics through calculus, general physics, general biology, general chemistry, organic chemistry,

biochemistry, computer science, or engineering. Deficiencies in these areas can be corrected through appropriate course work in the first year of residence. Laboratory research experience is desirable but is not a formal requirement. Scores for the GRE (General Test required; Subject Test recommended) or MCAT, three letters of recommendation, transcripts of undergraduate grades, and a statement of interest must accompany the application.

To enter the Ph.D. program, students apply to an interest-based track within the interdepartmental graduate Program in the Biological and Biomedical Sciences (BBS).

Special Requirements for the Ph.D. Degree

Each entering student is assigned a faculty advisory committee to provide guidance. This committee is responsible for establishing the student's course of study and for monitoring his or her progress. This committee will be subsequently modified to include faculty with expertise in the student's emerging area of interest. Although each student's precise course requirements are set individually to take account of background and educational goals, the course of study is based on a model curriculum beginning with four core required courses (Principles of Neuroscience, Neurobiology, Bioethics in Neuroscience, and Structural and Functional Organization of the Human Nervous System) designed to ensure broad competence in modern neuroscience. Students must successfully complete NSCI 580b, Bioethics in Neuroscience, prior to the end of their first year of study. Students are also required to complete at least three additional elective courses from a broad set of neuroscience-related courses. The Graduate School uses grades of Honors, High Pass, Pass, and Fail and requires two term grades of Honors during the first two years of study. Students are expected to maintain at least a High Pass average. Additional degree requirements are successful completion of both terms of Lab Rotation for First-Year Students (NSCI 512a/b) and both terms of Second-Year Thesis Research (NSCI 513a/b). This will ensure that degree candidates obtain a solid background in systems, cellular, and molecular approaches to neuroscience. Admission to candidacy requires passing a qualifying examination normally given during the second year, and submission of a dissertation prospectus (NIH grant format) before the end of the third year. In accordance with the expectations of the BBS program, Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Thesis committee meetings are required annually. Also required is the completion and satisfactory defense of the thesis.

Requirements for M.D./Ph.D. students are the same as for Ph.D. students with the following differences: five courses are required (Principles of Neuroscience and Structural and Functional Organization of the Human Nervous System, and three elective graduate-level courses). M.D./Ph.D. students are required to serve for one term as teaching assistants; however, two terms of teaching are preferred.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. Awarded only to students who are not continuing for the Ph.D. degree and have successfully completed the equivalent of 30 credit hours in the doctoral program. This includes a passing grade in the four required courses plus two elective courses, a minimum

of two Honors grades, and successful completion of both terms of Lab Rotation for First-Year Students (NSCI 512a/b) and both terms of Second-Year Thesis Research (NSCI 513a/b). Students are not admitted for this degree.

Program information is available at <http://medicine.yale.edu/neuroscience>.

Courses

NSCI 501a/NBIO 501a, Principles of Neuroscience Ralph DiLeone, Angeliki Louvi
General neuroscience seminar: lectures, readings, and discussion of selected topics in neuroscience. Emphasis is on how approaches at the molecular, cellular, physiological, and organismal levels can lead to understanding of neuronal and brain function.
WF 3:15–4:45

[NSCI 502b/MCDB 730b^U, Cell Biology of the Neuron]

[NSCI 504b/MCDB 735b^U/NBIO 504b, Seminar in Brain Development and Plasticity]

NSCI 507b/NBIO 507b, Cellular and Molecular Mechanisms of Neurological Disease
Sreenganga Chandra, William Cafferty

The course focuses on those diseases (Alzheimer's, Parkinson's, ALS, and other neurodegenerative diseases, triplet repeat induced diseases, multiple sclerosis, epilepsy, etc.) in which modern neuroscience has advanced mechanistic explanations for clinical conditions. It highlights recent molecular, electrophysiological, and imaging experiments in parsing disease mechanisms. The application of pathophysiologic understanding to therapeutics is considered. TTH 4–5

NSCI 510b/NBIO 500b, Structural and Functional Organization of the Human Nervous System Michael Schwartz, Pasko Rakic, and staff

An integrative overview of the structure and function of the human brain as it pertains to major neurological and psychiatric disorders. Neuroanatomy, neurophysiology, and clinical correlations are interrelated to provide essential background in the neurosciences. Lectures in neurocytology and neuroanatomy survey neuronal organization in the human brain, with emphasis on long fiber tracts related to clinical neurology. Weekly three-hour laboratory sessions in close collaboration with faculty members. Lectures in neurophysiology cover various aspects of neural function at the cellular level, with a strong emphasis on the mammalian nervous system. Clinical correlations consist of five sessions given by one or two faculty members representing both basic and clinical sciences. These sessions relate neurological symptoms to cellular processes in various diseases of the brain. Variable class schedule; contact course instructors. This course is offered to graduate and M.D./Ph.D. students only and cannot be audited.

NSCI 512a/b/NBIO 512a/b, Lab Rotation for First-Year Students Charles Greer
Required for all first-year Neurobiology and Neuroscience graduate students. Rotation period is one term. Both terms required. Grading is Satisfactory/Unsatisfactory.

NSCI 513a/b, Second-Year Thesis Research Charles Greer
Required for all second-year Neuroscience graduate students. Both terms required. Grading is Satisfactory/Unsatisfactory.

NSCI 519a/b, Tutorial

By arrangement with faculty and approval of DGS.

[NSCI 521a/PHAR 521a, Neuroimaging in Neuropsychiatry I: Imaging Methods]**NSCI 521b/PHAR 521b, Neuroimaging in Neuropsychiatry II: Clinical Applications**

Irina Esterlis, Hilary Blumberg, Kelly Cosgrove

Neuroimaging methodologies including Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), Magnetic Resonance Imaging (MRI), functional Magnetic Resonance Imaging (fMRI), and Magnetic Resonance Spectroscopy (MRS) are rapidly evolving tools used to study the living human brain. Neuroimaging has unprecedented implications for routine clinical diagnosis, for assessment of drug efficacy, for determination of psychotropic drug occupancy, and for the study of pathophysiological mechanisms underlying neurologic and psychiatric disorders. The course is designed to provide an overview of the application of state-of-the-art neuroimaging methods to research in neurologic and psychiatric disorders. TH 9–10:30

NSCI 523a/ENAS 880a, Imaging Drugs in the Brain Evan Morris, Kelly Cosgrove

Seminar course to explore the uses of PET, SPECT, and fMRI to study the mechanisms of action and long-term effects of drugs (legal and illegal) on brain function. Basic research is the main focus, augmented by two class periods allotted to uses of imaging in drug development by Pharma. Syllabus is comprised of review articles, book chapters, and journal articles. Some class periods begin with a short lecture to cover methodological concepts, followed by discussion of reading material. Topics include basic understanding of imaging technology (physics, biochemistry, and mathematics) as it relates to imaging of drugs, receptors, neurotransmitters; understanding the primary outcomes of imaging experiments; imaging experiment design; recent findings related to drug abuse; common neurophysiological pathways of addictive drugs (how to image reward); and uses of imaging in drug development (what do drug companies want to measure?). T 3:30–5:20

[NSCI 532a/NBIO 532a, Neurobiology of Cortical Systems]**[NSCI 535b/NBIO 535b, History of Modern Neuroscience]****NSCI 540b/NBIO 540b, How to Give a Talk** Jessica Cardin

This course is a practical introduction to the art and science of giving a data-based neuroscience seminar. The ability to give a clear, convincing, and engaging talk about your work is one of the key career skills of successful scientists. Content, visual presentation, body language, and delivery all combine to determine your impact on your audience. The focus in class is on student presentation skills and detailed feedback, interspersed with short example talks by invited guests from Yale and other institutions. Students give at least two talks over the course of the term and participate in weekly Q&A and feedback. Grading is based on class participation. Enrollment limited to ten.

NSCI 580b/NBIO 580b, Bioethics in Neuroscience Charles Greer

This course is an introduction to ethics and ethical decision making in the neurosciences. Format for the course is an informal discussion. Each week we are joined by members of the Yale faculty and community who can share their experiences and expertise as it relates to the topic of the week. This course is mandatory for first-year graduate students in the

Interdepartmental Neuroscience Program (INP). Grading is Satisfactory/Unsatisfactory and is based on attendance/participation, weekly reaction papers, and a final term paper. The successful (Satisfactory) completion of this course is worth one full graduate course credit. TH 4–5:15

[NSCI 595a/NBIO 595a, Seminar in Visuomotor Neurophysiology]

[NSCI 596a/NBIO 596a, Seminar in Neurophysiology of Decision Making]

[NSCI 597b/NBIO 597b, Neuroeconomics Offered every other year]

NSCI 611b/PSYC 611b^U, Systems Neuroscience Steve Chang

This course provides an overview of the fundamental principles governing the central nervous system. Topics include the anatomy of the central nervous system, the neural mechanisms underlying cortical and subcortical control of behavior, various neuroscience techniques, as well as implications for nervous system disorders. The lectures combine basic knowledge of the nervous system with the key experimental findings that led to new discoveries in brain function. TTH 9–10:15

[NSCI 612b/ENAS 812b, Molecular Transport and Intervention in the Brain]

NSCI 720a/MCDB 720a^U/NBIO 720a, Neurobiology Haig Keshishian,
Paul Forscher

Examination of the excitability of the nerve cell membrane as a starting point for the study of molecular, cellular, and intracellular mechanisms underlying the generation and control of behavior. MWF 11:35–12:25

NURSING

400 West Campus Drive, 203.785.2389
<http://nursing.yale.edu/phd-program>
 M.Phil., Ph.D.

Dean

Margaret Grey

Director of Graduate Studies

Robin Whittemore (203.737.2351, robin.whittemore@yale.edu)

Professors Jane Dixon, Marjorie Funk, Margaret Grey, Holly Kennedy, M. Tish Knobf, Ruth McCorkle, Nancy Redeker, Nancy Reynolds, Lois Sadler

Associate Professors Joanne Iennaco, Margaret Moss, Linda Pellico, Allison Shorten, Jacquelyn Taylor, Robin Whittemore

Assistant Professors Wei-Ti Chen, Julie Womack

Fields of Study

Fields include chronic illness (diabetes, cardiovascular disease, cancer, HIV/AIDS); self- and family management; maternal and child health; sleep and sleep disorders; global health; health equity and care of vulnerable populations; acute and critical care; end-of-life and palliative care; genetic and environmental influences on health; gerontology and long-term care; and school- and community-based interventions.

Special Admissions Requirements

Applicants should have a master's degree in nursing, or the equivalent, including previous course work in statistics and graduate-level course work in research methods. The Graduate Record Examination (GRE) General Test is required. The Test of English as a Foreign Language (TOEFL) is required of all applicants for whom English is a second language. Samples of written work (e.g., published article, thesis, literature review) and a curriculum vitae are required. Qualified applicants will be invited for an interview with a member of the doctoral faculty.

Special Requirements for the Ph.D. Degree

COURSE WORK

Completion of fourteen core courses and four cognates in the student's area of specialization (including one advanced analysis course) is required. The fourteen required core courses are: NURS 901a, Research Methods I: Research Designs; NURS 901b, Research Methods II: Mixed Methods; NURS 903a, Research Methods III: Measurement of Health Variables; NURS 905a, Research Methods IV: Intervention Development; NURS 907, Dissertation Seminar (required in each term for years 1–4); NURS 911a, Science, Scholarship, and Communication of Knowledge I; NURS 911b, Science, Scholarship, and Communication of Knowledge II; NURS 913a, Foundations of Scientific Inquiry I: Philosophical and Theoretical Basis for Nursing Science; NURS 913b, Foundations of Scientific Inquiry II: Biopsychosocial Theories of Health; Symptom Management;

Self-Management; NURS 915a, Science, Scholarship, and Communication of Knowledge III; NURS 915b, Science, Scholarship, and Communication of Knowledge IV; NURS 917b, Advanced Statistics for Nursing Research; NURS 929b, Ethical Conduct of Clinical Research; and NURS 941a, Health Policy, Leadership, and Systems.

The grading system includes Honors, High Pass, Pass, and Fail. Students must maintain a High Pass average and achieve a grade of Honors in at least two core courses to remain in good standing. High Pass is required in all core courses in the first year for a student to be eligible to take the Preliminary Examination. After the first year, no more than one grade of Pass in a core course will be permitted. A grade of Pass or better is required for all cognates, including the required advanced analysis course.

In addition to all other requirements, students must successfully complete NURS 929b, Ethical Conduct of Clinical Research, prior to the end of their first year of study. This requirement must be met prior to registering for a second year of study.

GRADUATE RESEARCH ASSISTANT AND TEACHING FELLOW EXPERIENCE

During the first two years of the program, students are Graduate Research Assistants with faculty mentors and participate in the mentor's ongoing research.

Two terms of a Teaching Fellowship Program are required. Teaching Fellows assist with the teaching of larger master's-level courses, typically during their third year of doctoral study.

EXAMINATIONS

Successful completion of three examinations is required.

1. The Preliminary Examination is taken in June after the first year of course work has been completed. A grade of High Pass or better in each core course is required. The Preliminary Examination is intended to allow the student to demonstrate mastery of doctoral course work. Passing the Preliminary Examination is a prerequisite for continuing in the second year of doctoral study.
2. The Qualifying Examination typically takes place during the third year of study, and preferably by the end of the fifth term, when required course work is completed. If the Qualifying Examination is not completed by the end of the sixth term, the student will be placed on Academic Probation. If not completed by the end of the seventh term, the student will be dismissed from the program. The student prepares a comprehensive dissertation proposal containing a statement of the problem to be studied, conceptual framework, critical review of relevant literature, design, methods, and plan for analysis. The oral Qualifying Examination typically lasts 1 to 1.5 hours. The student gives a 15-minute formal presentation of the proposed study and answers questions regarding the research and related topics. Successful completion of the Qualifying Examination is required for candidacy for the doctoral degree.
3. The Final Oral Examination is based on the dissertation. The dissertation is intended to demonstrate that the student is competent in the chosen area of study and has conducted independent research. The Final Oral Examination typically lasts 1.5 to 2 hours. The student gives a 15- to 20-minute formal presentation of the dissertation and answers questions. Successful completion of the Final Oral Examination is required before the Ph.D. can be awarded.

Master's Degree

M.Phil. This degree will be granted to Ph.D. students who successfully complete two years of course work, but do not progress to the dissertation stage. To be awarded the M.Phil. degree, students need to complete all core courses, six cognates (may include independent study with faculty), and two years of Graduate Research Assistant experience, and must pass the Preliminary Examination. This degree is normally granted only to students who are withdrawing from the Ph.D. program.

For information on the terminal master's degree offered by the Yale School of Nursing (Master of Science in Nursing), please visit the School's Web site, <http://nursing.yale.edu>.

Required Courses

NURS 901a, Research Methods I: Research Designs Jane Dixon, Holly Kennedy

This introductory course in research methods provides an opportunity to survey and evaluate various scientific designs to investigate problems of importance to nursing and health. Emphasis is placed on the interrelationships of the clinical problem, study aims, and study design—with goal of understanding methods decisions that are made by researchers, and how these decisions influence study validity and credibility. Qualitative and quantitative approaches to research methods are explored. Required of all Ph.D. students in nursing. Open to master's students with permission of the instructors. Three hours per week.

NURS 901b, Research Methods II: Mixed Methods Robin Whittemore,
M. Tish Knobf

The purpose of this course is to provide an overview of mixed methods research. This overview consists of the history, philosophical foundations, purpose, data collection, analysis, and evaluation of the common mixed methods designs. Required of all Ph.D. students in nursing. Three hours per week for seven weeks.

NURS 903a, Research Methods III: Measurement of Health Variables Jane Dixon

This course focuses on theory of measurement and reliability and validity of research instruments—with emphasis on interaction of conceptual, methodological, and pragmatic considerations. An integration of seminar and lecture is employed. Required of all second-year Ph.D. students in nursing. Open to advanced graduate students in other schools of the University. Three hours per week for seven weeks.

NURS 904a/b, Doctoral Independent Study

This elective is initiated by the student and negotiated with faculty. The purpose is to allow in-depth pursuit of individual areas of interest and/or practice. A written proposal must be submitted and signed by the student, the faculty member(s), and the program chairperson.

NURS 905a, Research Methods IV: Intervention Development M. Tish Knobf,
Lois Sadler

This seminar focuses on the research methods necessary for the understanding, developing, and testing of interventions to improve outcomes in health and illness. Content

includes the use of various approaches to the development of biobehavioral interventions. The second half of the module deals with methodological issues in carrying out clinical intervention research. Required of all second-year Ph.D. students in nursing. Open to others with permission of the instructor. Three hours per week for seven weeks.

NURS 907, Dissertation Seminar Nancy Redeker

This required doctoral course provides the student with advanced study and direction in research leading to development of the dissertation proposal and completion of the dissertation. Students are guided in the application of the fundamentals of scientific writing and criticism. All Ph.D. students in nursing are required to take this seminar every term. Three hours per month.

NURS 911a, Science, Scholarship, and Communication of Knowledge I

This is the first course in a four-course sequence designed to socialize the student into the roles and responsibilities of a Ph.D.-prepared nurse scientist. Students develop specific beginning competencies necessary to engage in a career as an independent nurse scientist, including basic principles and processes of scientific writing and communication, and research priorities and strategies for building a program of research. The NURS 911/915 seminar series accompanies the research practicum and is required of all Ph.D. students in nursing. One hour every other week.

NURS 911b, Science, Scholarship, and Communication of Knowledge II

This is the second course in a four-course sequence designed to socialize the student into the roles and responsibilities of a Ph.D.-prepared nurse scientist. Students develop specific beginning competencies necessary to engage in a career as an independent nurse scientist, including basic principles and processes of grant writing and communicating research results. The NURS 911/915 seminar series accompanies the research practicum and is required of all Ph.D. students in nursing. One hour every other week.

NURS 913a, Foundations of Scientific Inquiry I: Philosophical and Theoretical Basis for Nursing Science Nancy Redeker, Robin Whittemore

In this course students examine the nature of the philosophical and theoretical basis for nursing science. The nature of science is explored through a dialogue of competing philosophical perspectives, such as logical positivism, post-positivism, historicism, critical theory, and post-structuralism. The philosophies that have informed the scientific process and the conceptual and theoretical underpinnings of nursing science are discussed. Specific approaches to concept/theory development and analysis, with linkages to philosophical perspectives, are examined. Required of all Ph.D. students in nursing. Three hours per week.

NURS 913b, Foundations of Scientific Inquiry II: Biopsychosocial Theories of Health; Symptom Management; Self-Management Nancy Reynolds

This course examines major conceptualizations of health and illness, self- and family management, and research supporting these conceptualizations. Emphasis is placed on the link between health and illness self-management, with particular emphasis on vulnerable populations, and related concepts such as symptom distress, self-efficacy and coping, and the contributions of risk and protective factors to self-management. Self-management is considered from both an individual and family perspective, and sociocultural

influences on self-management are explored. Required of all Ph.D. students in nursing. Three hours per week.

NURS 915a, Science, Scholarship, and Communication of Knowledge III

This is the third course in a four-course sequence designed to socialize the student into the roles and responsibilities of a Ph.D.-prepared nurse scientist. Students develop specific beginning competencies necessary to engage in a career as an independent nurse scientist, including basic principles and processes of peer review, responding to research critiques, and publishing research results. The NURS 911/915 seminar series accompanies the research practicum and is required of all Ph.D. students in nursing. One hour every other week.

NURS 915b, Science, Scholarship, and Communication of Knowledge IV

This is the fourth course in a four-course sequence designed to socialize the student into the roles and responsibilities of a Ph.D.-prepared nurse scientist. Students develop specific beginning competencies necessary to engage in a career as an independent nurse scientist, including basic principles and processes of grant management, mentorship, career planning, and roles and responsibilities of the nurse scientist and leader. The NURS 911/915 seminar series accompanies the research practicum and is required of all Ph.D. students in nursing. One hour every other week.

NURS 917b, Advanced Statistics for Nursing Research Margaret Holland

This course starts with a review of basic descriptive and inferential statistics and advances to multivariate analyses most commonly used in nursing studies. The emphasis is on attaining a conceptual understanding of these statistical techniques, selecting appropriate techniques for a given clinical research problem, conducting computer-assisted data analyses, and correctly expressing the results of such analyses. The laboratory part of the course covers fundamentals of data management and statistical analysis, and proceeds to the conduct of advanced analyses. The course emphasizes using programming language in SAS; however, the menu-driven user interfaces in SAS, SPSS, n-Query, MS Excel, and MS Access also are briefly covered. This course is required of all Ph.D. students in nursing and may be elected by M.S.N. students with permission of the instructors. Three hours per week.

NURS 929b, Ethical Conduct of Clinical Research Lois Sadler

The course introduces major concepts in the ethical conduct of clinical research from the perspective of the advanced practice nurse and the nurse-researcher. National and international ethical codes for research and regulatory requirements are reviewed. Emphasis is placed on the protection of vulnerable populations and community-based research, including international research. Required of all Ph.D. students in nursing. Open to others with permission of the instructor. One hour per week.

NURS 941a, Health Policy, Leadership, and Systems

The course addresses salient issues in health policy and the challenges to linking research and clinical care with public and private policy agendas. The course covers the following topics: health care delivery systems; policy and political factors that affect access to care and its financing, delivery, and quality; challenges to evidence-based policy and

the dissemination of research findings to policy and community-based leaders. It also includes theories of leadership and policy change relevant to students' research topics. Critical thinking, problem-solving skills, and research-based analysis are integrated throughout the course. A major written assignment suitable for submission to a peer-reviewed journal (or that can be easily modified for same) is a course requirement. Prerequisite: students must pass a test based on the online Yale University School of Nursing Health Policy Module. Required of all Ph.D. students in nursing. Three hours per week.

Electives

NURS 923a, Current Issues in Cardiovascular Nursing Research Marjorie Funk

Students examine current issues in cardiovascular nursing research. Topics vary each year to reflect the current state of the science. Prerequisites: clinical background in cardiovascular nursing and doctoral-student standing. Open to others with permission of the instructors. Two hours every other week and thirty hours at the Scientific Sessions of the American Heart Association.

NURS 927b, Research in Care of People with Cancer or at Risk for Cancer and Their Families M. Tish Knobf

This course focuses on the current state of the science in care of people with cancer, or at risk for cancer, and their families. Specific attention is paid to factors associated with quality-of-life outcomes, such as symptoms, functional status, and affect; and factors that place people at high risk, such as family history, ethnicity, and socioeconomic class. Research from nursing, medicine, and the social sciences is discussed. Two hours per week.

NURS 931b, Creating Methods: Innovation and Synthesis Jane Dixon

This elective doctoral seminar explores methodological development in nursing and health research, through illustration of how methodological perspectives are conceptualized and systematically analyzed, in order to prepare the learner to contribute to the methods literature. During the first part of the course, we examine methods papers of various types. Each student prepares a methods paper of publishable quality. Ideally, this may become a methods paper for the dissertation. There is a focus on advanced quantitative design, including large datasets and secondary analysis.

PHARMACOLOGY

Sterling Hall of Medicine B316, 203.785.7469

<http://medicine.yale.edu/pharm>

M.S., M.Phil., Ph.D.

Chair

Joseph Schlessinger

Director of Graduate Studies

Elias Lolis (SHM B345, 203.785.6233, elias.lolis@yale.edu)

Co-Directors of Medical Studies

James Howe (SHM B251, 203.737.2398, james.howe@yale.edu)

Benjamin Turk (SHM B395, 203.737.2494, ben.turk@yale.edu)

Professors Karen Anderson, Anton Bennett, Yung-chi Cheng, Jack Cooper (*Emeritus*), Priscilla Dannies (*Emerita*), Barbara Ehrlich, Jonathan Ellman, James Howe, Leonard Kaczmarek, Mark Lemmon, Elias Lolis, Gary Rudnick, Joseph Schlessinger, William Sessa, Dianging (Dan) Wu

Associate Professors Titus Boggon, David Calderwood, Kathryn Ferguson, Ya Ha, Irit Lax, Benjamin Turk

Fields of Study

Major emphases in the department are in the areas of molecular pharmacology, mechanisms of drug action, signal transduction, structural biology, neuropharmacology, and chemotherapy.

Special Admissions Requirements

A bachelor's degree in biology, chemistry, or another science is required. Undergraduate courses should include biology, organic chemistry, physics, and calculus. GRE scores are required; a GRE Subject Test, preferably in Biology or Chemistry, is recommended.

To enter the Ph.D. program, students should apply to an interest-based track within the interdepartmental graduate program in the Biological and Biomedical Sciences. Most students interested in a Ph.D. in Pharmacology apply through the Molecular Medicine, Pharmacology, and Physiology track or the Biochemistry, Biophysics, and Structural Biology track.

Special Requirements for the Ph.D. Degree

Because the field of pharmacology encompasses many disciplines, the department's flexible program of study toward the Ph.D. degree permits students to concentrate in areas of their particular interest. Students must take the core graduate pharmacology course (PHAR 504a) and the two terms of the graduate seminar course (PHAR 502a/b) or equivalent from another department. The other courses will be selected based on each student's interest but must include at least two of three other courses: PHAR 528a, PHAR 529b, and PHAR 550a; PHAR 560b may be substituted for PHAR 550a. Students are

required to do three laboratory rotations. The Graduate School requires a grade of Honors for a minimum of two courses. Honors for seminar courses or rotations cannot be used toward this requirement. Students must meet the Honors requirement by the end of the fourth term of full-time study. Students must also maintain an overall High Pass average. A grade of Honors or High Pass is required for PHAR 504a. Student progress toward these goals is reviewed at the end of the second term.

Prior to registering for a second year of study, students must successfully complete PHAR 580b, The Responsible Conduct of Research. In addition, two lectures of PHAR RCR requirements and one lecture of B&BS 503, RCR Refresher for Senior BBS Students, must be completed by the end of the fourth year.

Students are also required to pass the qualifying examination by the end of their fourth term. Before the end of the third year, a thesis prospectus must be submitted and accepted for admission to candidacy. A doctoral dissertation based upon original research includes an oral presentation given only to the pharmacology faculty (pre-defense). Within six months of passing the pre-defense, the student must submit a preliminary written thesis to the thesis committee and an outside reader. A public Ph.D. dissertation seminar will be scheduled, followed by a closed examination by the thesis committee and the outside examiner. Once the draft of the written thesis is approved by the thesis committee, it is submitted to the Graduate School. Two first-author manuscripts are required from the thesis research.

An important aspect of graduate training in pharmacology is the acquisition of teaching skills through the participation in courses related to the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school levels. Ph.D. students are required to participate in two terms (or the equivalent) of teaching. Fulfillment of this requirement occurs by the end of the third year. Students are not expected to teach during their first year.

M.D./Ph.D. Students

M.D./Ph.D. students must satisfy all of the above requirements for the Ph.D. with the following modifications: (1) only two of three laboratory rotations are required; (2) some medical school courses (except Pharmacology) can qualify as Graduate School courses as long as the M.D./Ph.D. student registers for them in OCS (Online Course Selection); and (3) only one term of teaching is required.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. (en route to the Ph.D.) Students are eligible for the M.S. degree upon successful completion of the first three terms of the Ph.D. program. This includes one year of lab rotations and course requirements.

Program materials are available upon request to the Director of Graduate Studies, Department of Pharmacology, Yale University, PO Box 208066, New Haven CT 06520-8066.

Courses

PHAR 502a/C&MP 630a/PATH 680a, Seminar in Molecular Medicine,

Pharmacology, and Physiology Don Nguyen, Titus Boggon

Readings and discussion on a diverse range of current topics in molecular medicine, pharmacology, and physiology. The class emphasizes analysis of primary research literature and development of presentation and writing skills. Contemporary articles are assigned on a related topic every week, and a student leads discussions with input from faculty who are experts in the topic area. The overall goal is to cover a specific topic of medical relevance (e.g., cancer, neurodegeneration) from the perspective of three primary disciplines (i.e., physiology: normal function; pathology: abnormal function; and pharmacology: intervention).

PHAR 504a, Principles of Pharmacology Elias Lolis

This course covers the molecular mechanisms of therapeutics, which are presented in a conceptual framework to increase understanding but decrease memorization. Topics include (but are not limited to) receptor affinity, efficacy, multiple equilibria, pharmacokinetics, and toxicity; enzyme kinetics and inhibition, drug discovery and design; molecular basis of antimicrobial therapy, cardiology drugs, anticancer and antiviral therapies; and therapeutics for inflammatory disorders, asthma, and allergy. MW 11:35–12:50

PHAR 506a and b, Methods in Pharmacological Research (Rotations) Elias Lolis

Students work in laboratories of faculty of their choice. The schedule for each rotation is announced at the beginning of the fall term.

[PHAR 521a/NSCI 521a, Neuroimaging in Neuropsychiatry I: Imaging Methods]

PHAR 521b/NSCI 521b, Neuroimaging in Neuropsychiatry II: Clinical Applications

Irina Esterlis, Hilary Blumberg, Kelly Cosgrove

Neuroimaging methodologies including Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), Magnetic Resonance Imaging (MRI), functional Magnetic Resonance Imaging (fMRI), and Magnetic Resonance Spectroscopy (MRS) are rapidly evolving tools used to study the living human brain. Neuroimaging has unprecedented implications for routine clinical diagnosis, for assessment of drug efficacy, for determination of psychotropic drug occupancy, and for the study of pathophysiological mechanisms underlying neurologic and psychiatric disorders. The course is designed to provide an overview of the application of state-of-the-art neuroimaging methods to research in neurologic and psychiatric disorders. TH 9–10:30

PHAR 528a, Principles of Signal Transduction Anton Bennett

The regulation of intracellular signaling is of fundamental importance to the understanding of cell function and regulation. This course introduces the broad principles of intracellular signal transduction. More detailed lectures on specific intracellular signaling pathways are given in which students learn both the basic and most recent and cutting-edge concepts of intracellular signaling. Topics include regulation of signaling by protein phosphorylation, small G proteins, G-protein-coupled receptors, hormones, phospholipids, adhesion, and gasses.

PHAR 529b, Structural Pharmacology Ya Ha, Titus Boggon

The goal of the course is to show students how concepts of structural biology are applied to areas of great importance in pharmacology such as protein kinases, proteases, cell surface receptors, integrins and other membrane-bound enzymes, and transporters and channels, and how these concepts facilitate drug development. TTH 2–3:30

PHAR 530b, Practical Applications in Structural Pharmacology Ya Ha,

Titus Boggon

This 0.5-credit course begins on February 24, joining PHAR 529b. The goal of the course is to show students how concepts of structural biology are applied to areas of great importance in pharmacology such as protein kinases, proteases, cell surface receptors, integrins and other membrane-bound enzymes, and transporters and channels, and how these concepts facilitate drug development. TTH 2–3:30

PHAR 550a/C&MP 550a^U/ENAS 550a^U/MCDB 550a^U, Physiological Systems

Emile Boulpaep, W. Mark Saltzman

The course develops a foundation in human physiology by examining the homeostasis of vital parameters within the body, and the biophysical properties of cells, tissues, and organs. Basic concepts in cell and membrane physiology are synthesized through exploring the function of skeletal, smooth, and cardiac muscle. The physical basis of blood flow, mechanisms of vascular exchange, cardiac performance, and regulation of overall circulatory function are discussed. Respiratory physiology explores the mechanics of ventilation, gas diffusion, and acid-base balance. Renal physiology examines the formation and composition of urine and the regulation of electrolyte, fluid, and acid-base balance. Organs of the digestive system are discussed from the perspective of substrate metabolism and energy balance. Hormonal regulation is applied to metabolic control and to calcium, water, and electrolyte balance. The biology of nerve cells is addressed with emphasis on synaptic transmission and simple neuronal circuits within the central nervous system. The special senses are considered in the framework of sensory transduction. Weekly discussion sections provide a forum for in-depth exploration of topics. Graduate students evaluate research findings through literature review and weekly meetings with the instructor. MWF 9:25–10:15

PHAR 560b/C&MP 560b^U/ENAS 570b^U/MCDB 560b^U, Cellular and Molecular

Physiology: Molecular Machines in Human Disease Emile Boulpaep,

Fred Sigworth

The course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiological levels. Students learn about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed on the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiological behaviors of cells and tissues are also stressed. Molecular motors are introduced and their mechanical relationship to cell function is explored. Students read papers from the scientific literature that establish the connections between mutations in genes encoding membrane proteins and a wide variety of human genetic diseases. MWF 9:25–10:15

PHAR 580/C&MP 650/PATH 660, The Responsible Conduct of Research

Barbara Ehrlich, Demetrios Braddock

Organized to foster discussion, the course is taught by faculty in the Pharmacology, Pathology, and Physiology departments and two or three senior graduate students. Each session is based on case studies from primary literature, reviews, and two texts: Francis Macrina's *Scientific Integrity* and Kathy Barker's *At the Bench*. Each week, students are required to submit a reaction paper discussing the reading assignment. Students take turns leading the class discussion; a final short paper on a hot topic in bioethics is required. TH 11–12:15

PHILOSOPHY

Connecticut Hall, 203.432.1665

<http://philosophy.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Stephen Darwall

Director of Graduate Studies

Sun-Joo Shin [F] (C205, 203-432-6971, sun-joo.shin@yale.edu)

Zoltán Szabó [Sp] (C301, 203.432.1669, zoltan.szabo@yale.edu)

Professors Seyla Benhabib (*on leave* [Sp]), David Charles (*on leave* [F]), Stephen Darwall, Michael Della Rocca, Keith DeRose, Paul Franks (*on leave* [Sp]), Tamar Gendler, John Hare, Karsten Harries (*on leave* [Sp]), Verity Harte (*on leave* [Sp]), Brad Inwood, Shelly Kagan, Joshua Knobe, Mary Margaret McCabe, Thomas Pogge, Scott Shapiro, Sun-Joo Shin, Steven Smith, Jason Stanley, Zoltán Szabó (*on leave* [F]), Kenneth Winkler, Gideon Yaffe

Assistant Professors Daniel Greco (*on leave*), Elizabeth Miller, John Pittard, Bruno Whittle

Fields of Study

The department offers a wide range of courses in various traditions of philosophy, with strengths and a well-established reputation in the history of philosophy, ethics, metaphysics, epistemology, and philosophy of art, as well as other central topics.

Special Requirements for the Ph.D. Degree

In the first two years all students must complete a total of twelve term courses. Graduate courses are grouped: (1) metaphysics, theory of knowledge, philosophy of science; (2) ethics, aesthetics, philosophy of religion, political philosophy, and theory of value; (3) history of philosophy. No more than six and no fewer than two courses may be taken in each group. A course in logic must also be taken, although on the basis of previous work a student may petition to have this requirement waived. Two qualifying papers must be submitted, one in the history of philosophy, the other in another distribution area; normally the first of these papers will be submitted by mid-September, the second by December, of a student's third year. It is expected that these papers will be more substantial and professional than an ordinary term paper. Students must demonstrate skills required for research in their field of expertise in one of the following ways (normally by the end of the second year): (a) competence in at least one of the following languages: French, German, Greek, or Latin; (b) competence in another language whose literature is directly related to their philosophical research; or (c) competence in some set of skills required for independent research in their areas of expertise. Students in Philosophy will teach in the third and fourth (and possibly sixth) years. They must have teaching experience in at least two distribution areas. Approval of the dissertation prospectus is expected before the end of the sixth term. Upon completion of all predissertation requirements,

including the prospectus, students are admitted to candidacy for the Ph.D. Admission to candidacy must take place by the end of the third year of study. The norm for completion of the Ph.D. degree is five to six years.

Classics and Philosophy Combined Ph.D. Program

The Classics and Philosophy Program is a combined program, offered by the Departments of Classics and Philosophy at Yale, for students wishing to pursue graduate study in ancient philosophy. Suitably qualified students may apply for entry to the program either through the Classics department for the Classics track or through the Philosophy department for the Philosophy track.

Applicants for the Classics track of the combined program must satisfy the general requirements for admission to the Classics graduate program, in addition to the requirements of the Classics track of the combined program. Details of the Classics track of the program are available online at www.yale.edu/classics/research_philosophy_program.html.

Applicants for the Philosophy track of the combined program must satisfy the general requirements for admission to the Philosophy graduate program, in addition to the requirements of the Philosophy track of the combined program. Details of the Philosophy track of the program are available online at <http://philosophy.yale.edu/graduate-program/classics-and-philosophy-program>.

The combined program is overseen by an interdepartmental committee currently consisting of Verity Harte, David Charles, and Brad Inwood together with the director of graduate studies for Classics and the director of graduate studies for Philosophy.

Philosophy and Psychology Combined Ph.D. Program

The Philosophy and Psychology Program is a combined program, offered by the Departments of Philosophy and Psychology at Yale. Students enrolled in the program complete a series of courses in each discipline as well as an interdisciplinary dissertation that falls at the intersection of the two. On completing these requirements, students are awarded a Ph.D. either in Philosophy and Psychology, or in Psychology and Philosophy.

Students can be admitted into the combined program either through the Psychology department or through the Philosophy department. Students must be accepted into one of these departments (the “home department”) through the standard admissions process, and both departments must then agree to accept the student into the combined program.

Students can be accepted into the combined program either (a) at the time they initially apply for admission to their home department, or (b) after having already completed some course work within the home department. In either case, students must be accepted into the combined program by each department.

Students in the combined program complete two-thirds of the course requirements of each of the two disciplines, then write a qualifying paper and a dissertation that are fully interdisciplinary. For more details about the program requirements, see <http://philosophy.yale.edu/graduate-program/philosophy-and-psychology-combined-phd-program>.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. (en route to the Ph.D.) An M.A. degree is awarded to students after completion of seven term courses with an average grade of High Pass.

Please see the Philosophy Web site for information on the program: <http://philosophy.yale.edu>.

Courses

PHIL 567a^U, Mathematical Logic I Sun-Joo Shin

An introduction to the metatheory of first-order logic, up to and including the completeness theorem for the first-order calculus. An introduction to the basic concepts of set theory is included. MW 11:35–12:25

PHIL 570a^U, Epistemology Keith DeRose

Introduction to current topics in the theory of knowledge. The analysis of knowledge, justified belief, rationality, certainty, and evidence. MW 11:35–12:25, 1 HTBA

PHIL 614b^U/RLST 901b^U, Martin Heidegger Noreen Khawaja

A comprehensive introduction to the oeuvre of Martin Heidegger. Key texts from *Being and Time* to the essay on technology, including the famous “Rectoral Address” of 1933, and writings on poetry, art, and theology. Consideration of Heidegger’s work in systematic and historical terms. Focus on his attempt to use philosophy to incite an “essential transformation in the history of Western spirit” along with its stakes, limitations, and consequences. W 3:30–5:20

PHIL 615b^U, Hume Kenneth Winkler

A study of Hume’s epistemology and metaphysics and his science of human nature. Topics include space and time; inductive reasoning; causation; belief in an external world; personal identity; liberty and necessity; moral judgment; religious belief; and skepticism. Readings in Book I of *A Treatise of Human Nature*, *An Enquiry concerning Human Understanding*, and *Dialogues concerning Natural Religion*. W 3:30–5:20

PHIL 616b^U, Philosophy of Spinoza Michael Della Rocca

An in-depth study of Spinoza’s philosophy with attention to his major work, the *Ethics*, as well as his political writings, the *Treatise on the Emendation of the Intellect*, the letters, and other writings. Focus not only on Spinoza’s metaphysics, but also on his views on philosophy of mind, teleology, action, and emotion. Some attention also to competing methods for interpreting works in the history of philosophy. T 3:30–5:20

PHIL 617b^U/JDST 651b^U, Critical Theory and the Frankfurt School

Asaf Angermann

This course is an introduction to the thought and writings of the philosophers known as the Frankfurt School, who founded and developed the idea of Critical Theory. Taken in its original meaning as a method or even a practice, rather than a systematic theory, Critical Theory suggests a way of thinking about the interrelations between philosophy and society, culture and politics, and on the complex relation between philosophical

concepts and social reality. By reading key texts of Frankfurt School authors such as Adorno, Horkheimer, Marcuse, Benjamin, Kracauer, and Fromm, the course inquires into the meaning of concepts such as critique, history, freedom, individuality, emancipation, and aesthetic experience. T 3:30–5:20

PHIL 619a^U, Descartes Karsten Harries

An examination of Descartes as a founder of the modern world picture. Consideration of all his major works. T 1:30–3:20

PHIL 622a^U/CLSS 622a^U, Plato's *Republic* Verity Harte, Mary Margaret McCabe

Reading and philosophical discussion of the whole of Plato's major work, *The Republic*. Core class has readings in translation. Additional discussion section for graduate students. W 3:30–5:20, F 2–3:30

PHIL 623b^U, Aristotelian Virtue Theory David Charles

What kind of characteristic is virtue? What makes virtuous activity good to do? In addressing these questions, we first consider Aristotle's account of virtue and then those suggested by some neo-Aristotelian "virtue ethicists" including Anscombe, Foot, Hursthouse, and Thompson. Our main focus is on the connections among action, value, and practical knowledge. W 3:30–5:20

PHIL 626a^U, Cognitive Science of Morality Joshua Knobe

Introduction to the emerging field of moral cognition. Focus on questions about the philosophical significance of psychological findings. Topics include the role of emotion in moral judgment; the significance of character traits in virtue ethics and personality psychology; the reliability of intuitions and the psychological processes that underlie them. M 1:30–3:20

PHIL 627b^U, Computability and Logic Sun-Joo Shin

A technical exposition of Gödel's first and second incompleteness theorems and of some of their main consequences in consequences in proof theory and model theory, such as Lob's theorem, Tarski's undefinability of truth, provability logic, and nonstandard models of arithmetic. M 3:30–5:20

PHIL 628b^U, Propositions, Truth, and Paradox Bruno Whittle

Semantic paradoxes and the question of how to give adequate accounts of truth and of propositions in light of them. Readings include recent work on languages that contain their own truth predicates and on attempts to give consistent accounts of structured propositions. T 7–8:50

PHIL 640a^U, Action and Metaphysics Michael Della Rocca

An examination of central themes in the philosophy of action over the past half-century and their connection to important trends in recent metaphysics. Topics to be covered include causal vs. non-causal theories of action, the individuation of actions (and of events), reasons for action, deviant causal chains, the nature of intention. Exploration of a Parmenidean monism of action. Special attention to the relation between action and ground, between action and relations, and between action and meaning. Authors include Davidson, Anscombe, Frankfurt, Bratman, Velleman, Railton, Peacocke, Sarah Paul, Korsgaard, Lavin, Anton Ford, Bradley, Schaffer, Gideon Rosen. T 3:30–5:20

PHIL 641b^U, Reductionism Elizabeth Miller

An exploration of some reductive approaches in contemporary metaphysics and philosophy of science and some challenges to the reductive project. Is there a deep sense in which all the complexity of reality reduces to some more limited class of fundamental features? TH 1:30–3:20

PHIL 643a^U, Philosophy of Quantum Mechanics Elizabeth Miller

An examination of a wide range of philosophical issues as informed by quantum mechanics. Evaluation of different, and controversial, interpretations of quantum mechanics and their distinct ontologies. Subtopics include the measurement problem, non-locality and holism, wave function realism, and the relationship between physics and metaphysics. T 1:30–3:20

PHIL 644b^U, Philosophy of Wilfrid Sellars Jay Garfield

History may well see Wilfrid Sellars as the most influential philosopher of the twentieth century, but his work is little known outside of the world of professional philosophy. Sellars's thought is grounded in a nuanced reading of the history of Western philosophy, with a particular focus on Kant and his response to problems arising in early modern European philosophy. But Sellars's principal contributions are in the philosophy of science, philosophy of mind, epistemology, the philosophy of language, and metaphysics. His critiques of foundationalism, his formulation of functionalism, and his investigations of intentionality and the relationship of normativity to naturalism shape all thinking about these issues in the Western philosophical world today. We read Sellars's most important essays and explore the system of philosophical thought they constitute. Prerequisites: at least one intermediate-level course in epistemology or the philosophy of mind, and at least one course in the history of modern European philosophy. T 1:30–3:20

PHIL 645b^U/CPLT 629b^U/GMAN 563b^U, Nietzsche and His Readers Paul North

Reading and discussion of Friedrich Nietzsche's major texts, as well as critiques and interpretations by some of his most influential twentieth-century readers. T 3:30–5:20

PHIL 646b^U, Philosophy of Language: Situations and Events Zoltán Szabó

The class investigates the promise of unifying event-semantics and situation-semantics and raises questions about the underlying metaphysics of the theory. W 1:30–3:20

PHIL 647b^U, Buddhist-Western Philosophical Engagement Jay Garfield

The last few decades have seen a gradual rapprochement between Western philosophy and Buddhist studies, reflecting an increased awareness on each side of the relevance of work on the other. In this course we read recent books addressing the intersections between Buddhist and Western philosophy and the contributions each can make to the other. Prerequisite: at least one intermediate-level course in Western philosophy or in Buddhist studies. T 9:25–11:15

PHIL 655a^U, Normative Ethics Shelly Kagan

A systematic examination of normative ethics, the part of moral philosophy that attempts to articulate and defend the basic principles of morality. The bulk of the course surveys and explores some of the main normative factors relevant in determining the moral status of a given act or policy (features that help make a given act right or wrong). Brief

consideration of some of the main views about the foundations of normative ethics (the ultimate basis or ground for the various moral principles). TH 1:30–3:20

PHIL 657a^U/PLSC 611a^U, Recent Work on Justice Thomas Pogge

In-depth study of one contemporary book, author, or debate in political philosophy, political theory, or normative economics. Depending on student interest, this might be a ground-breaking new book, the life's work of a prominent author, or an important theme in contemporary political thought. T 1:30–3:20

PHIL 663a^U/LAW 20662/PLSC 605a^U, Rethinking Sovereignty, Human Rights, and Globalization Seyla Benhabib

This course explores conceptions of sovereignty, cosmopolitanism, and human rights as basic elements of the international political order from the dawn of the modern age to the present in historical, philosophical, and jurisprudential aspects. T 3:30–5:30

PHIL 671a^U, Moral Emotions Stephen Darwall

A close study of the role of emotions and attitudes in the moral life and in moral philosophy. The course investigates the nature of emotions such as shame, guilt, gratitude, love, and respect, as well as such related phenomena as empathy and sympathy. It considers their relation to fundamental moral concepts, as well as their epistemological role and capacity to ground moral judgments and facts. W 7–8:50

PHIL 672a^U/GMAN 651a^U/PLSC 583a^U, Contemporary Critical Theory

Seyla Benhabib

A careful examination of Hegel's theory of the modern state and its elaboration by Habermas and Honneth. W 9:25–11:15

PHIL 673b^U, Theories of the Good Shelly Kagan

What features make one outcome intrinsically better or worse than another from the moral point of view? We examine four values that may be relevant: (1) How are judgments of individual well-being to be combined into an overall assessment of an outcome? (2) Is virtue intrinsically valuable, or only instrumentally so? (3) Does the distribution of well-being matter, and if so, what makes an outcome better or worse with regard to equality? (4) Finally, what is the significance of people getting the particular level of well-being that they deserve? M 1:30–3:20

PHIL 705a, First-Year Seminar Michael Della Rocca, Paul Franks

Required of and limited to first-year students in the Philosophy Ph.D. program. Topic varies from year to year. Preparation for graduate work. Reading, writing, and presentation skills. W 1:30–3:20

PHIL 706a, Work in Progress Sun-Joo Shin

In consultation with the instructor, each student presents a significant work in progress, e.g., a revised version of an advanced seminar paper or a dissertation chapter. Upon completion of the writing, the student presents the work in a mock colloquium format, including a formal question-and-answer period. M 1:30–3:20

PHIL 717a, Recent Work and Research in Epistemology Keith DeRose

A study of some prominent issues in current epistemology, focusing on literature relevant to research interests of students and the instructor. Topics may include skepticism, internalist vs. externalist accounts of knowledge and of justification, the structure of knowledge and of justification (foundationalism, coherentism), contextualism in epistemology, relevant alternative accounts of knowledge, and the epistemology of lotteries. Students not in the philosophy graduate program are welcome, but should contact the instructor for permission and further information before enrolling. M 3:30–5:20

PHIL 718a/LAW 20104/PLSC 553a, Justice Bruce Ackerman

An examination of contemporary theories, together with an effort to assess their practical implications. Authors this year include Peter Singer, Richard Posner, John Rawls, Robert Nozick, Michael Walzer, Marian Young, and Roberto Unger. Topics: animal rights, the status of children and the principles of educational policy, the relation of market justice to distributive justice, the status of affirmative action. Follows Law School academic calendar. MT 4:10–6

PHIL 720b, Recent Work in Philosophy of Religion Keith DeRose

A study of recent work in the philosophy of religion, with a focus on the problem of evil, the possible place of human freedom in a world governed by God, and the epistemology of religious, and particularly, theistic, belief. M 7–8:50

PHIL 722a, Nicolaus of Cusa, *On Learned Ignorance* Karsten Harries

Nicholas of Cusa's *On Learned Ignorance*, despite ways in which what it has to say seems dated, provides us with a continuing challenge. This is especially true of his insight into the essential transcendence of reality, so different from the ontology implied by Descartes's insistence on clear and distinct understanding. Special emphasis on his understanding of infinity and perspective. TH 1:30–3:20

PHIL 726b, Knowledge and Action Jason Stanley, Timothy Williamson

In this seminar, we look at several themes connecting knowledge and action. A number of philosophers, including the instructors, have defended a connection between knowledge and action; on this view, knowledge is the epistemic guarantee that a reason is good for acting. We consider different interpretations and modifications of the biconditional, "act on p if and only if you know that p" (suitably restricted), and consider arguments pro and con for each direction. We look at various proposals about making distinctions between justifications and excuses in the context of a defense of the knowledge norm. Our intention is to cover as much as possible of the recent debate. We also look at the growing debate in "X-Phi" about the role of knowledge and action, which emerges in part from one aspect of the knowledge norms debate, about stakes sensitivity (a strategy used to defend one direction of the knowledge norm for action). We also pursue knowledge deeper into action theory, connecting topics such as skill, knowledge, intention, and belief. Other topics that may be explored are a comparison of the debate between knowledge norms of action and knowledge norms of assertion, and some recent papers of Kristie Dotson arguing that a classic theme of black feminist philosophy is the connection between epistemic states and legitimate reasons for action. W 7–8:50

PHIL 728a/REL 937a, Kierkegaard's Philosophy of Religion John Hare

This course explores a number of texts by Kierkegaard, most of them pseudonymous, but also *Works of Love* written under his own name. A focus of the course is on what Kierkegaard intends us to think about the three stages of life, namely the aesthetic, the ethical, and the religious. TH 1:30–3:20

PHIL 730b/LAW 21715, Ethics of War and Peace Scott Shapiro

This course integrates an exploration of Western moral traditions and ethical philosophy with the unique legal and moral obligations placed upon those in government who make decisions regarding the use of U.S. military force and those in the military who practice the profession of arms. Methodology: facilitated seminar discussions and case study analyses spanning the breadth of issues that arise in armed conflict: just war theory, law of armed conflict, conscientious objection, military justice, humanitarian intervention, terrorism, and drone warfare, among others. Scheduled examination or paper option. Follows Law School academic calendar. MW 1:35–3

PHIL 732b/REL 929b, Theology of Plato and Aristotle John Hare

This course is about Plato's and Aristotle's views of the divine. Most of the important work of both philosophers on this topic is read. One aim of the course is to think about these philosophers as sources, sometimes congenial and sometimes not, for Christian reflection on a range of questions including the relation between goodness and the divine, the nature of the soul, the origin or lack of the origin of the cosmos, and the relation between happiness and virtue. TTH 9:30–10:20

PHIL 735b/LAW 21712, Nietzsche's Critique of Modernity Anthony Kronman, Paul Kahn

Nietzsche was critical of many aspects of the modern age that we generally associate with liberal values. These include equality, tolerance, and the rule of law. What was the basis of his criticism? What alternative, if any, did he propose? We examine some of the key concepts of Nietzsche's philosophy with these questions in mind. Readings include *The Birth of Tragedy*, *The Gay Science*, *On the Genealogy of Morals*, and other works. Paper required. Follows Law School academic calendar. M 4:10–6

PHIL 740b/CLSS 880b, Seneca on Society: The Treatise *On Benefits* Brad Inwood

All major ancient philosophers had well-developed views on social and political relations, and the treatise *On Benefits* is the most extensive Stoic work surviving on the topic. This sophisticated essay integrates Stoic ethical and political thought with ethics and philosophy of mind, situating it in the concrete social conditions of elite Roman culture in the first century C.E. Open to those reading in Latin (the Teubner of Hosijs is recommended) as well as in the English translation by Griffin and Inwood (University of Chicago Press, 2014), the seminar accommodates a variety of approaches (primarily philosophical, but also social-historical and literary).

PHIL 750a or b, Tutorial

By arrangement with faculty.

PHYSICS

35 Sloane Physics Laboratory, 203.432.3607

<http://physics.yale.edu>

M.S., M.Phil., Ph.D.

Chair

Paul Tipton

Director of Graduate Studies

Sean Barrett (SPL 24, 203.432.6928, graduatephysics@yale.edu)

Professors Robert Adair (*Emeritus*), Charles Ahn (*Applied Physics*), Yoram Alhassid, Thomas Appelquist, Charles Bailyn (*Astronomy*), O. Keith Baker, Charles Baltay, Sean Barrett, Cornelius Beausang (*Adjunct*), Hui Cao (*Applied Physics*), Richard Casten (*Emeritus*), Richard Chang (*Emeritus*), Paolo Coppi (*Astronomy*), David DeMille, Michel Devoret (*Applied Physics*), Frank Firk (*Emeritus*), Bonnie Fleming, Paul Fleury (*Applied Physics*), Moshe Gai (*Adjunct*), Marla Geha (*Astronomy*), Steven Girvin, Leonid Glazman, John Harris, Karsten Heeger, Victor Henrich (*Applied Physics*), Arvid Herzenberg (*Emeritus*), Jay Hirshfield (*Adjunct*), Francesco Iachello, Dmitri Kharzeev (*Adjunct*), Henry Kraybill (*Emeritus*), Steve Lamoreaux, William Lichten (*Emeritus*), Samuel MacDowell (*Emeritus*), Simon Mochrie, Vincent Moncrief, Priyamvada Natarajan (*Astronomy*), Peter Parker (*Emeritus*), Daniel Prober (*Applied Physics*), Nicholas Read, Vladimir Rokhlin (*Computer Science; Mathematics*), Jack Sandweiss (*Emeritus*), Robert Schoelkopf (*Applied Physics*), Ramamurti Shankar, Witold Skiba, Charles Sommerfield (*Emeritus*), A. Douglas Stone (*Applied Physics*), Paul Tipton, John Tully (*Chemistry*), Thomas Ullrich (*Adjunct*), C. Megan Urry, Pieter van Dokkum (*Astronomy*), Xiao-Jing Wang (*Neurobiology; Psychology*), John Wettlaufer (*Geology & Geophysics*), Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*), Michael Zeller (*Emeritus*)

Associate Professors Helen Caines, Sarah Demers, Eric Dufresne (*Mechanical Engineering & Materials Science*), Thierry Emonet (*Molecular, Cellular & Developmental Biology*), Walter Goldberger, Jack Harris, Sohrab Ismaïl-Beigi (*Applied Physics*), Daisuke Nagai, Corey O'Hern (*Mechanical Engineering & Materials Science*), Nikhil Padmanabhan, Hongxing Tang (*Electrical Engineering*), Volker Werner

Assistant Professors Murat Acar (*Molecular, Cellular & Developmental Biology*), Damon Clark (*Molecular, Cellular & Developmental Biology*), Reina Maruyama, David Poland

Fields of Study

Fields include atomic physics and quantum optics; nuclear physics; particle physics; astrophysics and cosmology; condensed matter; biological physics; quantum information physics; applied physics; and other areas in collaboration with the School of Engineering & Applied Science, and the departments of Applied Physics; Mathematics; Chemistry; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; Geology and Geophysics; and Astronomy.

Special Admissions Requirements

The prerequisites for work toward a Ph.D. degree in physics include a sound undergraduate training in physics and a good mathematical background. The GRE General Test and the Subject Test in Physics are required.

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to the Ph.D. program in Physics may also apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Special Requirements for the Ph.D. Degree

To complete the course requirements students are expected to take a set of nine term courses. A set of five core courses (Advanced Classical Mechanics, Electromagnetic Theory, Quantum Mechanics I and II, and Statistical Mechanics) serves to complete the student's undergraduate training in classical and quantum physics. A set of four advanced courses, including a required course in quantum field theory, provides an introduction to modern physics and research. Certain equivalent course work and successful completion of a pass-out examination may reduce the course requirement or allow substitution of elective courses for individual students. In addition, all students are required to be proficient and familiar with mathematical methods of physics (such as that necessary to master the material covered in the five core courses) and to be proficient and familiar with advanced laboratory techniques. These requirements can be met either by taking a course offered by the department or by carrying out an approved Special Investigation with individual faculty. In addition to all other requirements, students must successfully complete PHYS 590b, Responsible Conduct in Research for Physical Scientists, prior to the end of their first year of study. This requirement must be met prior to registering for a second year of study.

Students who have completed their course requirements with satisfactory grades (a grade of Honors in PHYS 990, Special Investigations, may be counted toward the Graduate School requirement of two grades of Honors), pass the qualifying examination, and submit an acceptable thesis prospectus are recommended for admission to candidacy. The qualifying examination, normally taken at the beginning of the third term (and no later than the beginning of the fifth term), is a six-hour written examination covering the five core courses and mathematical methods as described above. Students normally submit the dissertation prospectus before the end of the third year of study.

There is no foreign language requirement. Teaching experience is regarded as an integral part of the graduate training program. During their study students are expected to serve as teaching fellows, usually in the first two years. Formal association with a dissertation adviser normally begins in the fourth term after the qualifying examination has been passed and required course work has been completed. An adviser from a department other than Physics can be chosen in consultation with the director of graduate studies (DGS), provided the dissertation topic is deemed suitable for a physics Ph.D.

Master's Degrees

M.Phil. Students who have successfully advanced to candidacy qualify for the M.Phil. degree.

M.S. (en route to the Ph.D.) Students who complete the first-year graduate courses with a satisfactory record (including two Honors or four High Passes) qualify for the M.S. degree.

Program materials are available upon request to the Director of Graduate Studies, Department of Physics, Yale University, PO Box 208120, New Haven CT 06520-8120; e-mail, graduatephysics@yale.edu; Web site, <http://physics.yale.edu>.

Courses

PHYS 500a, Advanced Classical Mechanics Yoram Alhassid

Newtonian dynamics, Lagrangian dynamics, and Hamiltonian dynamics. Rigid bodies and Euler equations. Oscillations and eigenvalue equations. Classical chaos. Introduction to dynamics of continuous systems. TTH 11:35–12:50

PHYS 502b, Electromagnetic Theory I A. Douglas Stone

Classical electromagnetic theory including boundary-value problems and applications of Maxwell equations. Macroscopic description of electric and magnetic materials. Wave propagation. MW 11:35–12:50

PHYS 504Lb, Modern Physics Measurements Steve Lamoreaux

A laboratory course with experiments and data analysis in soft and hard condensed matter, nuclear and elementary particle physics. MW 1:30–4:20

PHYS 506a^u, Mathematical Methods of Physics Nicholas Read

Survey of mathematical techniques useful in physics. Includes vector and tensor analysis, group theory, complex analysis (residue calculus, method of steepest descent), differential equations and Green's functions, and selected advanced topics. MW 9–10:15

PHYS 508a, Quantum Mechanics I Walter Goldberger

The principles of quantum mechanics with application to simple systems. Canonical formalism, solutions of Schrödinger's equation, angular momentum, and spin. MW 11:35–12:50

PHYS 512b, Statistical Physics I Nicholas Read

Review of thermodynamics, the fundamental principles of classical and quantum statistical mechanics, canonical and grand canonical ensembles, identical particles, Bose and Fermi statistics, phase transitions and critical phenomena, renormalization group, irreversible processes, fluctuations. TTH 9–10:15

PHYS 515b, Topics in Modern Physics Research Yoram Alhassid

A seminar course intended to provide an introduction to current research in physics and an overview of physics research opportunities at Yale. F 12–1

PHYS 517b3/ENAS 517b/MB&B 517b3/MCDB 517b3, Methods and Logic in

Interdisciplinary Research Lynne Regan, Julien Berro, Enrique De La Cruz,
Eric Dufresne, Thierry Emonet, Paul Forscher, Jonathon Howard, Megan King,
Simon Mochrie, Corey O'Hern, Thomas Pollard, Yongli Zhang, and staff

This half-term PEB class is intended to introduce students to integrated approaches to research. Each week, the first of two sessions is student-led, while the second session is led by faculty with complementary expertise and discusses papers that use different approaches to the same topic (for example, physical and biological or experiment and theory). Counts as 0.5 credit toward graduate course requirements. MW 5–7

[PHYS 522a, Introduction to Atomic Physics]**PHYS 523b/ENAS 541b/MB&B 523b, Biological Physics** Corey O'Hern

An introduction to the physics of several important biological phenomena including transport in the cell cytoplasm, protein folding, DNA packaging, and thermodynamics of protein binding and aggregation. The material and approach are positioned at the interface of the physical and biological sciences, and involve significant computation. This course teaches the basics of computer programming necessary for quantitative studies of biological systems. We start with the foundations of programming in MATLAB. During the course, students perform sophisticated data analyses, view and analyze protein structures, and perform Monte Carlo and molecular dynamics simulations. No prior programming experience is needed. TTH 1–2:15

[PHYS 524a, Introduction to Nuclear Physics]**[PHYS 526b, Introduction to Elementary Particle Physics]****PHYS 528a/ENAS 848a, Soft Condensed Matter Physics** Eric Brown

An introduction to the physics and phenomenology of soft condensed matter: classical systems with mesoscale structure where thermal fluctuations and interfacial forces play essential roles. Discussion of applications to materials science/engineering, nanotechnology, and molecular/cellular biology. Essential concepts from statistical thermodynamics, classical mechanics, and electricity and magnetism are reviewed/developed as needed.

PHYS 530b, Scientific Teaching for Physical Sciences Rona Ramos,

Jennifer Frederick

W 9–11

PHYS 538b, Introduction to Relativistic Astrophysics and General Relativity

Vincent Moncrief

Basic concepts of differential geometry (manifolds, metrics, connections, geodesics, curvature); Einstein's equations and their application to such areas as cosmology, gravitational waves, black holes.

PHYS 548a^u and 549b^u/APHY 548a^u and 549b^u/ENAS 850a^u and 851b^u, Solid State Physics I and II Victor Henrich [F], Michel Devoret [Sp]

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonons, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. Fall: 2.5 HTBA; Spring: TTH 2:30–3:45

PHYS 561b/MCDB 561b^U, Introduction to Dynamical Systems in Biology

Thierry Emonet, Kathryn Miller-Jensen

An introduction to quantitative methods in biology, emphasizing numerical and analytical modeling of static and dynamical processes in biological systems. Topics include switches, cooperativity, regulatory networks, feedback, signal transduction, and noise in gene expression. For each topic, the relationship between system architecture, dynamical properties, and behavior is examined. Includes instruction in the use of MATLAB and the transformation of a cartoon model into a mathematical model that can be simulated in a computer. Students read and present research papers from the primary literature. Prerequisite: PHYS 170 or equivalent, or permission of the instructor. TTH 2:30–3:45

PHYS 562a/AMTH 765a/CB&B 562a/ENAS 561a/MB&B 562a^U/MCDB 562a^U,**Dynamical Systems in Biology** Damon Clark, Jonathon Howard

This course covers advanced topics in computational biology. How do cells compute, how do they count and tell time, how do they oscillate and generate spatial patterns? Topics include time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form; mechanics of cell shape and motion; spatially heterogeneous processes; diffusion. Prerequisite: MCDB 561b or equivalent, or a 200-level biology course, or permission of the instructor. TTH 2:30–3:45

PHYS 570a/ASTR 570a, High-Energy Astrophysics Priyamvada Natarajan

A survey of current topics in high-energy astrophysics, including accreting black hole and neutron star systems in our galaxy, pulsars, active galactic nuclei and relativistic jets, gamma-ray bursts, and ultra-high-energy cosmic rays. The basic physical processes underlying the observed high-energy phenomena are also covered. TTH 10:30–11:45

PHYS 590b, Responsible Conduct in Research for Physical Scientists

Required seminar for all first-year students.

[PHYS 600b/ASTR 600b^U, Cosmology]**[PHYS 601b/APHY 601b, Quantum Information and Computation]****PHYS 608b, Quantum Mechanics II** Jack Harris

Approximation methods, scattering theory, and the role of symmetries. Relativistic wave equations. Second quantized treatment of identical particles. Elementary introduction to quantized fields. TTH 11:35–12:50

PHYS 609a, Relativistic Field Theory I Thomas Appelquist

The fundamental principles of quantum field theory. Interacting theories and the Feynman graph expansion. Quantum electrodynamics including lowest order processes, one-loop corrections, and the elements of renormalization theory. TTH 11:35–12:50

PHYS 610b/APHY 610b, Quantum Many-Body Theory Leonid Glazman

Identical particles and second quantization. Electron tunneling and spectral function. General linear response theory. Approximate methods of quantum many-body theory. Dielectric response, screening of long-range interactions, electric conductance, collective modes, and photon absorption spectra. Fermi liquid; Cooper and Stoner instabilities; notions of superconductivity and magnetism. BCS theory, Josephson effect, and

Majorana fermions in condensed matter; superconducting qubits. Bose-Einstein condensation; Bogoliubov quasiparticles and solitons. TTH 11:35–12:50

PHYS 624a, Group Theory Francesco Iachello

Lie algebras, Lie groups, and some of their applications. Representation theory. Explicit construction of finite-dimensional irreducible representations. Invariant operators and their eigenvalues. Tensor operators and enveloping algebras. Boson and fermion realizations. Differential realizations. Quantum dynamical applications. MW 9–10:15

PHYS 628a, Statistical Physics II Leonid Glazman

An advanced course in statistical mechanics. Topics may include mean field theory of and fluctuations at continuous phase transitions; critical phenomena, scaling, and introduction to the renormalization group ideas; topological phase transitions; dynamic correlation functions; quantum phase transitions; superfluid and superconducting phase transitions; cooperative phenomena in low-dimensional systems.

PHYS 630b, Relativistic Field Theory II Thomas Appelquist

An introduction to non-Abelian gauge field theories, spontaneous symmetry breakdown, and unified theories of weak and electromagnetic interactions. Renormalization group methods, quantum chromodynamics, and nonperturbative approaches to quantum field theory. TTH 1–2:15

PHYS 633b/APHY 633b, Introduction to Superconductivity Daniel Prober

The fundamentals of superconductivity, including both theoretical understandings of basic mechanism and description of major applications. Topics include historical overview, Ginzburg-Landau (mean field) theory, critical currents and fields of type II superconductors, BCS theory, Josephson junctions and microelectronic and quantum-bit devices, and high-Tc oxide superconductors. TTH 11:35–12:50

[PHYS 634a/APHY 634a, Mesoscopic Physics I]

[PHYS 662b, Special Topics in Particle Physics: Beyond the Standard Model]

[PHYS 667b/APHY 667b, Special Topics in Condensed Matter Physics: Quantum Hall Effect and Conformal Field Theory]

PHYS 675a^U/APHY 675a^U, Principles of Optics with Applications Hui Cao

Introduction to the principles of optics and electromagnetic wave phenomena with applications to microscopy, optical fibers, laser spectroscopy, nanophotonics, plasmonics, and metamaterials. Topics include propagation of light, reflection and refraction, guiding light, polarization, interference, diffraction, scattering, Fourier optics, and optical coherence. TTH 11:35–12:50

PHYS 676a/APHY 676a, Introduction to Light-Matter Interactions Peter Rakich

Optical properties of materials and a variety of coherent light-matter interactions are explored through the classical and quantum treatments. The role of electronic, phononic, and plasmonic interactions in shaping the optical properties of materials is examined using generalized quantum and classical coupled-mode theories. The dynamic response of media to strain, magnetic, and electric fields is also treated. Modern topics are explored,

including optical forces, photonic crystals, and metamaterials; multi-photon absorption; and parametric processes resulting from electronic, optomechanical, and Raman interactions. TTH 1–2:15

PHYS 677a/APHY 677a, Noise, Dissipation, Amplification, and Information

Michel Devoret

Graduate-level non-equilibrium statistical physics applied to noise phenomena, both classical and quantum. The aim of the course is to explain the fundamental link between the random fluctuations of a physical system in steady state and the response of the same system to an external perturbation. Several key examples in which noise appears as a resource rather than a limitation are treated: spin relaxation in nuclear magnetic resonance (motional narrowing), Johnson-Nyquist noise in solid state transport physics (noise thermometry), photon correlation measurements in quantum optics (Hanbury Brown-Twiss experiment), and so on. The course explores both passive and active systems. It discusses the ultimate limits of amplifier sensitivity and speed in physics measurements. MW 9–10:15

PHYS 678b, Computing for Scientific Research Daisuke Nagai

An introduction to basic computational tools and techniques utilized in science and engineering research. The course focuses on developing hands-on experience via a mixture of lectures and practical programming. Introduction to the fundamentals of PC hardware, the UNIX/Linux operating system, scripting languages (Perl), and the development of programs to solve physical and mathematical problems. Programming languages with emphasis on C/C++ (procedural and object-orientated) as well as the conceptual underlying numerical methods are covered to provide the tools for scientific problem solving. This course is intended for students with little basic programming experience. F 1–3:30

PHYS 679b/APHY 679b, Nonlinear Optics and Lasers Hui Cao

Fundamental principles of nonlinear optics and lasers. Nonlinear optical susceptibilities; wave propagation and coupling in nonlinear media; harmonic, sum, and difference frequency generation; parametric amplification and oscillation; phase conjugation via four-wave mixing; self-phase modulation and solitons. Stimulated and spontaneous emission, interaction of two-level atoms with light, optical amplification. Optical resonators and threshold conditions for laser oscillation. Semiclassical laser theory, nonlinear and multi-mode lasing. Noise and quantum effects in lasers (time permitting). TTH 11:35–12:50

[PHYS 687, Physics of Diatomic Molecules]

[PHYS 688, Advanced Topics in Field Theory]

[PHYS 691a/APHY 691a, Quantum Optics]

[PHYS 705b/ENAS 705b/MB&B 715b, Numerical Simulations of Liquids]

[PHYS 816a/APHY 816a, Techniques of Microwave Measurements and RF Design]

PHYS 990a and b, Special Investigations

Directed research by arrangement with individual faculty members and approved by the DGS.

PHYS 991b/ENAS 991b/MB&B 591b/MCDB 591b, Integrated Workshop

Lynne Regan, Joerg Bewersdorf, Stuart Campbell, Kathryn Miller-Jensen,
Simon Mochrie, Corey O'Hern

This required course for students in PEB involves hands-on laboratory modules with students working in pairs. A biology student is paired with a physics or engineering student; a computation/theory student is paired with an experimental student. The modules are devised so that a range of skills is acquired, and students learn from each other. Modules are hosted in faculty laboratories.

POLITICAL SCIENCE

Rosenkranz Hall, 203.432.5241
<http://politicalscience.yale.edu>
 M.A., M.Phil., Ph.D.

Chair

Steven Wilkinson

Director of Graduate Studies

Elisabeth Wood

Professors Bruce Ackerman, Akhil Amar (*Law*), Seyla Benhabib (*on leave* [Sp]), Paul Bracken (*Management*), David Cameron (*on leave* [Sp]), Bryan Garsten, Alan Gerber, Jacob Hacker (*on leave* [Sp]), Gregory Huber, Susan Hyde, Stathis Kalyvas, Karuna Mantena, David Mayhew, Barry Nalebuff (*Management*), Douglas Rae, John Roemer, Susan Rose-Ackerman, Frances Rosenbluth, Nicholas Sambanis (*on leave* [Sp]), James Scott, Ian Shapiro, Stephen Skowronek (*on leave* [Sp]), Steven Smith, Susan Stokes, Alec Stone Sweet, Peter Swenson, Ivan Szelenyi (*Sociology*), John Wargo (*Forestry & Environmental Studies*), Steven Wilkinson, Elisabeth Wood

Associate Professors Ana De La O Torres, Alexandre Debs (*on leave*), H  l  ne Landemore, Adria Lawrence, Jason Lyall, Andrew March, Nuno Monteiro (*on leave*), Vesla Weaver (*on leave*)

Assistant Professors Peter Aronow (*on leave*), Katharine Baldwin, Deborah Beim (*on leave* [F]), Allan Dafoe (*on leave* [Sp]), Samuel DeCanio, John Henderson (*on leave*), Eitan Hersh, Sigrun Kahl, Margaret Peters (*on leave*), Kelly Rader, Thania Sanchez (*on leave* [Sp]), Tariq Thachil

Fields of Study

Fields include political theory, international relations, comparative politics, American politics, political economy, quantitative empirical methods, qualitative and archival methods, and formal theory.

Special Admissions Requirement

The department requires that scores from the GRE General Test and a writing sample accompany an application. Additional details about the application process are available on the department Web site. The department only accepts applications for the Ph.D. program.

Special Requirements for the Ph.D. Degree

Overall program requirements Students are required to pass sixteen term courses by the end of their fourth term in the program, to receive a grade of Honors in at least two Political Science courses, and to maintain an overall High Pass or above average (for purposes of calculating this average, Honors=3, High Pass=2, Pass=1, and Fail=0). The High Pass average must also be met for graduate courses listed in the Political Science

department. To remain in good standing throughout their time in the Ph.D. program, students are expected to actively participate in classes and workshops, produce high quality written work, and demonstrate regular progress toward completion of the dissertation. The department regularly offers about sixty term courses for graduate students each year. Courses are conducted as seminars and typically have small enrollments. Four of the courses required for the degree may be in departments other than Political Science (two of these can be advanced language courses with the approval of the director of graduate studies [DGS]).

Each student must demonstrate elementary reading competence in one foreign language. Such competence is usually demonstrated by taking, or having completed, two years of undergraduate course work or by examination. Alternatively, the language requirement can be satisfied by successfully completing two terms of formal theory or two terms of statistical methods at the graduate level (beyond the introductory course in statistical methods offered in the department).

Courses are offered in five substantive fields—political theory, international relations, comparative politics, American politics, and political economy—and three methods fields: quantitative empirical methods, qualitative and archival methods, and formal theory. Courses taken must include one each in at least three of the department's substantive fields. Courses cannot be counted in more than one field. Each student must demonstrate competence in three fields (two of which must be substantive fields) before the start of the fifth term. Competence can be demonstrated either by passing the comprehensive examination in the field or by course work, provided that each student takes at least two comprehensive exams. The fields of formal theory and quantitative empirical methods offer certification only through examination. For fields to be certified by course work, students are required to satisfactorily complete three courses in the field, where courses in the field are determined by the faculty and the DGS, including one in which a research paper is written and presented. The paper must be submitted to review by the instructor of the course for which the paper was written. The department offers exams twice a year, in late August and in early January. Students are expected to pass their comprehensive examinations by August of their second year. Each examination is based on a reading list compiled by the faculty within the field and updated each year. Each list offers an introduction and framework for study in the field and preparation for the examination. A committee of faculty within the field grades the exams as Distinguished, Satisfactory, or Unsatisfactory.

Students who successfully complete the Ph.D. in Political Science will often join the faculties of colleges and universities. For that reason, learning what is involved in teaching and gaining teaching experience are also essential components of graduate education. The department normally expects students to devote themselves exclusively to course work and comprehensive examinations in their first two years in the Ph.D. program. Students in Political Science typically teach in their third and fourth years.

During each year in residence, graduate students are expected to participate actively and regularly in one or more of the many research workshops run by the department. Students beyond their fourth term are required to enroll in at least one of the workshops for credit, and all workshops are graded on a Satisfactory/Unsatisfactory basis. All students are expected to present a research paper of their own at one of these workshops

before the end of their fourth year. Workshop participation does not count toward the requirement of sixteen term courses.

Prior to registration for the second year (1) Students must have taken and passed at least seven courses, including the required Introduction to the Study of Politics, and maintained an overall High Pass average. At least five of these courses must be graduate courses in Political Science. While only seven courses are required, students are normally expected to complete eight courses in the first year to be on track to complete sixteen courses by the end of the second year. (2) Students are strongly encouraged to complete at least one field certification prior to the beginning of their second year. (3) Students are strongly encouraged to attend one of the subfield weekly workshops. (Note that these workshops do not count toward the required number of completed courses.)

Prior to registration for the third year (1) Students must have taken at least sixteen term courses and have received a grade of at least Pass in each of them, including the two-term required Research and Writing course for second-year students. Research and Writing is devoted to the preparation of a manuscript based on original research on a topic of the student's choice and will count as two of the sixteen credits needed to advance to candidacy. (2) Students must have received a grade of Honors in at least two Political Science courses and maintained an overall High Pass average. (3) Students must have completed certification in three fields by the end of their second year. (For purposes of fulfilling this requirement, students registered for the August exams are assumed to have passed those exams when determining eligibility for enrollment in the third year.) At the discretion of the DGS, students who fail an exam may be granted a one-term extension (to January of the third year) for obtaining certification. (4) Students are strongly encouraged to attend one of the required subfield weekly workshops. (Note that these workshops do not count toward the required number of completed courses.)

Admission to candidacy Students must be admitted to candidacy prior to registration for the fourth year of study. Students are recommended to the Graduate School for admission to candidacy by the Department of Political Science after having completed departmental requirements listed above and the Graduate School's prospectus requirement. As part of admission to candidacy, a student must have a prospectus approved by a dissertation director and two other members of the faculty. This must occur no later than May 1 of the student's third year of study.

Submitting the dissertation A student's dissertation research is guided by a committee of no fewer than three faculty members, at least two of whom must be members of the Yale Department of Political Science. One of the committee members is designated as chair. When a dissertation is completed, the student will select two members to write written reports on the final dissertation, at least one of whom must be a member of the Yale Department of Political Science. The DGS will also appoint one additional member of the department to write an additional evaluation.

Combined Degrees

The Graduate School offers a combined degree in Political Science and African American Studies. For details, see the entry under African American Studies in this bulletin. Students may also pursue a joint degree with the Law School.

Master's Degrees

M.Phil. The academic requirements for the M.Phil. degree are the same as for the Ph.D. degree except for the completion of the prospectus and dissertation.

M.A. (en route to the Ph.D.) The M.A. degree is awarded upon completion of a full year of course work in the program (i.e., at least eight term courses) with an average of High Pass or better. The courses must include at least six listed in the Political Science department and one each in at least three of the department's substantive fields. A graduate-level course in statistical analysis is also required for the M.A. degree. Language requirements are the same as for the Ph.D. degree.

Courses

EMPIRICAL ANALYSIS AND RESEARCH METHODOLOGY

PLSC 503b, Quantitative Methods Ana De La O Torres

An introduction to statistical identification, causal inference, and quantitative research design under the frequentist paradigm. Special emphasis is placed on identification of causal effects under the Neyman-Rubin causal model of potential outcomes.

PLSC 504a, Advanced Quantitative Methods Allan Dafoe

The course covers a wide range of topics in quantitative methodology. The recurrent theme is the challenge of drawing secure causal inferences from data. Topics covered include matching estimators, differences-in-differences estimators, instrumental variable methods, and regression discontinuity analysis. We also introduce maximum likelihood estimation and an array of linear and nonlinear regression applications such as dichotomous and polychotomous response models, models for censored and truncated data, sample selection models, duration models, and models for count data. The broader aim of the course is to provide students with the statistical background necessary to read and conduct quantitative research. The course assumes students have command of the material covered in PLSC 500a and PLSC 503b, including basic probability theory, matrix algebra, and the linear regression model.

PLSC 505b/SOCY 508b, Qualitative Field Research Elisabeth Wood

In this seminar we discuss and practice qualitative field research methods. The course covers the basic techniques for collecting, interpreting, and analyzing ethnographic data, with an emphasis on the core ethnographic techniques of participant observation and in-depth interviewing. All participants carry out a local research project. Open to undergraduates with permission of the instructor.

PLSC 510a, Introduction to the Study of Politics Susan Stokes

The course introduces students to some of the major controversies in political science. We focus on the five substantive themes that make up the Yale Initiative: Order, Conflict, and Violence; Representation and Popular Rule; Crafting and Operating Institutions; Identities, Affiliations, and Allegiances; and Distributive Politics. We divide our time between discussing readings on these subjects and conversations with different members of the faculty who specialize in them. There is also some attention to methodological

controversies within the discipline. Requirements: an annotated bibliography of one of the substantive themes and a take-home final exam.

PLSC 517a, Fundamentals of Modeling John Roemer

The course is an introduction to techniques of microeconomic modeling, as applied to problems in political economy and political science. The level is that of a sophisticated course in intermediate microeconomics. Topics include preferences, utility functions, Pareto efficiency, competitive economic equilibrium, the first theorem of welfare economics, Hotelling-Downs political equilibrium, Nash equilibrium, Wittman-Nash political equilibrium, Nash bargaining, Arrow's theorem and social welfare functions, and distributive justice. Prerequisites: differential calculus and/or the Political Science Math Camp. Microeconomics at the intermediate level is helpful but not mandatory.

PLSC 518b, Fundamentals of Modeling II Humberto Llavador

Building upon Fundamentals of Modeling I, the course offers a rigorous introduction to noncooperative game theory. The goal of the course is to help students understand the key concepts and ideas in game theory and to provide students with a road map for applying game theoretic tools to their own research. Topics include strategic form games, extensive form games, and Bayesian games, among others. Students are assumed to have mathematical knowledge at the level of the Political Science Math Camp and to have taken Fundamentals of Modeling I or its equivalent.

PLSC 522a/SOCY 503a, Historical Approaches to the Study of Politics Sigrun Kahl

Provides an overview of the how-to, and the payoff, of a historical approach to the study of politics. Covers a wide range of topics, from the classics of political science and sociology up to recent comparative historical work.

PLSC 540, Research and Writing Adria Lawrence, Kelly Rader

This is a required course for all second-year students. It meets for the first six weeks of the fall term and the first six weeks of the spring term. The fall meetings are devoted to discussion of research design as well as individual student projects. The spring meetings are devoted to discussion of drafts of student papers. The work of the spring-term seminar includes criticism of the organization, arguments, data evaluation, and writing in each student's paper by the instructors and the other students. Using this criticism, and under the supervision of the instructors, each student conducts additional research, if necessary, rewrites the paper as required, and prepares a final paper representing the best work of which the student is capable. Students must submit a one-page outline of the proposed project for the first fall-term meeting and a complete draft of the paper at the first meeting in the spring.

POLITICAL THEORY

PLSC 553a/LAW 20104/PHIL 718a, Justice Bruce Ackerman

An examination of contemporary theories, together with an effort to assess their practical implications. Authors this year include Peter Singer, Richard Posner, John Rawls, Robert Nozick, Michael Walzer, Marion Young, and Roberto Unger. Topics: animal rights, the status of children and the principles of educational policy, the relation of market justice to distributive justice, the status of affirmative action. Follows Law School academic calendar. MT 4:10–6

PLSC 565a, Democracy and Distribution Ian Shapiro

An examination of the relations between democracy and the distribution of income and wealth, principally but not exclusively in the United States. Particular attention to the ways in which different groups, classes, and coalitions affect, and are affected by, democratic distributive politics. Attention is divided among theories of distribution, distributive instruments, and the implementation of policies affecting distribution. Substantive topics include taxes, welfare, public opinion, gender, race, affirmative action, education, and trade unions. Research paper or two review essays.

PLSC 576b^U, Ancient Greek Political Development Daniela Cammack

This course explores the varieties of political experience in the ancient Greek world in the Archaic, Classical, and Hellenistic periods. Attention is given to different regime types (monarchy, tyranny, aristocracy, oligarchy, democracy), places (Athens, Sparta, Crete, Carthage, Syracuse, Persia), political forms (city-state, alliance, empire), institutions (assembly, council, courts, offices), and persons (political leader, citizen, woman, foreign resident, slave).

PLSC 583a^U/GMAN 651a^U/PHIL 672a^U, Contemporary Critical Theory

Seyla Benhabib

A careful examination of Hegel's theory of the modern state and its elaboration by Habermas and Honneth. W 9:25–11:15

PLSC 595a/ECON 791a/LAW 20248, Theories of Distributive Justice John Roemer

This year, we spend the first half of the course (or so) reading and discussing Thomas Piketty's *Capital in the Twenty-First Century* (2014). We then survey the main egalitarian theories of distributive justice proposed by economists and political philosophers since J. Rawls, including A. Sen, R. Dworkin, G.A. Cohen, R. Arneson, and S. Scheffler. We subject these theories to economic and philosophical analysis. Prerequisite: intermediate microeconomics or PLSC 517a.

PLSC 597b, Lincoln's Statecraft and Rhetoric Steven Smith

This class is based on a reading and interpretation of Lincoln's major speeches and letters. Its purpose is to understand his views on the problem of slavery, equality, and race in American society, but also to consider the relation of words to deeds in the practice of his statecraft. We also situate Lincoln within the history and theory of statesmanship.

PLSC 605a^U/LAW 20662/PHIL 663a^U, Rethinking Sovereignty, Human Rights, and Globalization Seyla Benhabib

This course explores conceptions of sovereignty, cosmopolitanism, and human rights as basic elements of the international political order from the dawn of the modern age to the present in historical, philosophical, and jurisprudential aspects. T 3:30–5:30

PLSC 611a^U/PHIL 657a^U, Recent Work on Justice Thomas Pogge

In-depth study of one contemporary book, author, or debate in political philosophy, political theory, or normative economics. Depending on student interest, this might be a ground-breaking new book, the life's work of a prominent author, or an important theme in contemporary political thought. T 1:30–3:20

PLSC 615b^U/SAST 640b^U, Indian Political Thought Karuna Mantena

This seminar is a historical survey of modern political thought in the Indian subcontinent, with a special focus on the texts, ideas, and debates that have come to shape the theory and practice of Indian democracy. Writings by R.M. Roy, Phule, Naoroji, Vivekananda, Tagore, Aurobindo, Tilak, Savarkar, Iqbal, Gandhi, Ambedkar, MN Roy, Azad, Nehru, and Lohia are considered. Topics include the analysis and critique of colonialism; modernity, tradition, and the challenge of equality; nationalism, diversity, and community; constitutionalism and the rule of law; multiculturalism, secularism, and toleration.

PLSC 619b, John Dewey and the Progressives Hélène Landemore

The course explores readings on “industrial democracy” and related topics from John Stuart Mill to Thomas Piketty, with a focus on the progressive area (1890–1920) and the central figure of John Dewey.

PLSC 627b^U, Aristotle’s Political Thought Bryan Garsten

A careful reading of Aristotle’s *Nicomachean Ethics* and *Politics*, along with selected debates in the secondary literature and consideration of Aristotle’s place in recent political theory.

PLSC 640b/HIST 970b, Advanced Topics in Modern Political Philosophy

Karuna Mantena, Isaac Nakhimovsky

This seminar is designed to survey modern political philosophy at a level appropriate for graduate students (to help them prepare for the field exam) and for advanced undergraduates who have completed substantial course work in intellectual history and/or political theory. This term, the seminar addresses the topic of democracy and inequality from Rousseau to Marx. We pursue the politics of classical political economy by tracing discussions of the identity of the modern representative republic, the nature of capitalism or commercial society, and the relation between the two from Rousseau to Marx. While the main focus is close analysis of the writings of Rousseau, Smith, and Marx, we also mark the trajectory from Smith to Marx via readings from Kant, Hegel, Condorcet, Malthus, Ricardo, and Proudhon. T 1:30–3:20

PLSC 646a^U, Beyond Representative Government Hélène Landemore

This course explores institutional innovations aiming to take democracy beyond the stage of “representative government” from both empirical and normative perspectives. The goal is to understand what democracy could and should mean in the twenty-first century.

INTERNATIONAL RELATIONS**PLSC 662b^U/MGT 586b, Strategy, Technology, and War** Paul Bracken

An integrated, comprehensive examination of technology and strategy in the field of national security. Key concepts—technology strategy, macro-organizational behavior, strategic posture—describe the international strategic environment. Analysis of the changing structure of defense in light of new dynamics: a second nuclear age; the spread of advanced technologies to China, India, militia groups, etc.; network-centric and information warfare; private equity investment in defense and intelligence; and a shifting

locus of innovation to lower tier firms. This interdisciplinary course crosses boundaries of management, politics, and economics.

PLSC 665a^U/GLBL 555a, Causes of War Allan Dafoe

Examination of social, symbolic, and psychological aspects of international relations, with emphasis on the roles of perception and reputation in militarized conflict. Topics include deterrence, honor, prestige, signaling, audience costs, and international law. Rationalist, psychological, and cultural perspectives. Some attention to research design.

PLSC 695a, International Relations I Nicholas Sambanis

The course examines theories of international relations and evaluates empirical evidence in favor of or against those theories. It surveys the main theoretical traditions in international relations and considers how empirical methods can be used to identify causation in the international relations field. Students acquire broad familiarity with the diverse literature in this field, learn to identify opportunities for new research, and apply rigorous methodology to evaluate theoretical claims. The course is designed for students who plan to pursue doctoral-level research in international relations and want to pass the Ph.D. qualifying exam in the field.

PLSC 696b, International Relations II Jason Lyall

This course introduces students to the various methodological challenges that arise while conducting empirical research in international relations as well as possible research designs for overcoming them. This course, which builds directly on PLSC 695a, draws heavily, though not exclusively, on research issues that arise in the subfield of international security. Each week we tackle a key debate: proposed topics include (1) explaining the origins, conduct, and outcomes of inter- and intrastate wars; (2) the sources of military effectiveness; (3) the uses and limits of coercive diplomacy; and (4) the effects of transnational forces and actors. We use these debates as springboards for broader discussions of the strengths and weaknesses of different research approaches, including experimental, quasi-experimental, observational, and interview and archival-based work. PLSC 695a is strongly recommended.

COMPARATIVE POLITICS

PLSC 709a/LAW 20140, Comparative Constitutional Law Bruce Ackerman

An effort to define the key concepts adequate for an evaluation of the worldwide development of modern constitutionalism since the Second World War. Enrollment limited.

PLSC 734a,b/SOCY 560a,b, Comparative Research Workshop

Jonathan Wyrzten, Emily Erikson

This weekly workshop is dedicated to group discussion of work-in-progress by visiting scholars, Yale graduate students, and in-house faculty from Sociology and affiliated disciplines. Papers are distributed a week ahead of time and also posted on the Web site of the Center for Comparative Research (www.yale.edu/ccr). Students who take the course for a letter grade are expected to present a paper-in-progress the term that they are enrolled for credit. T 11:50–1:20

PLSC 740a^U, Political Violence Stathis Kalyvas

A survey of both fundamental and cutting-edge research on all forms of political violence, from street protest to genocide, including riots, political assassinations, military coups, terrorism, civil wars, and certain types of organized crime. What connects them and how are the rise and decline of each form shaping the presence or absence of the other ones?

PLSC 755a^U, European Politics David Cameron

Comparison of the political systems of the major European countries. Topics include political institutions, electoral politics and political parties, public policies, and contemporary problems.

PLSC 756a^U, The European Union David Cameron

Origins and development of the European Community and Union over the past fifty years; ways in which the often conflicting ambitions of its member states have shaped the EU; relations between member states and the EU's supranational institutions and politics; and economic, political, and geopolitical challenges.

PLSC 758b^U/GLBL 539b^U, Political Parties in the Developing World Tariq Thachil

Political parties are routinely described as ineffective, unresponsive, and corrupt. Yet they are vital players in both democratic and nondemocratic regimes across the globe. Parties are essential for several basic political functions, ranging from representing societal interests, providing political alternatives, mobilizing voting publics, and even maintaining social control. It is thus essential for any serious student of democracy to understand how political parties emerge and function. This course introduces students to the big questions surrounding parties and party systems, with an emphasis on the non-Western world. It examines how different kinds of parties form, the various ways in which they seek to forge linkages with ordinary citizens, and the effect of their competition on democratic institutions. The readings examine a variety of parties, from those that led independence movements, to those that represent particular ethnic groups or religious ideology. Examples are drawn from countries in Latin America, Asia, the Middle East, and sub-Saharan Africa.

PLSC 760b^U, India and Pakistan: Democracy, Conflict, and Development

Steven Wilkinson

The variation in democracy, conflict, and development between India and Pakistan since 1947, as well as variation within each country. Management of ethnic and religious conflicts, secularism, secessionist movements in Kashmir and elsewhere, the tension between economic growth and equity, and problems of governance.

PLSC 766a^U, Politics and Markets Peter Swenson

Examination of the interplay between market and political processes in different substantive realms, time periods, and countries. Inquiry into the developmental relationship between capitalism and democracy, including the developmental and functional relationships between the two. Investigation of the politics of regulation in areas such as property rights; social security; international finance; and product, labor, and service markets. Topics include the economic motives of interest groups and coalitions in the political process.

PLSC 772b^U, The Greek Civil War Stathis Kalyvas

The Greek civil war has been the object of considerable research as one of the major European civil wars of the twentieth century. It is closely intertwined with two signal events of the twentieth century, the Second World War and the Cold War. The class offers an in-depth look into this conflict, primarily based on its considerable historiography, but also bringing in contributions from other disciplines and areas, from anthropology to fiction.

PLSC 776b^U/RLST 728b, Islam and Democracy in the Modern Middle East

Andrew March

This seminar studies the development of regimes of government in Muslim countries since the nineteenth century. The focus is on early constitutional movements, the rise of political Islam, the management of religion in various twentieth-century states, the Iranian revolution, and the growth of Salafi ideas, culminating in the ISIS “caliphate.”

PLSC 777a, Comparative Politics I: Research Design Susan Stokes

This course, the first in the yearlong introduction to the study of comparative politics for Ph.D. students in political science, examines the purpose and methodology of comparative inquiry. Designed to introduce students to the study of comparative politics and to assist students in developing research topics and strategies, the course explores key themes—the origins of political regimes, the building of nations and states, ethnicity and nationalism, collective action, the politics of welfare states, and the logic of institutional change—through the critical reading and discussion of classic and contemporary works.

PLSC 778b, Comparative Politics II Katharine Baldwin

The second part of a two-part sequence designed to introduce graduate students to the fundamentals of comparative politics, including the major debates, topics, and methods.

PLSC 779a/ANTH 541a/F&ES 836a/HIST 965a, Agrarian Societies: Culture, Society, History, and Development Peter Perdue, James Scott,

Kalyanakrishnan Sivaramakrishnam

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from anthropology, economics, history, political science, and environmental studies are used to develop a meaning-centered and historically grounded account of the transformations of rural society. Team-taught. W 1:30–5:20

PLSC 789b^U/EAST 562b^U, The Politics and Political Economy of East Asia

Woo Chang Kang, Frances Rosenbluth

This class is designed to help students understand political, economic, and diplomatic developments in East Asia with a focus on Japan, China, Korea, and Taiwan. We begin with the historical events that shaped the internal politics of each country and their international relations. We explore the interrelationship between their politics and their paths of economic development. Finally, we consider their uneasy relationships as neighbors in East Asia.

POLITICAL ECONOMY

PLSC 712a, Comparative Political Economy Frances Rosenbluth

This seminar is designed to give graduate students a broad-gauged introduction to one of the largest and most vibrant branches of political science. We begin by examining the field's diverse theoretical underpinnings and placing political economy in the context of political science more broadly. The remainder of the course is concerned with the application of theory to practice. We examine the interaction between government and the economy in democratic and nondemocratic regimes, and in developed and developing countries. Topics include micro- and macroeconomic policy, industrial relations, the political economy of gender, and international political economy.

PLSC 714b/LAW 21042, Corruption, Economic Development, and Democracy

Susan Rose-Ackerman

A seminar on the link between political and bureaucratic institutions, on the one hand, and economic development, on the other. A particular focus is the impact of corruption on development and the establishment of democratic government. Enrollment limited to fifteen.

PLSC 715b^U, The Political Economy of Inequality in Advanced Democracies

David Rueda

This course introduces students to some of the major topics related to the political economy of inequality, institutions, and redistribution. It is organized around a framework that emphasizes exploring the assumptions that underlie most of the literature on the political economy of inequality in industrialized democracies. Distributional issues have been at the core of political science for a long time. Yet over the past three decades the study of the political origins and consequences of inequality is gaining strength in comparative politics. New data sources and analytical tools explain a revival that is shedding new light on many issues central to the discipline. This seminar is designed to provide students with a critical overview of some of the assumptions in the field. The first part of the seminar explores inequality and redistribution demands. The second part of the seminar is dedicated to arguments about how redistribution preferences are translated into policy (and what institutions intermediate these effects).

AMERICAN POLITICS

PLSC 727b^U/F&ES 759b/MGT 697b, Capitalism: Success, Crisis, and Reform

Douglas Rae

Examination of capitalism as it functions in practice, with extensive use of business cases. The role of capitalism in generating wealth and innovation. Survey of critical institutions in banking, regulation, taxation, and trade. Negative consequences of capitalist development such as radical inequality, disruption of the natural environment, and intermittent social crises. Consideration of strategies for shaping capitalism in future decades.

PLSC 800a, Introduction to American Politics Jacob Hacker

An introduction to the analysis of U.S. politics. Approaches given consideration include institutional design and innovation, social capital and civil society, the state, attitudes, ideology, econometrics of elections, rational actors, formal theories of institutions, and

transatlantic comparisons. Assigned authors include R. Putnam, T. Skocpol, J. Gerring, J. Zaller, D.R. Kiewiet, L. Bartels, D. Mayhew, K. Poole & H. Rosenthal, G. Cox & M. McCubbins, K. Krehbiel, E. Schickler, and A. Alesina. Students are expected to read and discuss each week's assignment and, for each of five weeks, to write a three- to five-page analytic paper that deals with a subject addressed or suggested by the reading.

PLSC 801a^U, Political Preferences and American Political Behavior Gregory Huber
Introduction to research methods and topics in American politics. Focus on ideas about choice that are useful for the study of politics. Topics include utility theory, heuristics and biases, proximity vs. directional voting, Bayesian updating, retrospective voting, priming and framing, the role of emotion, and the consequences of political ignorance.

PLSC 802b, Collective Action and Choice Deborah Beim
A graduate-level course, open to undergraduates, about the basic issues of collective action and choice (preference aggregation), with a particular focus on issues of American politics. Topics include externalities and public goods provision, social choice theory, models of electoral competition (including "median voter" models, and extensions to those models that incorporate strategic challenger entry, campaign spending, heterogeneity in voter attentiveness, valence dimensions, and primaries, etc.), the effects of different institutional settings (e.g., competitive versus retention elections) on choices, the incumbency advantage, lobbying, and decision making in small groups (e.g., issues of deliberation). Course work includes reading and writing assignments.

PLSC 803b, American Politics III: Institutions Kelly Rader
A graduate-level course, open to undergraduates, designed to introduce students to research on American political institutions. We examine different explanations for and models of the sources of institutions, discuss their internal organization and governance, and consider the effects of institutions on outcomes of interest. Topics include alternatives to institutions, agenda-setting models, influences on bureaucratic decisions, the size of government and state building, congressional organization, the presidency, policy feedback and path dependence, and interest groups. Course work includes reading and writing assignments.

PLSC 820a, Executive Politics and the Presidency Stephen Skowronek
This course surveys the origins of the American presidency, its constitutional foundations, institutional development, and current operations. Special attention is given to topics of interest in current research, including the politics of leadership, the scope and limits of unilateral action, changing relations with Congress, the bureaucracy and the public, and the managerial capacities of the Executive Office of the President.

PLSC 842b/LAW 21046, The Constitution: History, Philosophy, and Law

Bruce Ackerman

An inquiry into the foundations of the American Constitution, at its founding and at critical moments in its historical transformation—most notably in response to the Civil War, the Great Depression, and the Civil Rights Movement. Philosophically speaking, do we still live under the Constitution founded by the Federalists, or are we inhabitants of the Second or Third or Nth Republic? Institutionally, in what ways are the patterns of modern American government similar to, and different from, those in post-Revolutionary

(1787–1860) and post-Civil War (1868–1932) America? Legally, what is or was the role of constitutional law in the organization of each of these historical regimes? Through asking and answering these questions, the course tries to gain a critical perspective on the effort by the present Supreme Court to create a new constitutional regime for the twenty-first century. Self-scheduled examination (web) or paper option.

PLSC 853a^U, U.S. National Elections Eitan Hersh

An investigation of electoral realignments, voting for president and Congress, voter turnout, incumbency advantage, nominations, and campaign finance. Paper.

PLSC 860b, Advanced Topics in Quantitative American Politics Alan Gerber,
Gregory Huber

This course reviews significant substantive findings and the most important recent developments in research design in quantitative American politics. The course provides a forum for students to initiate and complete a collaborative research project with the instructors. Prerequisite: although attention is not exclusively restricted to experimental research, enrollment requires permission of the instructor and is limited to students with an adequate statistics background and demonstrated research interest in work that focuses on empirical examination of causal relationships.

RESEARCH WORKSHOPS

PLSC 919, American Politics Workshop

The course meets throughout the year in conjunction with the ISPS American Politics Workshop. It serves as a forum for graduate students in American politics to discuss current research in the field as presented by outside speakers and current graduate students. Can be taken as Satisfactory/Unsatisfactory only. W 12–1:20

PLSC 920, Comparative Politics Workshop

A forum for the presentation of ongoing research by Yale graduate students, Yale faculty, and invited external speakers in a rigorous and critical environment. The workshop's methodological and substantive range is broad, covering the entire range of comparative politics. There are no formal presentations. Papers are read in advance by participants; a graduate student critically discusses the week's paper, the presenter responds, and discussion ensues. Detailed information can be found at www.yale.edu/cpworkshop. Can be taken as Satisfactory/Unsatisfactory only. T 12–1:20

PLSC 921, Political Theory Workshop

The Political Theory Workshop is an interdisciplinary forum that focuses on theoretical and philosophical approaches to the study of politics. The workshop seeks to engage with (and expose students to) a broad range of current scholarship in political theory and political philosophy, including work in the history of political thought; theoretical investigations of contemporary political phenomena; philosophical analyses of key political concepts; conceptual issues in ethics, law, and public policy; and contributions to normative political theory. The workshop features ongoing research by Yale faculty members, visiting scholars, invited guests, and advanced graduate students. Papers are distributed and read in advance, and discussions are opened by a graduate student commentator. Detailed information can be found at www.yale.edu/isps/seminars/politheo/index.html. Can be taken as Satisfactory/Unsatisfactory only. W 4:15–5:45

PLSC 922, Order, Conflict, and Violence (OCV) Seminar Series Elisabeth Wood

The OCV seminar series focuses on processes related to the emergence and breakdown of order. The key assumption is that understanding and studying these processes requires better theoretical and empirical foundations and calls for challenging existing disciplinary and methodological divides. The seminar series is, therefore, dedicated to the presentation of cutting-edge work from all social science disciplines and includes the presentation of ongoing research by Yale graduate students. Detailed information can be found at www.yale.edu/macmillan/ocvprogram. Can be taken as Satisfactory/Unsatisfactory only.

PLSC 924, Leitner Political Economy Seminar Series

The Leitner Political Economy Seminar Series engages research on the interaction between economics and politics as well as research that employs the methods of political economists to study a wide range of social phenomena. The workshop serves as a forum for graduate students and faculty to present their own work and to discuss current research in the field as presented by outside speakers, faculty, and students. Detailed information can be found at www.yale.edu/leitner/seminars.html. Can be taken as Satisfactory/Unsatisfactory only. M 12–1:20

PLSC 926, International Relations Workshop

The International Relations Workshop engages work in the fields of international security, international political economy, and international institutions. The forum attracts outside speakers, Yale faculty, and graduate students. It provides a venue to develop ideas, polish work-in-progress, or showcase completed projects. Typically, the speaker would prepare a 35- to 40-minute presentation, followed by a question-and-answer session. More information can be found at www.yale.edu/polisci/conferences/ir.html. Can be taken as Satisfactory/Unsatisfactory only. W 12–1:20

PLSC 990, Directed Reading

By arrangement with individual faculty.

PSYCHOLOGY

Kirtland Hall, 203.432.4500
<http://psychology.yale.edu>
 M.S., M.Phil., Ph.D.

Chair

Frank Keil (203.432.4545, frank.keil@yale.edu)

Director of Graduate Studies

Gregory McCarthy (203.432.9261, gregory.mccarthy@yale.edu)

Professors Woo-kyoung Ahn, Stephen Anderson (*Linguistics*), Amy Arnsten (*Neurobiology*), John Bargh, Paul Bloom, Thomas Brown, Tyrone Cannon, Marvin Chun, Margaret Clark, Ravi Dhar (*School of Management*), John Dovidio, Carol Fowler (*Haskins Laboratories*), Robert Frank (*Linguistics*), Tamar Gendler (*Philosophy*), Jeannette Ickovics (*Public Health*), Marcia Johnson, Jutta Joormann, Dan Kahan (*Law School*), Alan Kazdin, Frank Keil, Robert Kerns (*Veterans Administration Medical Center*), Joshua Knobe (*Philosophy*), Marianne LaFrance (*Women's, Gender & Sexuality Studies*), Lawrence Marks (*Public Health*), Linda Mayes (*Child Study Center*), Gregory McCarthy, Nathan Novemsky (*School of Management*), Donald Quinlan (*Psychiatry*), Peter Salovey, Laurie Santos, Brian Scholl, Jane Taylor (*Psychiatry*), Tom Tyler (*Law School*), Fred Volkmar (*Child Study Center*), Victor Vroom (*School of Management*), Karen Wynn

Associate Professors Walter Gilliam (*Child Study Center*), Elena Grigorenko (*Child Study Center*), Joan Kaufman (*Psychiatry*), Becca Levy (*Public Health*), Kevin Pelphrey (*Psychiatry*), Maria Piñango (*Linguistics*), Mary Schwab-Stone (*Child Study Center*)

Assistant Professors Arielle Baskin-Sommers, Steve Chang, Yarrow Dunham, Avram Holmes, Hedy Kober (*Psychiatry*), Jaime Napier, David Rand, Gregory Samanez-Larkin

Lecturers Nancy Close, Nelson Donegan, Carla Horwitz, Kristi Lockhart, Mary O'Brien, Matthias Siemer, Marney White

Fields of Study

Fields include clinical psychology; cognitive psychology; developmental psychology; neuroscience; and social/personality psychology.

Special Admissions Requirement

The department requires that scores from the GRE General Test accompany an application.

Special Requirements for the Ph.D. Degree

In order to allow each student to be trained in accordance with his or her own interests and career goals, the general requirements of the department are kept to a minimum. The formal requirements are: (1) Course work selected to meet the individual's objectives

with a minimum of three basic-level courses and one course in data analysis. Two of the three required basic-level courses must be in two different areas of psychology outside the student's main area of concentration. The basic-level course requirement must be completed by the end of the second year. Students must attain an Honors grade in at least two term courses by the end of the second year of study. (2) Students are required to assist in teaching four courses by the end of their fourth year. (3) Completion of a First-Year Research Paper due by May 10 of the second term. (4) Completion of a predissertation research project, to be initiated not later than the second term and completed not later than May 1 of the second year. Certification of this research project as well as performance in course work and other evidence of scholarly work at a level commensurate with doctoral study, as judged by the faculty, are necessary for continuation beyond the second year. (5) Submission of a dissertation prospectus, and a theme essay that demonstrates the candidate's comprehensive knowledge and understanding of the area of concentration. Certification of the theme essay completes the qualifying examination. (6) Approval of the dissertation by an advisory committee and the passing of an oral examination on the dissertation and its general scientific implications. The theme essay and the dissertation prospectus are completed during the third year. Students are then formally admitted to Ph.D. candidacy. There are no language requirements.

The faculty considers teaching to be an essential element of the professional preparation of graduate students in Psychology. For this reason participation in the Teaching Fellow Program is a degree requirement for all doctoral students. They are expected to serve as teaching fellows for a total of nine teaching fellow units over the course of the second through fourth years in the program. Opportunities for teaching are matched as closely as possible with students' academic interests.

Combined Ph.D. Programs

Psychology offers combined Ph.D. degree programs with African American Studies and Philosophy. For the combined program with African American Studies, students must apply to the African American Studies department, with Psychology indicated as the secondary department. For the combined program with Philosophy, students can apply to the Philosophy department or the Psychology department. See departments for details.

Master's Degrees

M.Phil. The academic requirements for the M.Phil. degree are the same as for the Ph.D. degree except for the submission of a prospectus, a dissertation area review, and the completion and defense of a dissertation, which define the Ph.D.

M.S. (en route to the Ph.D.) The M.S. degree is awarded upon satisfactory completion of the second year of the program leading to the Ph.D. degree and also of the departmental predissertation research requirement.

Program materials are available online at <http://psychology.yale.edu>.

Courses

[PSYC 503a, Cognitive Processes and Brain Bases of Memory]

[PSYC 505a, Stereotyping and Prejudice]

[PSYC 506b/LING 540b^U, Computational Models in Cognitive Science]

[PSYC 509a, Social Cognition]

[PSYC 511b, Cognitive Development]

PSYC 513b, Biological Bases of Psychopathology Tyrone Cannon

This course addresses the current state of understanding of the role of biological factors in psychopathology, including genetic, neuroanatomical, neurophysiological, neurochemical, and neuropsychological findings. Although the focus is on human studies and on etiology, we also cover seminal work on animal models and biological intervention approaches. Topics to be covered include classification and diagnosis, brain systems and neuroscience methods, behavioral genetics, depression, anxiety disorders, schizophrenia, bipolar disorder, addictions, personality disorders, and developmental disorders. The interplay of biological and psychological factors (e.g., gene-environment interaction) is a central theme throughout.

[PSYC 514a^U, Topics in Infant Studies]

PSYC 518a, Multivariate Statistics John Dovidio

Introduction to the analysis of quantitative data from experiments—primarily the analysis of variance and contrast analyses. Some coverage of correlation and regression. Required of first-year students except with instructor's permission. MTH 9–11

[PSYC 519b, Advanced Regression Analyses]

[PSYC 520b^U, Computational Modeling of Social Behavior]

[PSYC 521a, Structural Equation Modeling]

[PSYC 522a^U, Mapping the Human Brain]

PSYC 526b^U, Research Methods in Human Neuroscience Gregory McCarthy

This laboratory course provides students with experience in the major methods used in human neuroscience research. The focus is on functional magnetic resonance imaging, electroencephalography, and evoked potentials. Psychophysiological techniques such as the measurement of skin conductance are also covered, but in less detail. Students acquire a firm understanding of each technique, and they design experiments, acquire data, and perform analyses. The course makes extensive use of MATLAB. W 1–5

[PSYC 531b^U, Psychopharmacology]

PSYC 539a, Psychopathology and Its Treatment Jutta Joormann

The aim of this course is to have students master information on theory, assessment, and intervention for major forms of psychopathology using cognitive-behavioral approaches. The focus is on learning how behavior can be conceptualized in cognitive-behavioral terms and how specific clinical interventions are implemented. Students play an active role in

this process by participating in class discussions, confronting the complexities of clinical intervention, and making presentations on treatment methods for various clinical problems. F 9:25–11:15

[PSYC 541a, **Research Methods in Psychology**]

[PSYC 543a, **Motivation**]

[PSYC 553a/MGMT 753a, **Behavioral Decision Making I: Choice**]

PSYC 554a/MGMT 754a, Behavioral Decision Making II: Judgment

Nathan Novemsky, Ravi Dhar

This seminar examines research on the psychology of judgment. We focus on identifying factors that influence various judgments and compare them to which factors individuals want and expect to drive their judgments. Topics of discussion include judgment heuristics and biases, confidence and calibration, issues of well-being including predictions and experiences, regret and counterfactuals. The goal is threefold: to foster a critical appreciation of existing research on individual judgment, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to existing knowledge. Students generally enroll from a variety of disciplines, including cognitive and social psychology, behavioral economics, finance, marketing, political science, medicine, and public health. T 4:10–7:10

[PSYC 557b, **Social and Emotional Relationships**]

PSYC 560a^U, Research Methods in Behavioral Genetics Tyrone Cannon

Methods of human behavioral genetics research. Focus on the genetics of psychiatric disorders, personality, and cognition. Students design and perform genetic-association analyses of behavioral traits, using existing datasets supplied by the instructor. MW 1–2:15

PSYC 570a, Nonverbal Communication Marianne LaFrance

Exploration of the psychological and social functions of nonverbal behavior (e.g., facial expression, gesture, posture, paralanguage, proxemics). Several levels of analysis are considered, including individual, interactional, group, intergroup, and cultural. T 2:30–4:20

[PSYC 575b^U, **Brain and Behavior**]

PSYC 579b^U, Thinking Woo-kyoung Ahn

A survey of psychological studies on thinking and reasoning, with discussion of ways to improve thinking skills. Topics include judgments and decision making, counterfactual reasoning, causal learning, inductive inferences, analogical reasoning, problem solving, critical thinking, and creativity. M 9:25–11:15

PSYC 601b/F&ES 862b/HPM 601b, The Science of Science Communication

Dan Kahan

The simple dissemination of valid scientific knowledge does not guarantee it will be recognized by non-experts to whom it is of consequence. The science of science communication is an emerging, multidisciplinary field that investigates the processes that enable ordinary citizens to form beliefs consistent with the best available scientific evidence, the conditions that impede the formation of such beliefs, and the strategies that

can be employed to avoid or ameliorate such conditions. This course surveys, and makes a modest attempt to systematize, the growing body of work in this area. Special attention is paid to identifying the distinctive communication dynamics of the diverse contexts in which non-experts engage scientific information, including electoral politics, governmental policy making, and personal health decision making.

PSYC 604b, Cognition and Emotion Matthias Siemer

The course presents an overview of current research questions and results in the area of cognition and emotion. We explore basic research questions as well as implications of cognitive approaches toward emotions for domains such as emotional disorders and psychological resilience and well-being.

[PSYC 607b^U, Cognitive Science of Causality]

[PSYC 608b^U, Cognitive Science of Ignorance]

[PSYC 610a^U, The Modern Unconscious]

PSYC 611b^U/NSCI 611b, Systems Neuroscience Steve Chang

This course provides an overview of the fundamental principles governing the central nervous system. Topics include the anatomy of the central nervous system, the neural mechanisms underlying cortical and subcortical control of behavior, various neuroscience techniques, as well as implications for nervous system disorders. The lectures combine basic knowledge of the nervous system with the key experimental findings that led to new discoveries in brain function. TTH 9–10:15

[PSYC 613b^U, Mind, Brain, and Society]

[PSYC 615a, Psychology, Psychotherapy, History, Systems, and Practice]

PSYC 617a^U, Etiology and Treatment of Addictions Arielle Baskin-Sommers

What is considered a drug? Why do some individuals use substances, but others become addicted? Are there effective treatments for addiction? Why and how does society attempt to control substance use and distribution? Exploring questions such as these is a central concern in this interdisciplinary seminar, which highlights research from cognitive neuroscience, psychology, sociology, and public health perspectives. The focus is on examining social, neurobiological, and genetic explanations for addiction, evaluating addiction treatments, and discussing the social construction of substance policies. Students are asked to think critically about material and evaluate its strengths and weaknesses. To foster critical thinking skills, students have ample opportunities to discuss topics in class, analyze arguments in reading assignments, and apply ideas to real-world situations through projects and presentations. Readings consist primarily of journal articles. W 9:25–11:15

[PSYC 618b^U, The Social Brain]

[PSYC 621b^U, Cognitive Science of Pleasure]

[PSYC 623b^U, Cognitive Science of Good and Evil]

[PSYC 624b^U, The Psychology of Legitimacy]

[PSYC 625b^U, Social Perception]

PSYC 626a/LAW 20339, Topics in Law and Psychology Tom Tyler, Marcia Johnson
 The goal of this seminar is to strengthen the collaborative bridge between law and psychology through discussion with faculty in both departments who have interests in connecting psychological knowledge to legal questions. Students write a paper on an aspect of this interdisciplinary field that interests them. The class is built around reading material suggested by faculty and when possible brings them into the class to talk about their work and answer questions about their views on the field. We also bring in researchers from other universities who are doing relevant research. T 4–6

PSYC 627b, Advanced Topics in Infant Studies Karen Wynn
 This course investigates selected advanced topics in infant cognitive, social, and/or emotional development. The topic varies from year to year. Some examples are: infants' concept of object, concept of number, early social cognition, and early emotional development.

[PSYC 629a/LAW 20647, Social Science Research Methods]

PSYC 630b/LAW 21745, Empirical Research Seminar Tom Tyler
 This class provides students with an opportunity to learn how to conduct empirical research. The class covers the basic ideas underlying research and examines various approaches that can be taken to research issues. Emphasis is on learning how to use various approaches. The class takes place in the computer lab so that students can get hands-on experience using research software.

[PSYC 632b^U, Food and the Brain]

PSYC 643a, Psychological Measurement of Individual Differences in Cognitive Functioning, Achievement, and Personality Mary O'Brien
 This course focuses on theoretical, methodological, and practical issues in psychological assessment. The processes that underlie evidence-based assessment are explored: how constructs are conceptualized and operationalized, how measures are developed and evaluated, how assessment tools are selected to answer specific questions, how findings are analyzed and synthesized, and how psychological reports are written to meet the expectations of professional and layperson audiences. Over the course of the term, students gain experience with administering, scoring, and interpreting a variety of commonly used assessment instruments (such as the WAIS-IV, WMS-IV, and MMPI-2). The importance of critical evaluation of the assessment process is emphasized throughout.

[PSYC 646a/LAW 20627, Social Science in Law]

PSYC 647a/LAW 20668, Social Science and Institutional Design: The Empirical Evaluation of Legal Policies and Practices Tom Tyler
 The current legal system bases many of its policies and practices upon assumptions concerning human nature. What does research tell us about how those policies and practices actually operate? What alternative social science models are available and how would institutions be different if those models were used? This class considers deterrence models and compares them to models emphasizing legitimacy, morality, and social norms.

Policing, the courts, and corrections are examined and evaluated against available empirical evidence. The class also considers alternative models of institutional design and evidence of their potential or actual effectiveness.

[PSYC 654b^U, **Sensory Information Processing**]

PSYC 657a/CDE 505a, Social and Behavioral Foundations of Health Becca Levy

The course provides students with an introduction to social and behavioral science issues that influence patterns of health and health care delivery. The focus is on the integration of biomedical, social, psychological, and behavioral factors that must be taken into consideration when public health initiatives are developed and implemented. The course emphasizes the integration of research from the social and behavioral sciences with epidemiology and biomedical sciences. T 9–10:30

[PSYC 664a/CDE 531a, **Health and Aging**]

[PSYC 670b, **Personality and Individual Differences**]

PSYC 671a, The Cognitive Science of Mind Reading Laurie Santos

Examination of theory of mind from a developmental, comparative, and neural perspective. Topics include whether different representational systems underlie theory of mind capacities, how infants come to represent others' mental states, whether nonhuman animals share humanlike theory of mind capacities, and how phenomena like conformity and metacognition can be reconciled with developmental and neural findings in the domain of mind reading.

PSYC 684a, Introduction to Psychotherapy: Technique Mary O'Brien

Introduction to basic clinical skills and clinical issues. Topics for discussion include developing a therapeutic relationship, barriers to effective communication, strategies for managing resistance, and developing a professional identity. Class format includes informal discussion, assigned readings, and student case presentations. Prerequisite: permission of the instructor. Enrollment limited to fifteen.

PSYC 684b, Introduction to Psychotherapy: Technique Mary O'Brien

The focus of the seminar is on formulating and conceptualizing psychological problems from a cognitive-behavioral perspective. Special consideration is paid to individual and cultural diversity in conceptualizing cases and planning treatment. Also discussed are ways in which cognitive-behavioral perspectives can be integrated with other theoretical orientations (e.g., interpersonal theory, experiential therapy).

PSYC 689a, Psychopathology and Diagnostic Assessment Mary O'Brien

Didactic practicum for first-year clinical students. Main emphasis is initial assessment. Treatment planning and evaluation of progress also covered. Students first observe and then perform initial interviews. Applicable ethics and local laws reviewed.

PSYC 690b, Ethics and Clinical Practice: Legislation and Diversity Issues

Mary O'Brien

Introduction to ethical and legal guidelines for clinical practice. In addition, supervision on diagnostic interview using the Structured Clinical Interview for DSM-IV is provided.

PSYC 702, Current Work in Cognition Marvin Chun

A weekly seminar in which students, staff, and guests report on their research in cognition and information processing. T 11:35–12:50

PSYC 704, Current Work in Behavior, Genetics, and Neuroscience Steve Chang

Examination of the current status of research and scientific knowledge bearing on issues of behavior, genetics, and neuroscience. Weekly speakers present research, which is examined methodologically; recent significant journal articles or technical books are also reviewed. F 11:35–12:50

PSYC 708, Current Work in Developmental Psychology Paul Bloom

A luncheon meeting of the faculty and graduate students in developmental psychology for reports of current research and discussion on topics of general interest. W 11:35–12:50

PSYC 710, Current Work in Social Psychology and Personality John Bargh [F],

John Dovidio [Sp]

Faculty and students in personality/social psychology meet during lunchtime to hear about and discuss the work of a local or visiting speaker. M 11:35–12:50

PSYC 711, Current Work in Child Development and Social Policy Erika Christakis

A series of lectures by guest speakers from academia, various levels of government, community organizations, service agencies, the business world, and the media. Speakers discuss their work and its social policy implications. Topics may include early childhood education, child care, intervention programs for children and families, education reform, mental health, child and family policies, research at the intersection of psychology and social policy, and media presentation of child and family issues, among others. M 9–10

PSYC 718a, Diversity in Clinical Science and Practice

Basic and applied current research in diversity in clinical science and practice is presented by faculty, visiting scientists, and graduate students and examined in terms of theory, methodology, and ethical and professional implications. Students cannot simultaneously enroll in PSYC 720. TH 11:35–12:50

PSYC 719b, History and Systems in Psychology

Basic and applied current research on the history and systems in psychology is presented by faculty, visiting scientists, and graduate students and examined in terms of theory, methodology, and ethical and professional implications. Students cannot simultaneously enroll in PSYC 720. TH 11:35–12:50

PSYC 720, Current Work in Clinical Psychology Arielle Baskin-Sommers

Basic and applied current research in clinical psychology that focuses on the cognitive, affective, social, biological, and developmental aspects of psychopathology and its treatment is presented by faculty, visiting scientists, and graduate students. This research is examined in terms of theory, methodology, and ethical and professional implications. Students cannot simultaneously enroll in PSYC 718a or 719b. TH 11:35–12:50

PSYC 721, Research Topics in Infant Cognition Karen Wynn

Investigation of various topics in infant cognition: early mechanisms for representing and reasoning about number; infants' ability to represent time; early object knowledge; foundations of intentional understanding. Prerequisite: permission of the instructor.

PSYC 723, Research Topics in Child and Adolescent Therapy Alan Kazdin

The course focuses on the development and execution of research related to child and adolescent treatment, and the factors with which clinical dysfunction and therapeutic change are associated.

PSYC 724, Research Topics in Cognition, Emotion, and Psychopathology

Jutta Joormann

This weekly seminar focuses on the role of cognition and emotion in psychopathology. We discuss recent research on basic mechanisms that underlie risk for psychopathology such as cognitive biases, cognitive control, and biological aspects of psychological disorders. The seminar also focuses on the interaction of cognition and emotion, on the construct of emotion regulation, and on implications for psychopathology.

PSYC 725, Research Topics in Human Neuroscience Gregory McCarthy

Discussion of current and advanced topics in the analysis and interpretation of human neuroimaging and neurophysiology. T 10–11:15

PSYC 727, Research Topics in Clinical Neuroscience Tyrone Cannon

Current research into the biological bases of schizophrenia and bipolar disorder, including topics related to etiology, treatment, and prevention. T 10–11:15

PSYC 728, Research Topics in Human Cooperation David Rand

Our lab asks why and when people are willing to help others at a cost to themselves, and how we can encourage this cooperative behavior. We combine experiments (mostly using economic games) with computer models, and run studies both in the lab and online.

PSYC 729, Research Topics in Language and Cognition Paul Bloom

Seminar focusing on ongoing research projects in language, cognition, and development. Prerequisite: permission of the instructor. W 4–5:30

PSYC 731, Research Topics in Cognition and Development Frank Keil

A weekly seminar discussing research topics concerning cognition and development. Primary focus on high-level cognition, including such issues as the nature of intuitive or folk theories, conceptual change, relations between word meaning and conceptual structure, understandings of divisions of cognitive labor, and reasoning about causal patterns.

PSYC 732, Research Topics in Visual Cognitive Neuroscience Marvin Chun

Examines current research in visual cognitive neuroscience, including discussion of proposed and ongoing research projects. Topics include visual attention, perception, memory, and contextual learning.

PSYC 733, Research Methods in Social Cognitive Development Yarrow Dunham

Investigation of various topics in developmental social cognition. Particular focus on the development of representations of self and other, social groups, and attitudes and stereotypes.

PSYC 734, Research Topics in Decision Neuroscience and Aging

Gregory Samanez-Larkin

Examines current research on decision neuroscience and life-span development, including discussion of proposed and ongoing research projects. Topics include emotion, motivation, learning, cognitive control, and neuromodulation/pharmacology.

PSYC 735, Research Topics in Thinking and Reasoning Woo-kyoung Ahn

In this lab students explore how people learn and represent concepts. Weekly discussions include proposed and ongoing research projects. Some topics include computational models of concept acquisition, levels of concepts, natural kinds and artifacts, and applications of some of the issues.

PSYC 736, Research Topics in Stereotyping and Prejudice John Dovidio

Explores the nature of prejudice in its traditional and contemporary forms. Although the emphasis is on the causes and consequences of racial bias in the United States, the dynamics of intergroup relations are considered more broadly as well. Emphasis is on developing critical thinking, reading, and research skills to test ideas relevant to understanding and combating stereotyping, prejudice, and discrimination.

PSYC 737, Research Topics in Clinical and Affective Neuroscience Avram Holmes

Seminar focusing on ongoing research projects in clinical, cognitive, and translation neuroscience. Prerequisite: permission of the instructor. T 10–11:15

PSYC 739, Research Topics in Autism and Related Disorders Fred Volkmar

Focus on research approaches in the study of autism and related conditions including both psychological and neurobiological processes. The seminar emphasizes the importance of understanding mechanisms in the developmental psychopathology of autism and related conditions. F 9–10

PSYC 741, Research Topics in Emotion and Relationships Margaret Clark

Members of this laboratory read, discuss, and critique current theoretical and empirical articles on relationships and on emotion (especially those relevant to the functions emotions serve within relationships). In addition, ongoing research on these topics is discussed along with designs for future research.

PSYC 743, Research Topics in Political Psychology Jaime Napier

Seminar focusing on ongoing research projects in political psychology, including the system justifying functions and the social and psychology antecedents and consequences of political and religious ideologies. Prerequisite: permission of the instructor.

PSYC 744, Research Topics in Philosophical Psychology Joshua Knobe

The lab group focuses on topics in the philosophical aspects of psychology.

PSYC 745, Research Topics in Disinhibitory Psychopathology

Arielle Baskin-Sommers

This laboratory course focuses on the study of cognitive and affective mechanisms contributing to disinhibition. We discuss various forms of disinhibition from trait (e.g., impulsivity, low constraint, externalizing) to disorder (e.g., antisocial personality disorder, psychopathy, substance use disorders), diverse methods (e.g., psychophysiology, self-report, neuroimaging, interventions), and multiple levels of analyses (e.g., neural, environmental, social). Members of this laboratory read and critique current articles, discuss ongoing research, and plan future studies. T 5–6:30

PSYC 749, Research Topics in Memory Marcia Johnson

Examines current research on cognition and memory, including discussion of proposed and ongoing research projects. Topics include issues in design, analysis, and interpretation of empirical studies exploring human memory.

PSYC 752, Research Topics in Social Neurosciences Steve Chang

A weekly seminar discussing recent advances in social neurosciences. We discuss recent progress in research projects by the lab members as well as go over recently published papers in depth. Our primary topics include neural basis of social decision making, social preference formation, and social information processing. Our lab studies these topics by combining neurophysiological and neuroendocrinological techniques in nonhuman animals. W 4–5

PSYC 766, Research Topics in Perception and Cognition Brian Scholl

Seminar-style discussion of recent research in perception and cognition, covering both recent studies from the literature and the ongoing research in the Yale Perception and Cognition Laboratory.

PSYC 771, Research Topics in Nonconscious Processes John Bargh

The lab group focuses on nonconscious influences of motivation, attitudes, social power, and social representations (e.g., stereotypes) as they impact on interpersonal behavior, as well as the development and maintenance of close relationships.

PSYC 775, Research Topics in Animal Cognition Laurie Santos

Investigation of various topics in animal cognition, including what nonhuman primates know about tools and foods; how nonhuman primates represent objects and number; whether nonhuman primates possess a theory of mind. Prerequisite: permission of the instructor.

PSYC 777/WGSS 767, Research Topics in Gender and Psychology

Marianne LaFrance

The “Gender Lab” meets weekly to consider research being done in the Psychology department that bears on some gender-related issue.

PSYC 778, Research Topics in Clinical and Affective Neuropsychology Hedy Kober

Lab meeting is held once a week throughout the year and is attended by undergraduate and graduate students, research staff, postdoctoral fellows, and other researchers interested in the weekly topics. In a rotating fashion, both internal and external speakers present data and ideas from various research projects, and/or research and methods papers in related areas, including the use of functional magnetic resonance imaging to answer questions in clinical and affective psychology.

PSYC 779, Research Topics in Depression and Treatment Response Ronald Duman

This weekly lab seminar focuses on the molecular and cellular mechanisms that underlie the neuronal and behavioral deficits caused by stress and depression, and conversely the signaling mechanisms underlying the therapeutic actions of antidepressants, including synaptic and behavioral responses.

PSYC 801, Clinical Internship (Child)

Advanced training in clinical psychology with children. Adapted to meet individual needs with location at a suitable APA-approved internship setting.

PSYC 802, Clinical Internship (Adult)

Advanced training in clinical psychology with adults. Adapted to meet individual needs with location at a suitable APA-approved internship setting.

PSYC 806, Practicum in Childhood Intervention

Advanced supervised work in settings where child and family policies are developed and/or implemented. Adapted to meet individual needs with location at suitable sites.

PSYC 808, Practicum in Child Psychology

The Yale Child Study Center offers a yearlong practicum, which includes assessment of children, psychotherapy, team meetings, supervision, and didactic experiences.

PSYC 809, Practicum in Assessment of School-Aged Children

Students gain practical experience in testing with children.

PSYC 810, Practicum in Developmental Assessment Linda Mayes

Practicum in early childhood screening and assessment of infants and toddlers at high risk for social adaptive and emotional developmental problems.

PSYC 811, Anxiety Disorders Practicum Mary O'Brien

Discussion of current topics in psychopathology and treatment of anxiety disorders. Group supervision of therapy cases involving OCD, panic, social phobia.

PSYC 812, Conduct Problem Practicum Alan Kazdin

Provides training in the diagnosis, assessment, and treatment of aggressive and antisocial children and their families. Prerequisite: permission of the instructor.

PSYC 813, Eating and Weight Disorders Practicum Marlene Schwartz

Practical work for graduate students in clinical psychology on therapeutic interventions for eating and weight disorders. Assessment, diagnosis, and treatment are covered.

PSYC 815, Mood Disorders Practicum Mary O'Brien [F], Marney White [Sp]

Supervised practicum in the assessment and treatment of mood disorders, with an emphasis on cognitive-behavioral perspectives.

PSYC 816, Practicum in Developmental Disabilities and Developmental Assessment

Fred Volkmar

An introduction to approaches in developmental assessment in infants and young children (under age five years) with a range of developmental difficulties. Students observe and/or participate in developmental assessments. Students are exposed to a range of assessment instruments including developmental tests, speech-communication assessments, and psychiatric diagnostic instruments appropriate to this age group. Prerequisite: permission of the instructor.

PSYC 817, Other Clinical Practica

For credit under this course number, clinical students register for practicum experiences other than those listed elsewhere in clinical psychology, so that transcripts reflect accurately the various practicum experiences completed.

PSYC 883, Practicum in Clinical Assessment Donald Quinlan

Supervised psychological assessment using measures of intellectual functioning, projective testing, and neuropsychological testing with patients.

PSYC 920, First-Year Research

By arrangement with faculty.

PSYC 923, Individual Study: Theme Essay

By arrangement with faculty.

PSYC 925, Individual Tutorial

By arrangement with faculty and approval of director of graduate studies.

PSYC 930, Predissertation Research

By arrangement with faculty.

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Elizabeth Claus

Professors Serap Aksoy (*on leave* [F]), Michelle Bell (*Forestry & Environmental Studies*), Michael Bracken, Elizabeth Bradley, Richard Bucala (*Internal Medicine*), Susan Busch (*on leave*), Michael Cappello (*Pediatrics*), Elizabeth Claus, Paul Cleary, John Dovidio (*Psychology*), Robert Dubrow (*on leave*), David Fiellin (*Internal Medicine*), Erol Fikrig (*Internal Medicine*), Alison Galvani, Robert Heimer, Theodore Holford, Jeannette Ickovics, Melinda Irwin, Amy Justice (*Internal Medicine*), Edward Kaplan (*School of Management*), Albert Ko, Harlan Krumholz (*Internal Medicine*), Brian Leaderer, Elan Lousis (*Neurology*), Robert Makuch, Lawrence Marks, Diane McMahon-Pratt, I. George Miller (*Pediatrics*), A. David Paltiel, Catherine Panter-Brick (*Anthropology; on leave* [F]), Peter Peduzzi (*on leave* [F]), Rafael Pérez-Escamilla (*on leave* [Sp]), Jeffrey Powell (*Ecology & Evolutionary Biology; on leave* [Sp]), Harvey Risch, Robert Rosenheck (*Psychiatry*), Peter Salovey (*Psychology*), Mark Schlesinger, Jody Sindelar, Mary Tinetti (*Internal Medicine*), Christian Tschudi, Vasilis Vasiliou, Daniel Zelterman, Heping Zhang, Hongyu Zhao

Associate Professors Ted Cohen, J. Lucian Davis, Andrew Dewan, Josephine Hoh, Trace Kershaw, Becca Levy, Judith Lichtman, Haiqun Lin, Shuangge Ma, Xiaomei Ma, Ingrid Nembhard, Linda Niccolai, John Pachankis (*on leave* [Sp]), Andrew Papachristos (*Sociology*), Melinda Pettigrew, Nina Stachenfeld (*Obstetrics, Gynecology & Reproductive Sciences*), Jeffrey Townsend (*on leave* [F]), Yawei Zhang, Yong Zhu

Assistant Professors Rene Almeling, Xi Chen, Maria Ciarleglio, Zack Cooper, Forrest Crawford, Nicole Deziel, Adrienne Ettinger, Abigail Friedman, Nicola Hawley, Anne Marie Jukic, Danya Keene, Joan Monin, Chima Ndumele, Sunil Parikh, Virginia Pitzer, Jason Schwartz, Fatma Shebl, Megan Smith (*Psychiatry*), Shiyi Wang, Zuoheng (Anita) Wang, Joshua Warren, Daniel Weinberger, Reza Yaesoubi, Bingqing (Theresa) Zhou

Fields of Study

Programs of study are offered in the areas of Biostatistics, Chronic Disease Epidemiology, Environmental Health Sciences, Health Policy and Management, and Epidemiology of Microbial Diseases. The Social and Behavioral Sciences Program (SBS), within the Chronic Disease Epidemiology department, offers students specialized instruction in the theory and methods of the social and behavioral sciences.

Special Admissions Requirements

Applicants should have a strong background in the biological and/or social sciences. Students pursuing a Biostatistics specialty should have a strong background in mathematics. The GRE General Test is required. The TOEFL is required of all applicants whose native language is not English. IELTS scores are also accepted in addition to or in lieu of TOEFL scores. This requirement is waived only for applicants who, prior to matriculation at Yale, will have received a baccalaureate degree or its foreign equivalent from a college or university where English is the primary language of instruction. If you do not qualify for a waiver but have taken the TOEFL within the past two years, you will need to have your TOEFL scores released to us (code 3987).

Academic Requirements

The normal requirement for the degree of Doctor of Philosophy can be up to six years of graduate study. The average time to completion for students in Public Health is five years. Generally the first two years are devoted primarily to course work and rotations for students in some areas. All doctoral students are required to successfully complete a minimum of ten graduate-level courses and must satisfy the individual departmental requirements, detailed below. Courses such as Dissertation Research, Preparing for Qualifying Exams, Research Ethics and Responsibilities, or Seminar do not count toward the course requirements. However, students must register for these “courses” in order for them to appear on the transcript.

All first-year students must enroll in and complete training in Research Ethics and Responsibilities (EPH 600b). This course will introduce and prepare students for responsible conduct in research, including data acquisition and management, mentor/trainee responsibilities, publication practices and authorship standards, scientific misconduct, and conflict of interest. Research Ethics and Responsibilities is offered annually and is graded Satisfactory/Unsatisfactory.

The Graduate School uses grades of Honors, High Pass, Pass, or Fail. Students are required to earn a grade of Honors in at least two full-term courses in the first two years, and are expected to achieve a High Pass average. (This applies to courses taken after matriculation in the Graduate School and during the nine-month academic year.) The Honors requirement must be met in courses other than those concerned exclusively with dissertation research and preparation. See Course and Honors Requirements for more details.

Teaching is regarded as an integral aspect of the graduate training program. Doctoral students are required to satisfactorily complete four terms as Teaching Fellows. These teaching experiences are typically completed during the second and third years

of study. First-year students are encouraged to focus their efforts on course work and in most instances are not permitted to serve as Teaching Fellows. First-year students may be allowed to serve as Teaching Fellows if they have been awarded advanced standing. Advanced standing is available only to students who have completed previous graduate study at Yale (e.g., the M.P.H. program); see Transfer Credit and Advanced Standing. If a student has been awarded one year of advanced standing, he/she will be allowed to teach both fall and spring terms of the first year. If a student has been awarded one term of advanced standing, he/she will be allowed to teach only during the spring term of the first year. Students interested in serving as Teaching Fellows during their first year of doctoral study should submit a petition to the director of graduate studies (DGS) well before the start of the term in which they hope to participate in a course.

Graduate research assistantship opportunities may take the place of teaching in the third year of study. Furthermore, a waiver of 10 hours is possible if the student is working as a project assistant (generally no more than 10 hours per week and with prior approval of the DGS). By year four, all students are engaged in full-time research activities.

REQUIRED COURSE WORK

Biostatistics Ph.D. students in the Department of Biostatistics (BIS) must complete a minimum of twelve courses (not including BIS 525, BIS 610b, BIS 695c, and EPH 600b). Course waivers must be recommended by the academic adviser and approved by the department chair and DGS.

Required courses are: BIS 525a and b, Seminar in Biostatistics; BIS 557a, Computational Statistics; BIS 610b, Applied Area Readings for Qualifying Exams; BIS 628b, Longitudinal and Multilevel Data Analysis; BIS 643b, Theory of Survival Analysis; BIS 646b, Nonparametric Statistical Methods and Their Applications; BIS 678a, Statistical Consulting; BIS 691b, Theory of Generalized Linear Models; BIS 695c, Summer Internship in Biostatistical Research; STAT 610a, Statistical Inference; and STAT 612a, Linear Models.

In consultation with their academic adviser, students choose a minimum of four additional electives that will best prepare them for dissertation work.

Chronic Disease Epidemiology Ph.D. students in the Department of Chronic Disease Epidemiology (CDE) must complete a minimum of fifteen courses (not including CDE 610b, and EPH 600b). Course waivers must be recommended by the academic adviser and approved by the department chair and DGS.

Students may choose the traditional Epidemiology concentration or the Social and Behavioral Sciences concentration as noted below. Students must declare their concentration by the end of the first year with approval from their academic adviser.

In the traditional *Epidemiology* concentration, required courses (or their equivalents) are: CDE 502b, Physiology for Public Health; CDE 508a, Principles of Epidemiology I; CDE 516b, Principles of Epidemiology II; CDE 523b, Measurement Issues in Chronic Disease Epidemiology; CDE 534b, Applied Analytic Methods in Epidemiology; CDE 610b, Applied Area Readings for Qualifying Exams; CDE 617b, Developing a Research Proposal*; CDE 619a, Advanced Epidemiologic Research Methods; CDE 634b, Advanced Applied Analytic Methods in Epidemiology and Public Health; and CDE 650a, Introduction to Evidence-Based Medicine and Health Care. In addition, in consultation with their

dissertation adviser, students choose three 600-level course units in Biostatistics as well as three additional electives that will best prepare them for their dissertation research.

Social and Behavioral Sciences concentration course requirements differ from the traditional Epidemiology requirements as follows: CDE 574b, Developing a Health Promotion and Disease Prevention Intervention (taken instead of CDE 619a); CDE 573a, Social and Cultural Factors in Mental Health and Illness (taken instead of CDE 502b); and CDE 676b, Questionnaire Development (taken instead of CDE 523b).

Students supported by training grants may be subject to additional requirements and should discuss whether there are training-specific requirements with the principal investigator of the grant.

*CDE 617b is not required of students funded by the Interdisciplinary HIV Prevention Training Grant. Those students must take a fourth elective in order to meet the fifteen-course requirement.

Environmental Health Sciences Ph.D. students in the Department of Environmental Health Sciences (EHS) must complete a minimum of thirteen courses (not including EHS 610b, and EPH 600b). Course waivers must be recommended by the academic adviser and approved by the department chair and DGS.

Required courses are: BIS 505a, Introduction to Statistical Thinking I; BIS 505b, Introduction to Statistical Thinking II; CDE 508a, Principles of Epidemiology I; EHS 502b, Physiology for Public Health; EHS 503a, Introduction to Toxicology; EHS 507a, Environmental Epidemiology; EHS 508b, Assessing Exposures to Environmental Stressors; and EHS 610b, Applied Area Readings for Qualifying Exams.

In addition, students elect six courses from the more specialized areas of environmental health (occupational health, risk assessment, etc.).

The following courses are strongly encouraged for students who select Environmental Epidemiology as their area of specialization: BIS 623a, Applied Regression Analysis; BIS 625a, Categorical Data Analysis; CDE 516b, Principles of Epidemiology II; CDE 617b, Developing a Research Proposal; EHS 545b, Molecular Epidemiology; and EHS 580b, Environmental Hormones and Human Health. In consultation with the student's adviser, alternate courses may be selected.

Students who select specialization in an area other than Environmental Epidemiology will, together with the academic adviser, identify the specialization area and determine the selection of courses required. These courses may come from other graduate programs in the department, as well as from programs in other parts of the University. Students are particularly encouraged to seek additional courses in such subjects as chemistry, cellular and molecular physiology, engineering, forestry, medicine, pharmacology, and physics.

Students supported by training grants may be subject to additional requirements and should discuss whether there are training-specific requirements with the principal investigator of the grant.

Epidemiology of Microbial Diseases Ph.D. students in the Department of Epidemiology of Microbial Diseases (EMD) must complete a minimum of ten courses (not including EPH 600b). Course waivers must be recommended by the academic adviser and approved by the department chair and DGS.

Courses in biostatistics, epidemiology, and microbiology are strongly recommended. The specific courses recommended depend on the background of individual students and

their stated research interests. An individual program that includes courses, seminars, and research rotations is developed by the student and his or her academic adviser. All students are required to complete three distinct research rotations. These are done in the fall and spring terms and in the summer between the first and second years. Students will be asked to prepare a brief presentation at the end of each rotation. These research rotations (EMD 670) are graded and account for three of the required ten courses. Student progress is reviewed at the end of each academic year.

The following courses are suggested as appropriate for Ph.D. students in EMD; however, other courses in Public Health or in other departments may also be appropriate: CBIO 602a, Molecular Cell Biology; CDE 516b, Principles of Epidemiology II; EMD 508a, Principles of Epidemiology I; EMD 512a, Immunology for Epidemiologists; EMD 538a, Quantitative Methods for Infectious Disease Epidemiology; EMD 539b, Introduction to Public Health Surveillance; EMD 543a, Global Aspects of Food and Nutrition; EMD 547b, Vaccines: Concepts in Biology; EMD 548b, Observing Earth from Space; EMD 550b/682b, Biology of Insect Disease Vectors; EMD 567a, Tackling the Big Three: Malaria, TB, and HIV in Resource-Limited Settings; EMD 680a, Advanced Topics in Tropical Parasitic Diseases; F&ES 500a, Landscape Ecology; GENE 734a, Molecular Biology of Animal Viruses; HPM 570a, Cost-Effectiveness Analysis and Decision Making; and PATH 650b, Cellular and Molecular Biology of Cancer.

Health Policy and Management Students in the Department of Health Policy and Management (HPM) must complete eighteen courses (not including EPH 600b) to become prepared for their qualifying examinations in the areas of biostatistics and health services research. Students will choose one of three areas of depth – Economic Theory and Application; Organizational Theory and Management; or Political and Policy Analysis – and work directly with specific faculty to gain knowledge and expertise in that area.

Students will complete the course work detailed below, or the equivalent of the topic areas covered in these courses. This course listing represents a suggested program of study. With the approval of the academic adviser and DGS, alternative courses that better suit the needs of the student may satisfy the course work requirement. The departmental representative to the Graduate Studies Executive Committee, in conjunction with the student's adviser, is responsible for determining if core course requirements have been satisfied by previous course work or alternative courses. If so, the student should apply for a course waiver through the Graduate School.

HPM 610b, Applied Area Readings for Qualifying Exams, is required of all second-year students.

In Biostatistics/Statistics and Methods, a minimum of four courses from the following: BIS 623a, Applied Regression Analysis; BIS 625a, Categorical Data Analysis; BIS 628b, Longitudinal and Multilevel Data Analysis; CDE 580a, Qualitative Research Methods in Public Health; ECON 558a, Econometrics; HPM 583b, Methods in Health Services Research; PLSC 500a, Statistics; PLSC 503b, Quantitative Methods; PLSC 504a, Advanced Quantitative Methods; PLSC 508b, Causal Inference and Research Design; SOCY 578a, Logic of Empirical Social Research; SOCY 580a, Introduction to Methods in Quantitative Sociology; SOCY 581b, Intermediate Methods in Quantitative Sociology; SOCY 582a, Statistics III: Advanced Quantitative Analysis for Social Scientists.

In Health Policy and Management, a minimum of four courses, all with Ph.D. readings, from the following: HPM 510a, Introduction to Health Policy and Health Systems; HPM 514b, Health Politics, Governance, and Policy; HPM 560b, Health Economics and U.S. Health Policy; HPM 561b, Managing Health Care Organizations; HPM 570a, Cost-Effectiveness Analysis and Decision Making; HPM 587a, Advanced Health Economics; HPM 590b, Addiction, Economics, and Public Policy; HPM 597b, Capstone Course in Health Policy; MGT 879b, Health Care Operations.

Areas of Depth

Students in HPM must complete a minimum of four courses relevant to the area of depth chosen.

In *Economic Theory and Application*, required courses are: ECON 545a, Microeconomics; and ECON 558a, Econometrics. (Students may count ECON 558a as either a statistics/methods class or as an area of depth class, but not both.) In addition, students take two field courses in a concentration area in which they plan to develop expertise. Sets of courses across topics can be selected to meet research interests. Concentration areas are: (1) Behavioral Economics (ECON 529b, Behavioral and Neuro-economics; ECON 740b, Experimental Economics Seminar; and MGMT 758b, Foundations of Behavioral Economics); (2) Labor Economics (ECON 630a, Labor Economics; ECON 631b, Labor Economics; and ECON 776b, Economics of Population); Public Finance (ECON 680a, Public Finance I; ECON 681b, Public Finance II); (3) Economic Development (ECON 730a, Economic Development I; ECON 731b, Economic Development II; ECON 776b, Economics of Population; and ECON 797b, Institutions, Politics, and Economic Policy in Developing Countries).

In *Organizational Theory and Management*, required courses are: MGMT 730a, Organizations and Management Workshop; and MGMT 731b, Organizations and the Environment. In addition, students take two courses in the field, selected in consultation with the student's adviser.

In *Political and Policy Analysis*, four courses are required, selected in consultation with the student's adviser. Suggested courses are: AMST 685b, Disability: Representation, History, Ethics; ANTH 583b, Health Disparities and Health Equity: Biocultural Perspectives; PLSC 800a, Introduction to American Politics; PLSC 801a, Political Preferences and American Political Behavior; PLSC 802b, Collective Action and Choice; PSYC 647b, Social Science and Institutional Design; and SOCY 557b, Political Sociology.

All HPM students supported by the National Institute on Drug Abuse (NIDA) training program must complete one to two courses in substance abuse, behavioral economics, or psychiatric/mental health issues; these may be classes already counted toward other Ph.D. requirements. Students supported by the Agency for Healthcare Research and Quality (AHRQ) Training Program in Health Services Research are expected to complete a TRIPP (Translating Research into Practice and Policy) project in which they work with an agency, association, or organization that is relevant for their research area of interest. The TRIPP project can range from two to eight weeks and is flexible in requirements and placement, which are developed with each student's academic advisers.

Students supported by training grants may be subject to additional requirements and should discuss whether there are training-specific requirements with the principal investigator of the grant.

Special Requirements for the Ph.D. Degree

At the end of years one and two, advisers will be asked to complete a progress report for each student evaluating his/her academic progress and describing his/her readiness for teaching and/or conducting research. This is then discussed with the student and reviewed by the DGS. Students who have not progressed adequately will be asked to meet with the DGS to address the situation. Advisers of students in year three who have not been admitted to candidacy by May of that year will also be asked to complete a progress report. Once a student is admitted to candidacy, he/she is required by the Graduate School to complete an annual Dissertation Progress Report.

To be admitted to candidacy, students must: (1) satisfactorily complete the course requirements for their department as outlined above, achieve grades of Honors in at least two full-term courses, and achieve an overall HP average; (2) obtain an average grade of High Pass on the qualifying examination; and (3) submit a dissertation prospectus. The qualifying examinations are typically taken by the end of the second full academic year. With the assistance of the faculty adviser, each student requests appropriate faculty members to join a dissertation advisory committee (DAC). The dissertation prospectus must be approved by the end of the third year.

The DAC reviews and approves the prospectus as developed by the student and recommends to the DGS and the Graduate Studies Executive Committee that the prospectus be approved. Each DAC is expected to meet as a group at least twice each year, and more frequently if necessary. The student schedules meetings of the DAC. The chair/adviser of the DAC produces a summary evaluation of progress and plans for the coming year. This document is to be distributed to each committee member for comments and signature. Each student and the DGS are to receive a copy of the signed document from the DAC chair/adviser.

After approval of the prospectus, the DAC reviews the progress of the dissertation research and decides when the dissertation is ready to be submitted to the readers. This decision is made based on a closed defense of the dissertation, which involves a formal oral presentation to the DAC and other invited faculty. Upon completion of the closed defense, the chair/adviser of the DAC submits its recommendation to the Graduate Studies Executive Committee, and its recommendation of suitable readers.

Doctoral dissertations originating in Public Health must also be presented in a public seminar. This presentation is scheduled after the submission of the dissertation to the readers and preferably prior to the receipt and consideration of the readers' reports. At least one member of the DAC supervising the dissertation and at least one member of the Graduate Studies Executive Committee are required to attend the presentation.

Master's Degrees

M.Phil. (en route to the Ph.D.) When students advance to candidacy, the registrar's office automatically submits a petition for the awarding of the M.Phil. degree.

Terminal Master's Degree Program The School offers a terminal master's degree program leading to an M.S. in Public Health in two specialty areas: Biostatistics (a two-year program) and Chronic Disease Epidemiology (a one-year program). All students must fulfill both the departmental and Graduate School requirements for a terminal M.S. degree.

Students must have an overall grade average of High Pass, including a grade of Honors in at least one full-term graduate course (for students enrolled in the one-year program in Chronic Disease Epidemiology) or in at least two full-term graduate courses (for students enrolled in the two-year program in Biostatistics). In order to maintain the minimum average of High Pass, each grade of Pass must be balanced by one grade of Honors. For more details, please see Course and Honors Requirements under Policies and Regulations.

A Biostatistics or Chronic Disease Epidemiology student who is withdrawing from the Ph.D. program, and has successfully completed all required course work for the terminal M.S. degree (described below), may apply and be recommended for the M.S. in Public Health. In other departments (Environmental Health Sciences, Epidemiology of Microbial Diseases, or Health Policy and Management) students must have successfully completed (prior to withdrawal) at least ten courses in the doctoral program and a capstone experience, achieving a minimum of two Honors grades and an overall High Pass average.

FIELDS OF STUDY

Terminal M.S. in Biostatistics

Faculty in the Biostatistics department of the School of Public Health offer a two-year terminal Master of Science degree. Fields include clinical trials, epidemiologic methodology, statistical genetics, and mathematical models for infectious diseases.

Requirements for M.S. in Biostatistics Applicants should have a strong background in quantitative sciences such as mathematics. In addition, it is recommended that applicants have undergraduate course work in the biological and social sciences. At a minimum, applicants would have taken one year of calculus and a course in linear algebra prior to enrolling in this program.

The GRE General Test is required. The TOEFL is required of all applicants whose native language is not English. This requirement is waived only for applicants who, prior to matriculation at Yale, will have received a baccalaureate degree or its foreign equivalent from a college or university where English is the primary language of instruction. If you do not qualify for a waiver but have taken the TOEFL within the past two years, you will need to have your TOEFL scores released to us (code 3987).

Course requirements The Biostatistics track requires a minimum of twelve courses (excluding the Ethics course, EPH 600b) plus a master's thesis. Required courses are: BIS 525a and b, Seminar in Biostatistics; BIS 540a, Fundamentals of Clinical Trials; BIS 623a, Applied Regression Analysis; BIS 625a, Categorical Data Analysis; BIS 628b, Longitudinal and Multilevel Data Analysis; BIS 630b, Applied Survival Analysis; BIS 695c, Summer Internship in Biostatistical Research; EPH 600b, Research Ethics and Responsibility; STAT 541a, Probability Theory; and STAT 542b, Theory of Statistics.

In addition, students must complete five elective courses and a master's thesis. Two of the electives must be in Biostatistics, chosen from the list below, and one must be in Public Health (not Biostatistics). Two additional electives are required and can be taken in any area relevant to the student's interest. Students will also be required to attend a Professional Skills Seminar (details provided in the first term).

Biostatistics electives are to be selected from these courses: BIS 557a, Computational Statistics; BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials;

BIS 643b, Theory of Survival Analysis; BIS 646b, Nonparametric Statistical Methods and Their Applications; BIS 651b, Spatial Statistics in Public Health; and BIS 691b, Theory of Generalized Linear Models. Epidemiology electives are to be selected from these courses: CDE 508a, Principles of Epidemiology I; CDE 516b, Principles of Epidemiology II; CDE 534b, Applied Analytic Methods in Epidemiology; CDE 617b, Developing a Research Proposal; and CDE 619a, Advanced Epidemiologic Research Methods. Students demonstrating a mastery of topics covered by the required courses may replace them with more advanced courses but must receive written permission from the DGS prior to enrolling in the substitute courses.

Terminal M.S. in Chronic Disease Epidemiology

Faculty in the Chronic Disease Epidemiology department of the School of Public Health offer a one-year terminal Master of Science degree. This one-year program is designed for medical and health care professionals (e.g., M.D., Ph.D., D.V.M., D.D.S., D.M.D.) who seek the skills necessary to conduct epidemiological research in their professional practice.

Requirements for M.S. in Chronic Disease Epidemiology Applicants should have a basic understanding of quantitative science and statistics. It is recommended that candidates have strong science backgrounds and demonstrated competency in statistical analysis and logical thinking. Applicants from rigorous programs in the biological or social sciences will be given preference. At a minimum, applicants should have one year of course work in statistics or equivalent prior to enrolling in this program.

Applicants must submit scores from either the MCAT or the GRE General Test. Students whose native language is not English must take the TOEFL or IELTS examination.

Course requirements The M.S. track in Chronic Disease Epidemiology requires the completion of ten courses (excluding the Ethics course, EPH 600b; and Seminar, CDE 525), including a capstone course.* Required courses are: BIS 623a, Applied Regression Analysis; BIS 625a, Categorical Data Analysis; BIS 630b, Applied Survival Analysis; CDE 508a, Principles of Epidemiology I; CDE 516b, Principles of Epidemiology II; CDE 523b, Measurement Issues in Chronic Disease Epidemiology; CDE 525a,b, Seminar in Chronic Disease Epidemiology and Social and Behavioral Sciences; CDE 617b, Developing a Research Proposal; and EPH 600b, Research Ethics and Responsibility.

In addition, students must complete three electives. Suggested electives are: BIS 540a, Fundamentals of Clinical Trials; BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials; BIS 643b, Theory of Survival Analysis; BIS 645b, Statistical Methods in Human Genetics; CDE 520b, Case-Based Learning for Genetic and Environmental Diseases; CDE 531a, Health and Aging; CDE 532b, Epidemiology of Cancer; CDE 533b, Topics in Perinatal Epidemiology; CDE 535b, Epidemiology of Heart Disease and Stroke; CDE 562a, Nutrition and Chronic Disease; CDE 597a, Genetic Concepts in Public Health; CDE 600a or b, Directed Readings; CDE 634b, Advanced Applied Analytical Methods in Epidemiology and Public Health; and CDE 650a, Introduction to Evidence-Based Medicine and Health Care.

*In the capstone course CDE 617b, the student is required to develop a grant application that is deemed reasonably competitive by the instructor. An alternative to this capstone course is an individualized tutorial (CDE 600) in which the student completes a manuscript that is suitable for submission for publication in a relevant journal.

M.D./Ph.D. Program Requirements for Public Health

All M.D./Ph.D. students must meet with the DGS in Public Health as soon as they affiliate. Students in this program are expected to meet the guidelines listed below in the timeframe outlined. The DGS must approve any variations to these requirements.

TEACHING

One term of teaching is required. If a student has served as a teaching fellow elsewhere on campus, this experience may be counted toward the requirement. DGS approval is required to waive the teaching requirement on the basis of previous Yale teaching experience.

ROTATIONS/INTERNSHIPS

Students should do two rotations/internships with potential advisers in the School of Public Health. These short-term research projects will be with a specific Principal Investigator and can be either in a lab, or field work, or analysis of an existing dataset. The purpose of these rotations/internships is to learn lab or field technique and to allow the student time to determine if the PI's research interests are compatible with his/her research interests. These rotations/internships are usually done during the summer between the first and second years of medical school course work. In some cases, a student may need to defer this activity until the summer after the second year after taking certain courses and/or completing readings so that he/she possesses the background necessary for a successful rotation/internship.

REQUIRED COURSE WORK

M.D./Ph.D. students are generally expected to take the same courses as traditional Ph.D. students. Departmental requirements may vary; therefore students should confer with the DGS and their Ph.D. adviser.

TIMELINE FOR QUALIFYING EXAM

Students generally take medical school courses in years one and two, then Public Health doctoral course work in years three and four. The qualifying exam is generally completed by the summer following the fourth year.

PROSPECTUS TIMELINE

Students are encouraged to develop their prospectus during their third and fourth years of study, while taking courses in the School of Public Health. Upon completion of the qualifying exam, students should focus entirely on completion of the prospectus, which should be submitted no later than six months after the completion of the qualifying exam.

Ph.D. or terminal M.S. degree program materials are available upon request to the Office of the Director of Graduate Studies (c/o M. Elliot), School of Public Health, Yale University, PO Box 208034, New Haven CT 06520-8034; 203.785.6383; e-mail, melanie.elliott@yale.edu.

Courses for all Public Health Graduate School Degrees

For course descriptions, see the School of Public Health Bulletin, available online in both html and pdf versions at www.yale.edu/bulletin.

BIOSTATISTICS

- BIS 505a, Introduction to Statistical Thinking I
- BIS 505b, Introduction to Statistical Thinking II
- [BIS 511a, GIS Applications in Epidemiology and Public Health]
- BIS 525a and b, Seminar in Biostatistics
- [BIS 538b, Survey Sampling: Methods and Management]
- BIS 540a, Fundamentals of Clinical Trials
- BIS 557a, Computational Statistics
- BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials
- BIS 575b, Introduction to Regulatory Affairs
- BIS 600a/b, Independent Study or Directed Readings
- BIS 610b, Applied Area Readings for Qualifying Exams
- BIS 623a, Applied Regression Analysis
- BIS 625a, Categorical Data Analysis
- [BIS 626a, Gerontologic Biostatistics: Statistical Methods for Clinical Research with Older Study Participants and for Basic Aging Research]
- BIS 628b, Longitudinal and Multilevel Data Analysis
- BIS 630b, Applied Survival Analysis
- [BIS 631a, Topics in Genetic Epidemiology]
- BIS 643b, Theory of Survival Analysis
- BIS 645b/CB&B 647b/GENE 645b, Statistical Methods in Human Genetics
- [BIS 646b, Nonparametric Statistical Methods and Their Applications]
- [BIS 648a, Statistical Methods for Sequence Data Analysis]
- [BIS 651b, Spatial Statistics in Public Health]
- BIS 678a, Statistical Consulting
- BIS 691b, Theory of Generalized Linear Models
- [BIS 692b/CB&B 645b/STAT 645b, Statistical Methods in Genetics and Bioinformatics]
- BIS 695c, Summer Internship in Biostatistical Research

CHRONIC DISEASE EPIDEMIOLOGY

- CDE 502b/EHS 502b, Physiology for Public Health
- CDE 505a/PSYC 657a, Social and Behavioral Foundations of Health
- CDE 508a/EMD 508a, Principles of Epidemiology I
- CDE 516b, Principles of Epidemiology II
- CDE 520b/EHS 520b, Gene and Environment Interactions
- CDE 523b, Measurement Issues in Chronic Disease Epidemiology
- CDE 525a and b, Seminar in Chronic Disease Epidemiology and Social and Behavioral Sciences
- [CDE 531a/PSYC 664a, Health and Aging]
- CDE 532b, Epidemiology of Cancer

CDE 533b, Topics in Perinatal Epidemiology
 CDE 534b, Applied Analytic Methods in Epidemiology
 CDE 535b, Epidemiology of Heart Disease and Stroke
 CDE 541a, Community Health Program Evaluation
 CDE 543a/EMD 543a, Global Aspects of Food and Nutrition
 CDE 545b, Health Disparities by Race and Social Class: Application to Chronic Disease Epidemiology
 CDE 562a, Nutrition and Chronic Disease
 CDE 572a, Obesity Prevention and Lifestyle Interventions
 CDE 573a, Social and Cultural Factors in Mental Health and Illness
 CDE 574b, Developing a Health Promotion and Disease Prevention Intervention
 CDE 577b, Interdisciplinary Research Methods in the Social and Behavioral Sciences
 CDE 580a, Qualitative Research Methods in Public Health
 CDE 581a, Stigma and Health
 CDE 582a, Regulatory and Scientific Issues Relating to Tobacco Use
 CDE 585a/GLBL 529a/LAW 20568, Sexuality, Gender, Health, and Human Rights
 CDE 594a, Maternal-Child Public Health Nutrition
 CDE 596b/LAW 21416, Global Health Justice Practicum
 CDE 597a, Genetic Concepts in Public Health
 CDE 600a/b, Independent Study or Directed Readings
 CDE 610b, Applied Area Readings for Qualifying Exams
 CDE 617b, Developing a Research Proposal
 CDE 619a, Advanced Epidemiologic Research Methods
 CDE 634b, Advanced Applied Analytic Methods in Epidemiology and Public Health
 CDE 650a, Introduction to Evidence-Based Medicine and Health Care
 CDE 670a,b, Advanced Field Methods in Chronic Disease Epidemiology
 [CDE 676b, Questionnaire Development]

ENVIRONMENTAL HEALTH SCIENCES

EHS 502b/CDE 502b, Physiology for Public Health
 EHS 503a/F&ES 896a, Introduction to Toxicology
 EHS 505a, Occupational Exposure Assessment and Control
 EHS 507a, Environmental Epidemiology
 EHS 508b/F&ES 897b, Assessing Exposures to Environmental Stressors
 EHS 510b, Contemporary Issues in Environmental Health
 EHS 511b/F&ES 893b, Applied Risk Assessment
 EHS 520b/CDE 520b, Gene and Environment Interactions
 EHS 525a, Seminar in Environmental Health
 EHS 545b, Molecular Epidemiology
 EHS 573b, Epidemiological Issues in Occupational and Environmental Medicine
 EHS 575a, Introduction to Occupational and Environmental Medicine
 EHS 580b, Environmental Hormones and Human Health
 EHS 584b, Water Quality in Public Health
 [EHS 585a/F&ES 898a, The Environment and Human Health]
 EHS 600a/b, Independent Study or Directed Readings
 EHS 610b, Applied Area Readings for Qualifying Exams

EPIDEMIOLOGY AND PUBLIC HEALTH

EPH 600b, Research Ethics and Responsibilities

[EPH 650a and b, Public Health Forum for Ph.D. Students]

EPIDEMIOLOGY OF MICROBIAL DISEASES

EMD 508a/CDE 508a, Principles of Epidemiology I

EMD 512a, Immunology for Epidemiologists

EMD 518a, Principles of Infectious Diseases I

EMD 518b, Principles of Infectious Diseases II

EMD 530b, Hospital Epidemiology

[EMD 536b, Investigation of Disease Outbreaks]

EMD 538a, Quantitative Methods for Infectious Disease Epidemiology

EMD 539b, Introduction to Public Health Surveillance

EMD 543a/CDE 543a, Global Aspects of Food and Nutrition

EMD 547b/MBIO 547b, Vaccines: Concepts in Biology

EMD 548b/ARCG 762b^U/F&ES 726b/G&G 562b^U, Observing Earth from Space

EMD 550b/682b, Biology of Insect Disease Vectors

EMD 567a, Tackling the Big Three: Malaria, TB, and HIV in Resource-Limited Settings

EMD 670a and b, Advanced Research Laboratories

EMD 680a/MBIO 680a, Advanced Topics in Tropical Parasitic Diseases

EMD 695a/E&EB 961a, Studies in Evolutionary Medicine II

EMD 695b/E&EB 960b, Studies in Evolutionary Medicine I

HEALTH POLICY AND MANAGEMENT

HPM 510a, Introduction to Health Policy and Health Systems

HPM 514b, Health Politics, Governance, and Policy

HPM 542b, Health of Women and Children

HPM 545b, Health Disparities

HPM 546a, Ethical Issues in Public Health

HPM 560b, Health Economics and U.S. Health Policy

HPM 561b/MGT 630b, Managing Health Care Organizations

HPM 564b, The Role of Evidence for Strategic Thinking in Global Health

HPM 566b, Critical Issues in Global Health

HPM 570a, Cost-Effectiveness Analysis and Decision Making

HPM 583b, Methods in Health Services Research

HPM 586b, Microeconomics for Health Policy and Health Management

HPM 587a, Advanced Health Economics

HPM 588a, The Constitutional Foundations of Public Health Law

[HPM 589a, Leadership and Public Health]

[HPM 590b, Addiction, Economics, and Public Policy]

[HPM 592a, Strategic Thinking in Global Health]

HPM 597b, Capstone Course in Health Policy

HPM 600a/b, Independent Study or Directed Readings

HPM 610b, Applied Area Readings for Qualifying Exams

HPM 617a,b, Colloquium in Health Services Research
HPM 620a/b, Readings in Health Services Research
HPM 630b, Advanced Readings in Health Services Research
HPM 640b, Directed Readings in Health Services Research
HPM 698b/MGT 698b, Health Care Policy, Finance, and Economics
HPM 699a,b/MGT 699a,b, Colloquium in Health Care Leadership

RELIGIOUS STUDIES

451 College Street, 203.432.0828

<http://religiousstudies.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Kathryn Lofton

Director of Graduate Studies

Harry Stout

Professors Harold Attridge (*Divinity*), Christopher Beeley (*Divinity*), Gerhard Böwering, Adela Yarbro Collins (*Divinity; Emerita*), John J. Collins (*Divinity*), Stephen Davis, Carlos Eire, Steven Fraade, Paul Franks (*on leave* [Sp]), Bruce Gordon (*Divinity*), Philip Gorski (*Sociology*), Phyllis Granoff, Frank Griffel (*on leave* [F]), John Hare (*Divinity*), Christine Hayes (*on leave* [F]), Jennifer Herdt (*Divinity*), Kathryn Lofton, Ivan Marcus (*on leave* [Sp]), Dale Martin, Andrew McGowan (*Divinity*), Sally Promey (*American Studies*), Gregory Sterling (*Divinity*), Harry Stout, Kathryn Tanner (*Divinity*), Denys Turner (*Emeritus*), Miroslav Volf (*Divinity*), Robert Wilson

Associate Professors Adam Becker (*Visiting*), Zareena Grewal (*American Studies; on leave* [F]), David Marcus (*Visiting*), Andrew Quintman (*on leave*), Eliyahu Stern (*on leave*)

Assistant Professors Eric Greene, Noreen Khawaja

Senior Lecturer Nancy Levene

Lecturers John Grim (*Forestry & Environmental Studies*), Margaret Olin, Mary Evelyn Tucker (*Forestry & Environmental Studies*)

Fields of Study

Students must enroll in one of the following fields of study: American Religious History, Asian Religions, Hebrew Bible/Old Testament, History of Ancient Christianity, Islamic Studies, Judaic Studies, New Testament, Religious Ethics, Theology, and Philosophy of Religion.

Special Admissions Requirement

The department requires the scores of the GRE General Test; previous study in areas relevant to the chosen field of study, including ancient languages where applicable; and a writing sample of 20–30 pages, which will be evaluated for both content and style.

Special Requirements for the Ph.D. Degree

Twelve term courses must be completed, in which the Graduate School Honors requirement must be met. Proficiency in two modern scholarly languages, normally French and German, must be shown, one before the end of the first year, the other before the beginning of the third; this may be done by passing an examination administered by

the department, by accreditation from a Yale Summer School course designed for this purpose, or by a grade of A or B in one of Yale's intermediate language courses. Mastery of the languages needed in one's chosen field (e.g., Chinese, Hebrew, Greek, Japanese) is also required in certain fields of study. A set of four qualifying examinations is designed for each student, following guidelines and criteria set by each field of study; these are normally completed in the third year. The dissertation prospectus must be approved by a colloquium, and the completed dissertation by a committee of readers and the departmental faculty. Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the Ph.D. This is expected before the seventh term in American Religious History, Philosophy of Religion, Religious Ethics, and Theology; before the eighth term in other fields. Students begin writing their dissertation in the fourth year and normally will have finished by the end of the sixth. There is no oral examination on the dissertation.

In the Department of Religious Studies, the faculty considers learning to teach to be an important and integral component of the professional training of its graduate students. Students are therefore required to teach as teaching fellows for at least two years during their graduate programs. Such teaching normally takes place during their third and fourth years, unless other arrangements are approved by the director of graduate studies.

A combined Ph.D. degree is available with African American Studies. Consult department for details.

Master's Degrees

M.Phil. and M.A. (both en route to the Ph.D.) See Degree Requirements under Policies and Regulations. Students in Religious Studies must take seven courses to be eligible for the M.A. degree. Additionally, students in Religious Studies are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

Prospective students must apply in one of the ten fields of study, and when requesting information they should specify their particular field of interest. Program materials are available upon request to the Registrar, Department of Religious Studies, Yale University, PO Box 208287, New Haven CT 06520-8287.

Courses

RLST 510a, Proseminar in the Study of Religion Noreen Khawaja

Introductory seminar in the study of religion. Fundamental concepts and open questions. Required of all first-year Ph.D. students in Religious Studies; open to others with permission of the instructor. W 7–8:50

RLST 535b^U, The Golden Age of Islam Gerhard Böwering

The development of Islamic civilization in the Middle East, North Africa, Spain, Iran, and India from Muhammad through the Mongol invasions to the rise of the Ottoman, Safavid, and Mughal empires (600–1500 C.E.). Emphasis on the intellectual and religious history of Islam in the age of the caliphates and during the rule of regional dynasties. TTH 2:30–3:45

RLST 551a, Readings in Indian Texts Phyllis Granoff

This is a course for students who read Sanskrit/Prakrit/Pali and would like to study a particular text in depth. The choice of text is determined after discussion with interested students. M 1:30–3:20

RLST 564a, The Study of Chinese Buddhism: Methods, History, and Perspectives

Eric Greene

This seminar provides an intensive introduction to the study of Chinese Buddhism in the Western academy. We read and discuss a variety of classic and contemporary English-language books and articles on the study of Chinese Buddhism. Our aim is both to gain a broad knowledge of the history and development of Chinese Buddhism (with a focus on the period through 1000 C.E.), and to critically evaluate how the most prominent scholars in the field of the past fifty years have approached this topic.

RLST 574b, Chinese Buddhist Texts Eric Greene

Close reading of selected Chinese Buddhist texts in the original. TH 1:30–3:20

RLST 601b, New Testament/Ancient Christianity Seminar Dale Martin

Required of doctoral students in New Testament studies and ancient Christianity. The topic and instructor change yearly. W 3:30–5:20

RLST 608b, Christianity in Late Antiquity Stephen Davis

Required of doctoral students in ancient Christianity. Topics include the relation of church and state after Constantine; theological controversies and church councils; inter-faith relations; pieties and practices; and material culture. M 1:30–3:20

RLST 625a/REL 601a, Theology and the New Testament Dale Martin,

Kathryn Tanner

This course first situates “Theology of the New Testament” in its modern (and “modernist”) contexts, critiques that practice and genre, and then explores how postmodern, Christian theological interpretation may employ but move beyond historical criticism to experiment with creative, imaginative, but still orthodox readings of the New Testament in today’s churches. T 1:30–3:20

RLST 665a, Christianity in the Second and Third Centuries Stephen Davis

Philological problems in the study of the second century and its aftermath. Required of doctoral students in New Testament studies and ancient Christianity. Open to other doctoral students with permission of the instructor. M 1:30–3:20

RLST 679a/HIST 579a, Popular Religion in Europe, 1300–1700 Carlos Eire

Readings and discussion in recent scholarship on the history of religion in the Christian West in the late medieval and early modern periods. TH 3:30–5:20

RLST 692b/HIST 595b/JDST 844b, Introduction to Modern Jewish History:

History and Historiography David Sorkin

This course introduces students to European Jewish history since approximately 1648. It teaches the major historiographical traditions as well as the major themes of European Jewish history. Its audience is students specializing in Jewish history but also other historians who wish to add an understanding of Jewish history to their understanding of Europe. M 3:30–5:20

RLST 694b^U/HIST 585b^U, Enlightenment and Religion David Sorkin

This course explores the relationship between the Enlightenment and religion. We probe two related issues. First, how did the *philosophes* view religion? We then ask the less conventional question of the uses theologians or clergy made of the Enlightenment. The course crosses national borders (England, France, German states, and Habsburg empire) and confessional boundaries (Protestantism, Catholicism, Judaism). Our focus is Western and Central Europe. W 3:30–5:20

RLST 695a/AMST 819a/HSAR 722a/REL 981a, Visual Controversies: Religion and the Politics of Vision Sally Promey, Vasileios Marinis

This interdisciplinary seminar explores the destruction, censorship, and suppression of pictures and objects, as these acts have been motivated by religious convictions and practices, in medieval Europe and then in the United States from colonization to the present. In such episodes, religion does not operate in a vacuum but draws attention to other cultural pressure points concerning, for example, race, ethnicity, gender, and sexuality. Already in the third century in Europe, and as early as the seventeenth century in the geographic area that is now the United States, individuals and groups practiced a range of behaviors we might meaningfully, though often figuratively, label iconoclastic. This course focuses most specifically on the emergence of Christian art and architecture in dialogue (or competition) with Greco-Roman religions and Islam; and on variations of Protestant Christianity; while it also directs attention to case studies within Byzantine Orthodoxy, American Judaism, Islam, and Catholicism and looks to comparative situations and episodes of contention elsewhere in the world. Topics likely considered include the conversion of “pagan” temples into Christian churches in late antiquity; iconoclastic interventions on Christian floor mosaics in Palestine after the Muslim conquest; destruction of images during Byzantine Iconoclasm; attitudes toward images during the Protestant Reformation; American Puritan uses of a theology of figuration to justify genocide as an “iconoclastic” act in the Pequot War; Shaker constructions of elaborate visionary pictures as forms of “writing” rather than “art”; sculptor Rose Kohler’s determination to define and regulate “Jewish art” in her work with National Council of Jewish Women; recent adjudication of the public display of the Ten Commandments or Christian nativity scenes; the Western contexts of the destruction of the Bamiyan Buddhas; and international culture wars and the specific uses of “blasphemy” charges to restrict the visual practices of religions. Prerequisite: permission of the instructors. M 3:30–5:20

RLST 701b/AMST 806b/HSAR 723b/WGSS 768b, Studies in “New” Materialities:**Agency, Ontology, Embodiment, Cognition** Sally Promey

This advanced research course invites students to engage and interrogate a set of “new” ideas about objects and materiality emerging in disciplines as far-ranging as political science, cultural anthropology, ethics, history of art, cognitive science, religious studies, and gender and sexuality studies. One concern is to explore how these ideas, far from being “new,” have a deep, and deeply political, history in relation to Western efforts to make sense of and order the material (and spiritual) world and to mark and distinguish Western modernity and “civilization.” In the second half of the term, research projects take the shape of applying some of these theoretical models to case studies concerning specific objects, bodies, and materials. Note that a course on the same subject is being offered

simultaneously at another institution, with students and professors in both courses entering into various sorts of conversation during the term. TH 1:30–3:20

RLST 703b/AMST 719b, Interrogating the Crisis of Islam Zareena Grewal

In official and unofficial discourses in the United States, diagnoses of Islam's various "crises" are ubiquitous, and Muslim "hearts and minds" are viewed as the "other" front in the War on Terror. Since 9/11, the U.S. State Department has made the reform of Islam an explicit national interest, pouring billions of dollars into USAID projects in Muslim-majority countries, initiating curriculum development programs for madrasas in South Asia, and establishing the Arabic Radio Sawa and the satellite TV station Al-Hurra to propagate the U.S. administration's political views as well as what it terms a "liberal" strain of Islam. Muslim Americans are also consumed by debates about the "crisis" of Islam, a crisis of religious authority in which the nature and rapidity of change in the measures of authority are felt to be too difficult to assimilate. This course maps out the various and deeply politically charged contemporary debates about the "crisis of Islam" and the question of Islamic reform through an examination of official U.S. policy, transnational pulp Islamic literature, fatwas and essays authored by internationally renowned Muslim jurists and scholars, and historical and ethnographic works that take up the category of crisis as an interpretive device. T 1:30–3:20

RLST 705a/AMST 705a/HIST 582a, Readings in Religion in American Society, 1600–2015 Kathryn Lofton, Harry Stout

This seminar explores intersections of religion and society in American history from the colonial period to the present as well as methodological problems important to their study. T 3:30–5:20

RLST 720b, Seminar in Islamic Religious Thought Gerhard Böwering

Intensive study of Islamic theological and mystical texts. Select readings in classical Arabic sources. Prerequisites: reading knowledge of Arabic and permission of the instructor. T 4–6

RLST 728b/PLSC 776b^U, Islam and Democracy in the Modern Middle East

Andrew March

This seminar studies the development of regimes of government in Muslim countries since the nineteenth century. The focus is on early constitutional movements, the rise of political Islam, the management of religion in various twentieth-century states, the Iranian revolution, and the growth of Salafi ideas, culminating in the ISIS "caliphate."

RLST 734a^U, Old Iranian Religion Stanley Insler

Study of the oldest sources available for the study of ancient Iranian religion, with attention to the historical and cultural backgrounds of extant texts. Focus on a close reading of the *Songs of Zarathustra*, whose religious and philosophical views shaped the future history of Iran. T 1:30–3:20

RLST 739a, Life and Thought of Jonathan Edwards Harry Stout

This course offers students a comprehensive view into the life and thought of Jonathan Edwards. T 1:30–3:20

RLST 746a^U/JDST 736a^U, Midrash Seminar: Rabbinic Interpretations of the Song of Moses (Deuteronomy 32) Steven Fraade

Close reading of the earliest running commentary to Moses' farewell song in Deuteronomy 32, as found in the collection *Sifre Haazinu*. The rhetoric and early rabbinic methods of scriptural interpretation; the commentary's place in the history of interpretation and its contributions to the historical study of ancient Jewish society and culture. Prerequisite: reading fluency in ancient Hebrew. TH 9:25–11:15

RLST 751b^U/JDST 721b^U, Introduction to Judaism in the Ancient World: From Temple to Talmud Steven Fraade

The emergence of classical Judaism in its historical setting. Jews and Hellenization; varieties of early Judaism; apocalyptic and postapocalyptic responses to suffering and catastrophe; worship and atonement without sacrificial cult; interpretations of scriptures; law and life; the rabbi; the synagogue; faith in reason; Sabbath and festivals; history and its redemption. MW 11:35–12:50

RLST 757a^U/JDST 725a^U, The Dead Sea Scrolls and the History of Ancient Judaism: Legal Polemic and Identity Formation in Ancient Judaism Steven Fraade

Study focuses on one of the most important of the recently published Dead Sea Scrolls: *Miqtsat Manaseh Torah* (4QMMT), which polemically defines the author's community by distinguishing its religious practices and history from those of its opponents. How does this text elucidate the debates between ancient Jewish groups as reported in second temple and early rabbinic literatures? How does such legal discourse, and its narrative accompaniments, rhetorically contribute to the socio-religious self-understanding of the Qumran covenantal community? Prerequisite: reading fluency in ancient Hebrew. W 9:25–11:15

RLST 762a^U/CPLT 690a^U/JDST 838a^U, Diaspora, Nationalism, and Sovereignty: Introduction to Modern Hebrew Literature Hannan Hever

An overview of the poetics, culture, history, and political dynamics of Modern Hebrew literature over the past 250 years. No background in Jewish literature and Jewish culture is required. All readings are in English translation. W 3:30–5:20

RLST 772b/JDST 760b, Rabbinics Research Seminar Christine Hayes

An in-depth survey of research debates and of methods and resources employed in the study of classical (pre-Geonic) rabbinic literature of all genres. Required of graduate students in ancient Judaism. Prerequisites: knowledge of Hebrew and Aramaic, ability to read academic Hebrew, and permission of the instructor. T 3:30–5:20

RLST 773a^U/HIST 596a^U/JDST 761a^U, Jewish History and Thought to Early Modern Times Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire. Focus on the formative period of classical rabbinic Judaism and on the symbiotic relationships among Jews, Christians, and Muslims. Jewish society and culture in its biblical, rabbinic, and medieval settings. TTH 11:35–12:50

RLST 776a/HIST 601a/JDST 790a, Jewish History, Thought, and Narratives in Medieval Societies Ivan Marcus

Research seminar that focuses on the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain). TH 9:25–11:15

RLST 792/SMTC 522, Intermediate Syriac Adam Becker

This two-term course is a continuation of SMTC 521. Reading and analysis of Syriac texts from various genres and time periods. Prerequisite: SMTC 521 or knowledge of Syriac.

RLST 793a/SMTC 793a, Biblical Aramaic David Marcus

An introduction to the morphology and syntax of Biblical Aramaic. Readings from the Aramaic passages of the Books of Daniel and Ezra. No previous knowledge of Aramaic is assumed.

RLST 794b/SMTC 794b, Aramaic of the Dead Sea Scrolls David Marcus

An introduction to the morphology and syntax of the Aramaic dialect found in the Dead Sea Scrolls. Reading of selected texts including the Genesis Apocryphon, the Targum of Job, the Book of Enoch, letters and contracts. No previous knowledge of Aramaic is assumed.

RLST 798b/HSAR 731b/JDST 692b, Witnessing, Remembrance, Commemoration Margaret Olin

Memory and its expressions structure and inform many aspects of contemporary visual culture. This seminar pursues readings about memory and witnessing chosen from among the works of such writers as Sigmund Freud, Albert Camus, Frances Yates, Maurice Halbwachs, and the authors of the Book of Genesis, as well as writings about commemoration by James Young and Pierre Nora, among others. Discussions apply these readings to the study of witnessing and memorializing as artistic practices, and examine visual realizations of such works, including some monuments and memorials near campus, but with a nonexclusive emphasis on Jewish examples, such as videos in the Fortunoff archive. Student projects center on theory or on special cases of witnessing or commemoration, ritual, memorial practice, and monuments, whether built, written, aural, electronic, or played out on the streets. M 3:30–5:20

RLST 801a, Hebrew Bible Seminar: Problems in the History of Israelite Religion Robert Wilson

An intensive study of important features of ancient Israelite religion, including the origins of monotheism, the priesthood, prophecy, and apocalypse. Prerequisites: two years of Biblical Hebrew and previous work in biblical interpretation. M 1:30–3:20

RLST 801b, Hebrew Bible Seminar: Problems in the Book of Ezekiel

Robert Wilson

A close reading of the Hebrew text of Ezekiel, with a focus on the book's literary history, style, and religious thought. Prerequisite: two years of Biblical Hebrew or the equivalent. M 1:30–3:20

RLST 865a^U, Moral, Religious, and Social Issues in Bioethics Stephen Latham

A selective survey of issues in biomedical ethics. Comparison of different points of view about biomedical issues, including religious vs. secular and liberal vs. conservative. Special attention to issues in research and at the beginning and end of life. MW 9–10:15

[RLST 900b^U, Existentialism]

RLST 901b^U/PHIL 614b^U, Martin Heidegger Noreen Khawaja

A comprehensive introduction to the oeuvre of Martin Heidegger. Key texts from *Being and Time* to the essay on technology, including the famous “Rectoral Address” of 1933, and writings on poetry, art, and theology. Consideration of Heidegger’s work in systematic and historical terms. Focus on his attempt to use philosophy to incite an “essential transformation in the history of Western spirit” along with its stakes, limitations, and consequences. W 3:30–5:20

RENAISSANCE STUDIES

53 Wall Street, Rm. 310, 203.432.0672

www.yale.edu/renstudies

M.A., M.Phil., Ph.D.

Chair and Director of Graduate Studies

Carlos Eire

Executive Committee Rolena Adorno, Edwin Duval, Carlos Eire, Roberto González Echevarría, Bruce Gordon, David Scott Kastan (*on leave* [F]), Christina Kraus, Lawrence Manley, Giuseppe Mazzotta, Robert Nelson, David Quint (*on leave* [Sp]), John Rogers (*on leave* [F]), Francesca Trivellato, Keith Wrightson (*on leave* [Sp])

Faculty associated with the program Rolena Adorno, Emily Bakemeier, Leslie Brisman, Paul Bushkovitch, Susan Byrne, Angela Capodivacca, Judith Colton (*Emeritus*), Edwin Duval, Carlos Eire, Roberta Frank, Paul Freedman, Roberto González Echevarría, Bruce Gordon, Emily Greenwood, Karsten Harries (*on leave* [Sp]), K. David Jackson, Maija Jansson, David Scott Kastan (*on leave* [F]), Christina Kraus, Lawrence Manley, Giuseppe Mazzotta, Mary Miller, Alastair Minnis, Robert Nelson, Catherine Nicholson (*on leave*), Steven Pincus, David Quint (*on leave* [Sp]), John Rogers (*on leave* [F]), Christopher Semk, Francesca Trivellato, Brian Walsh, Keith Wrightson (*on leave* [Sp])

Fields of Study

Renaissance Studies offers a combined Ph.D. degree that integrates concentration in a departmental field with interdisciplinary study of the broader range of culture in the Renaissance and early modern periods. The program is designed to train Renaissance specialists who are firmly based in a traditional discipline but who can also work across disciplinary boundaries. Departmental areas of concentration available are Classics, Comparative Literature, English, French, History, History of Art, History of Music, Italian, and Spanish and Portuguese.

Special Admissions Requirements

Only candidates wishing to proceed to a doctorate should apply. Application should be made to the department of concentration, with an indication that the candidate seeks nomination to the combined degree in Renaissance Studies. Applications should be accompanied by scores from the GREs and one research or critical paper.

Special Requirements for the Ph.D. Degree

Students are subject to the combined Ph.D. supervision of the Renaissance Studies program and the relevant participating department. The student's program will be decided in consultation with an adviser, the director of graduate studies in Renaissance Studies, and the director of graduate studies in the participating department. As detailed below, requirements for the combined degree vary slightly to accommodate the requirements of the participating departments, but all candidates for the combined degree are expected

to meet, at a minimum, the following requirements. (1) Students must demonstrate a reading knowledge of Latin, Italian, and a third language, which will vary according to departmental requirements. At the minimum, an examination in Latin or Italian should normally be passed upon entrance; a second language should be passed before the third term; and a third language by the end of the second year. (2) Each student is required to take sixteen term courses (in History of Art, fifteen). The normal pattern is to have completed fifteen courses during the first two years of study, no more than two of which may be individual reading and research. (3) A two-term core seminar, designed to present a wide range of topics concerned with Renaissance and early modern culture, is required of all combined degree candidates. This course, offered every other year, is open to students from other departments.

Training in teaching, through teaching fellowships, is considered an important part of every student's program. Most students teach in their third and fourth years.

The scheduling of the oral examination and the dissertation prospectus follows the practice of the primary department, but in every case the two requirements must be completed not later than September of the fourth year. The oral examination, varying in length from two hours to two hours and fifteen minutes, will include questions on Renaissance topics outside the primary discipline. The remainder of the examination will be devoted to the primary discipline, including (except in the case of Classics) some further coverage of the Renaissance period. Students take additional written examinations as required by the primary departments.

Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the combined Ph.D. degree. Admission to candidacy must be completed by the beginning of the fourth year.

The dissertation will be advised and completed according to departmental guidelines, but one of the readers will normally be a member of the Renaissance Studies Executive Committee.

CLASSICS

Course work Students are required to complete sixteen term courses. Eight of these will be courses in Classics and will include at least four courses in Greek and Latin literature, a course in historical or comparative grammar, and at least three seminars. The eight remaining courses making up the Renaissance Studies portion of the degree will be distributed as follows: two terms of the Renaissance Studies Core Course, six additional term courses to be taken in at least two disciplines (such as literature, history, history of art, music, religious studies, etc.). One of these courses should respect the spirit of the ordinary Classics requirement of a course in classical art or archaeology (a course on the classical origins of Renaissance architecture, for example, will satisfy this requirement).

Languages Students are expected to pass the normal Greek and Latin competency exams upon entrance to the program. Italian, as set by Renaissance Studies – one hour on sixteenth-century Italian prose, and another one-hour exam on modern Italian scholarship – and a second language, normally German or French.

Examinations Students are expected to pass the Greek and Latin translation exams, based on the Classics and Renaissance Studies Ph.D. reading lists, by the beginning of the fifth term in residence; the oral exams in Greek and Latin literature, based on the Classics

and Renaissance Studies Ph.D. reading lists, by the end of the fifth term in residence; and the oral exams on special fields appropriate to both disciplines, as described below, by the end of the sixth term in residence.

Orals Classics portion: seventy-five minutes on three or four topics in classical Greek and Latin literature. Renaissance Studies portion: forty-five minutes, three fifteen-minute questions on Renaissance topics to be divided between at least two disciplines, i.e., literature, history, history of art, etc.

Prospectus and dissertation The prospectus must be completed by the end of the seventh term in residence. Procedures regarding the dissertation will follow departmental practice, although the board of readers will normally include at least one member of the Renaissance Studies Executive Committee.

COMPARATIVE LITERATURE

Course work Students are required to complete sixteen term courses, at least seven of these (including the Comparative Literature proseminar) in the Department of Comparative Literature. Students must take at least ten courses in the field of Renaissance Studies (offered in several departments), including two terms of the Renaissance Studies Core Course and three courses in two disciplines other than literature (such as history, history of art, or religious studies). At least three of a student's overall list of courses must be in literary theory, criticism, or methodology; at least one course each in poetry, narrative fiction, and drama; and at least one course each in ancient or medieval literature and Enlightenment or modern literature. At least two courses must be completed with the grade of Honors. In general, students should take a wide range of courses with a focus on one or two national or language-based literatures.

Languages Latin and Italian, as set by Renaissance Studies—one hour of Renaissance Latin prose; one hour of sixteenth-century Italian prose, one of modern Italian scholarship—and two additional languages, at least one of them European.

Orals The joint oral examination will consist of seven twenty-minute questions (two topics in Renaissance literature from a comparative perspective; three on non-Renaissance literature, including at least one theoretical or critical question; and two questions on Renaissance topics in nonliterary disciplines). Orals should be completed no later than the end of the sixth term.

Prospectus and dissertation The prospectus should be completed in September of the fourth year. Procedures regarding the dissertation will follow departmental practice, although the final readers will normally include at least one member of the Renaissance Studies Executive Committee.

ENGLISH

Course work Students are required to complete sixteen term courses. Eleven of these will be courses in English, of which five (including those normally cross-listed, such as Comparative Literature courses and the Renaissance Studies Core Course) will be in Renaissance literature. An additional five courses in Renaissance topics will be non-cross-listed courses from other departments. Course work must be completed by the end of the fifth term.

Languages Latin, Italian, and a second modern language, to be tested by the Renaissance Studies program.

Orals Nine nine-minute questions, including four Renaissance topics. An additional thirty-minute portion, consisting of two fifteen-minute questions in Renaissance Studies on nonliterary disciplines. Orals must be completed by the end of the sixth term.

Prospectus and dissertation The prospectus must be completed by the beginning (i.e., September) of the seventh term. Procedures regarding the dissertation will follow departmental practice, with at least one reader from the Renaissance Studies Executive Committee.

FRENCH

Course work Sixteen term courses at the graduate level are required. Nine correspond to the requirements of the French department, seven to the requirements of the Renaissance Studies program. Of the nine courses taken in French, one must be French 610 (Introduction to Old French), two others must fall within the medieval and early modern periods (eleventh through seventeenth century). The six remaining courses in French must cover as broad a spectrum as possible of the various periods and subfields of French and francophone literature. Of the seven courses taken in Renaissance Studies, two must be the Renaissance Studies Core Course, two must be in a literature or literatures other than French, and three must be taken in other departments (e.g., History, History of Art, Music, Religious Studies, Philosophy, etc.).

Languages Latin and Italian, as required and examined by Renaissance Studies, and a third language relevant to the student's specialization (Greek, Hebrew, Spanish, Portuguese, German), in addition to French. A written examination in Latin will consist of a passage of humanist Latin prose (one hour). A written examination in Italian will consist of a literary passage from the Italian Renaissance (one hour) and a passage of modern Italian scholarship (one hour). Written examinations in the third language will consist of passages appropriate to the language and the discipline, or may be satisfied by a graduate seminar taken in the language or literature in question.

Orals An oral qualifying examination must take place as early as possible in the third year of study, before spring recess at the latest. The examination will consist of seven topics: four in French and three in Renaissance Studies. Of the four topics in French, one must center on Renaissance literature, two on other areas of French and francophone literature; the fourth will consist of the textual analysis of a poem or prose passage in French, provided to the candidate twenty-four hours before the examination. Of the three topics in Renaissance Studies, one or two must center on a Renaissance literature other than French, the remainder on an area or areas of Renaissance Studies other than literature. The French part of the examination will be conducted in French; the Renaissance Studies part will be conducted in English.

Prospectus and dissertation A formal prospectus defense must take place no later than two weeks before the end of the sixth term (third year) of study. The prospectus committee will consist of three faculty members, including the dissertation director(s) and at least one member of the Renaissance Studies Executive Committee. Once approved by

the committee, the prospectus will be submitted to the graduate faculty of the Department of French for a vote on final approval and advancement to candidacy. More than one dissertation adviser is permitted and indeed encouraged, but the principal adviser will normally be in the Department of French. The official readers of the finished dissertation need not be members of the original prospectus committee, but will include at least one member of the Department of French and at least one member of the Renaissance Studies Executive Committee.

HISTORY

Course work Students are required to complete sixteen term courses. Ten of these will be courses in History; of these, a minimum of four will be in Renaissance/early modern topics from the fourteenth through the seventeenth century. The six remaining courses making up the Renaissance Studies portion of the degree will be distributed as follows: two terms of the Renaissance Studies Core Course, four additional term courses to be taken in at least two disciplines outside of history (such as Classics, modern literatures, history of art, music, etc.). The normal History department requirements of three research seminars and a prospectus tutorial apply to combined-degree students.

Languages Latin and Italian, as set by Renaissance Studies – one hour of Renaissance Latin prose; two hours of Italian, one of sixteenth-century Italian prose, one of modern Italian scholarship – and a third language chosen by the student.

Orals History portion: seventy-five minutes in all, including forty-five minutes on the student's major Renaissance/Reformation/early modern field, which may, but need not be, shared with more than one examiner, and thirty minutes on a minor field outside the specialization (and preferably outside of European history). Renaissance Studies portion: forty-five minutes, three fifteen-minute questions to be divided between at least two disciplines outside of history narrowly conceived (i.e., in literature, history of art, etc.). Students are expected to complete the oral examination no later than September of the fourth year.

Prospectus and dissertation Students are expected to complete the prospectus by March of the third year. Procedures regarding the dissertation will follow departmental practice, although the board of readers will normally include at least one member of the Renaissance Studies Executive Committee.

HISTORY OF ART

Course work Students are required to complete fifteen term courses. Ten of these will be courses in History of Art; of these, a minimum of four will be in Renaissance art from fourteenth-century Italy through the baroque. The five remaining courses making up the Renaissance Studies portion of the degree will be distributed as follows: two terms of the Renaissance Studies Core Course, three additional term courses taken in at least two disciplines outside of history of art (such as literature, history, music, religious studies, etc.). Students will normally take seven courses in the first year, six in the second year (the credit for first-time teaching will be included in this number), and a final course in the fall of the third year.

Qualifying paper Normally during January of the second year, students submit a qualifying paper that should demonstrate the candidate's ability to complete a Ph.D. dissertation successfully.

Languages Latin and Italian, as set by Renaissance Studies—one hour of Renaissance Latin prose; two hours of Italian, one of sixteenth-century Italian prose, one of modern Italian scholarship. A third language (in most cases German) at the discretion of the History of Art department.

Orals The comprehensive oral examination will normally take place toward the end of the first term of the third year and must be completed no later than September of the fourth year. It will consist of a three-hour written examination based on the candidate's major field and an oral examination as follows: History of Art: seventy-five minutes, including examination on at least one field noncontiguous with the Renaissance; Renaissance Studies: forty-five minutes, three fifteen-minute questions to be divided between at least two disciplines outside the history of art.

Prospectus and dissertation Students are expected to complete the prospectus and colloquium by March of the third year. Procedures for the submission and evaluation of dissertations will be those followed in History of Art, although the board of readers will normally include a member of the Renaissance Studies Executive Committee.

ITALIAN

Course work Of the combined degree program's total of sixteen term courses, seven are in Renaissance Studies and nine are in the Department of Italian. Of the nine courses in Italian, at least three must be devoted to the period from Dante to the earlier seventeenth century. The seven courses making up the Renaissance Studies portion of the degree will be distributed as follows: two terms of the Renaissance Studies Core Course; two courses in Renaissance literatures other than Italian, and three courses divided between at least two nonliterary disciplines (e.g., history, history of art, religious studies, etc.).

Languages Latin, as set by Renaissance Studies (one hour of Renaissance Latin prose), a second romance language, and a non-romance language, tested in a two-hour examination (one hour of Renaissance prose, one hour of modern scholarship). Latin to be passed by the end of the first year (and preferably upon entrance); all languages to be passed before the oral examination.

Orals The qualifying examination, which must be completed by the end of the third year, will include an oral examination in which sixty minutes will be devoted to Italian literature, including the Renaissance, and forty-five minutes will be devoted to three fifteen-minute questions on a topic in Renaissance literature outside of Italy and two topics in nonliterary areas of the Renaissance (such as history or history of art). The portion of the examination devoted to Italian literature will also include a written component following departmental guidelines.

Prospectus and dissertation The dissertation (a prospectus of which must be completed by the beginning of the fourth year) will normally be directed within the Department of Italian, but at least one of the readers will normally be a member of the Renaissance Studies Executive Committee.

MUSIC

Course work Students are required to complete sixteen term courses. Ten of these will be courses in Music, including four in early music, i.e., from the later Middle Ages through the baroque. The six remaining courses making up the Renaissance Studies portion of the degree will be distributed as follows: two terms of the Renaissance Studies Core Course, four additional term courses taken in at least two disciplines outside of music (such as literature, history, history of art, religious studies, etc.).

Languages Latin and Italian, as set by Renaissance Studies – one hour of Renaissance Latin prose; two hours of Italian, one of sixteenth-century Italian prose, one of modern Italian scholarship. A third language (normally French or German) at the discretion of the Department of Music.

Comprehensive examinations Music: three ninety-minute essays (including one on early music), followed by an oral examination of ninety minutes. Renaissance Studies: one ninety-minute essay on an interdisciplinary Renaissance topic (e.g., art and literature of a particular country, or comparison of the culture of two or three princely courts, or the history of the Reformation or Counter-Reformation), followed by a thirty-minute oral examination on the essay topic. Students take the comprehensive exam in Music at the beginning of the third year and the Renaissance Studies comprehensive exam in the spring of the third year.

Prospectus and dissertation Students enroll in the third-year prospectus/dissertation seminar in Music and must complete the prospectus no later than September of the fourth year. Dissertations will be approved in the Department of Music, with at least one reader to come from the Renaissance Studies Executive Committee.

SPANISH AND PORTUGUESE

Course work A total of sixteen term courses at the graduate level is required. Nine correspond to the requirements of the Spanish and Portuguese department, seven to the requirements of the Renaissance Studies program. Of the nine courses taken in Spanish and Portuguese, two are required: Spanish 790, Methodologies of Modern Foreign Language Teaching, and Spanish 500, History of the Spanish Language. Of the remaining seven, three or four will be in Spanish and/or Portuguese literature from the medieval period through the seventeenth century, and the balance will be in the literature of Spain's and/or Portugal's ultramarine possessions. The student doing the combined degree program may elect to devote his or her departmental course work to either Hispanic or Luso-Brazilian literatures or do a combination of both in a distribution to be determined by the student in consultation with his or her departmental adviser(s). Of the seven courses taken in Renaissance Studies, two must be the Renaissance Studies Core Course, two must be in a literature or literatures other than Spanish and/or Portuguese, and three must be taken in other departments (e.g., History, History of Art, Religious Studies, Philosophy, etc.).

Languages Students are expected to have a strong command of Spanish and/or Portuguese as well as English. In addition, the following requirements must be met: (1) Latin, as set by the Renaissance Studies program (passing a one-hour translation examination in Renaissance Latin prose); (2) Italian, as set by the Renaissance Studies program

(successful completion of a one-hour translation exam in sixteenth-century Italian prose and a one-hour translation exam in modern Italian scholarship); (3) demonstration of reading/translation proficiency in one of the following languages: French, German, Greek, Portuguese (available to students doing departmental course work exclusively in Spanish), Spanish (available to students doing departmental course work exclusively in Portuguese), or another language relevant to the student's specialization. Students doing their departmental course work in a combination of Spanish-language and Portuguese-language courses will be understood to have satisfied this third reading knowledge requirement so long as the courses are taught and the readings done in the relevant Romance language. If the course work in either Hispanic or Luso-Brazilian literatures is done in English, then the student will be expected to demonstrate proficiency by taking a one-hour translation exam in the sixteenth-century prose of the relevant language.

One language requirement must be satisfied by the end of the first year of study, if not upon entrance into the program (preferably Latin or Italian); the remaining requirement (for students doing both Spanish- and Portuguese-language literatures) or requirements (for the student working exclusively in either Spanish or Portuguese) must be satisfied by the end of the second year.

Qualifying examination Written component: (1) a two-hour examination in peninsular Spanish and/or Portuguese literatures, and (2) a two-hour exam in the ultramarine literatures of Spain and/or Portugal. Oral component: eight fifteen-minute questions, distributed as follows: four in Spanish/Portuguese peninsular/ultramarine literatures (medieval period through the seventeenth century), and three in Renaissance Studies (one question on a non-Spanish/Portuguese literature, and two questions from extra-literary fields such as history, history of art, religious studies, etc.).

Prospectus The dissertation project should be carefully planned with faculty members from the relevant departments specializing in the respective areas. The prospectus should meet the approval of the student's adviser in the Department of Spanish and Portuguese and the Renaissance Studies program member advising the student. The prospectus must include a presentation of the topic to be investigated, an explanation of the reasons for its significance, and a description of the theoretical and methodological framework to be employed. The prospectus must be submitted to the director of graduate studies in the Department of Spanish and Portuguese, who will circulate it to the departmental faculty for their review and approval; the prospectus will likewise be submitted to the Renaissance Studies program for review and approval by the faculty member(s) working with the student. The prospectus must be submitted and approved by the faculty by the beginning of the seventh term of enrollment. Failure to meet this deadline will result in suspension of registration privileges by the Graduate School. The deadline for the submission of the dissertation prospectus in either term is the Monday of the final week of classes.

Dissertation The dissertation is to achieve a strong disciplinary (i.e., Spanish, Portuguese, or Spanish/Portuguese) identity while at the same time projecting a clear Renaissance Studies profile. The dissertation normally will be directed from within the Department of Spanish and Portuguese, and there will be at least one reader from the Renaissance Studies Executive Committee.

Master's Degrees

M.Phil. The combined M.Phil. degree may be requested after all requirements but the dissertation are met.

M.A. (en route to the Ph.D.) The M.A. degree is awarded upon completion of eight term courses, taken in at least three disciplines, and with at least three grades of Honors. The examination in Latin or Italian must have been passed.

Program materials are available upon request to the Chair, Renaissance Studies Program, Yale University, PO Box 208298, New Haven CT 06520-8298.

Courses

RNST 500a/CPLT 812a/HIST 563a/ITAL 600a, The Renaissance in Italy

David Quint

An introduction to the Renaissance in Italy, focused on reading and analyzing key texts.
TH 9:25–11:15

RNST 500b/HIST 564b, Introduction to Renaissance Studies Carlos Eire

An introduction to the Renaissance beyond Italy, focused on reading and analyzing key texts. W 3:30–5:20

RNST 900a,b, Directed Reading

By arrangement with faculty.

SLAVIC LANGUAGES AND LITERATURES

2704 Hall of Graduate Studies, 203.432.1300, slavic.department@yale.edu
<http://slavic.yale.edu>
 M.A., M.Phil., Ph.D.

Chair

Harvey Goldblatt (harvey.goldblatt@yale.edu)

Director of Graduate Studies

Bella Grigoryan (bella.grigoryan@yale.edu)

Professors Vladimir Alexandrov, Katerina Clark, Harvey Goldblatt, John MacKay

Associate Professor Molly Brunson

Assistant Professors Marijeta Bozovic, Bella Grigoryan

Senior Lectors II Irina Dolgova, Constantine Muravnik

Senior Lectors I Krystyna Illakowicz, Julia Titus, Karen von Kunes

Fields of Study

The department offers the Ph.D. in Russian literature and culture and, by special arrangement, in medieval Slavic literature and philology.

Special Admissions Requirements

An advanced-level command of the Russian language is required. A ten- to twenty-page writing sample, written in English, should be submitted with the application.

Special Requirements for the Ph.D. Degree

All graduate students are required to take four courses. RUSS 607, Topics in Russian Literature from Its Origins to the Eighteenth Century, is coordinated with the department's graduate reading list of required works in Russian literature of the period. All students will take an examination in RUSS 607 that will also double as the medieval Russian literature examination for the doctorate (for more on examinations, see below). RUSS 608, Eighteenth-Century Russian Literature, follows the same pattern as RUSS 607. Its readings are also coordinated with the department's graduate reading list of required works in Russian literature. All students will take an examination in RUSS 608 that will also double as the eighteenth-century Russian literature examination for the doctorate. The other required courses are SLAV 754, Old Church Slavic, and RUSS 834, Aspects of Russian Grammar and Teaching Methodologies, which combines pedagogy with the structure of Russian. If possible, SLAV 754 should be taken before RUSS 607. RUSS 834 should be taken concurrently with or before a graduate student's first term of teaching Russian language, typically during the seventh term of study.

The minimum number of graduate courses for the Ph.D. is sixteen, counting the above four required courses. Of the remaining twelve, at least two must be taken in nineteenth-century Russian literature and at least two in twentieth-century Russian literature, including poetry and prose or dramatic works.

Graduate students in their second year may also spend a term studying at the Russian State University for the Humanities in Moscow; those who complete an approved program successfully will receive up to four course credits toward the Ph.D.

Students who have done graduate work elsewhere may petition the department for up to four course credits toward their degree after one year's residence at Yale.

A special curriculum may be arranged for students wishing to specialize in medieval Slavic literature and philology.

Minor field As part of their program of study, students will also be responsible for developing a minor field of specialization in one of the following: (1) a Western or non-Western literature; (2) film studies; (3) a topic in intellectual history; (4) one of the other arts; (5) another Slavic literature; (6) Slavic linguistics; (7) another discipline relevant to their primary interests in Russian literature. The student's minor field of specialization will be determined in consultation with the director of graduate studies (DGS). The minor field can be developed most readily through reading courses in the Slavic department or by taking graduate courses in another department. Up to two graduate courses in other departments will count toward the sixteen for the doctorate if they are relevant to a student's program of study. The successful completion of a course or courses in the student's minor field taken in another department may double as the departmental examination in the minor.

Examinations The Ph.D. qualifying examinations comprise eight parts and will be completed during the third year of study: (1) medieval Russian literature; (2) Russian literature of the eighteenth century; (3) minor field; (4) nineteenth-century Russian prose and drama; (5) nineteenth-century Russian poetry; (6) twentieth-century Russian prose and drama; (7) twentieth-century Russian poetry; (8) pre-prospectus examination.

The first two examinations are taken in conjunction with courses offered during the first two years of course work, RUSS 607 and RUSS 608. Early in the fifth term of study, students will take (3), a forty-minute oral exam in their chosen minor field, administered by the DGS and relevant faculty within and/or outside the department; this examination will be waived if the student has successfully completed one or two relevant graduate courses in another department. In October of the third year of study (typically during the second week), students will take two written examinations, (4) and (5), of two hours each, the first on Monday of the given week, the second on Friday. Each exam will consist of two or three passages drawn from well-known works of literature that will be identified and that are designated as required on the department's reading list (which also includes additional works that are recommended but not required). Students will be expected to choose one passage and write an essay in which they analyze the text from as many of the following points of view as possible: versification (if relevant), style, structure, narrative point of view, themes, genre, period, place in the author's oeuvre and in literary history, comparative context, and critical reception. Two additional written examinations, (6) and (7), which will follow the same format, will be held during one week at the end of the student's fifth term of study (typically the first week of December), again on Monday and Friday. Each of these four written exams will be compiled and graded by two faculty members with expertise in the given century and genres. After each exam, students will be informed as to how they performed.

After the final written exam, all students will have a one-hour oral pre-prospectus exam on a date to be specified by the department near the beginning of the sixth term (typically, during the first week of February). This examination will explore issues pertaining to the student's future dissertation prospectus. Normally, preparation for the exam will entail a more focused reading of the departmental reading list. For example, a student who proposes to work on Pasternak would read not only the required and recommended works by Pasternak, but also the required and recommended works by other writers of the twentieth century. Students will also be expected to explore secondary and theoretical sources outside the reading list that are relevant to their chosen topic. Preparation for the examination will be done in consultation with two faculty advisers (see below), and students will be required to prepare in advance a 7–10 page text outlining their future dissertation topic, including a discussion of existing scholarship and the way they propose to structure their work. An annotated bibliography of primary and secondary works pertaining to their dissertation topic should also be appended. The pre-prospectus text will be distributed to all departmental faculty one week prior to the exam, and all faculty will attend the exam. The aim of this exam is for the student to take an intermediate step toward developing a dissertation prospectus and also to provide the student with feedback from the faculty about the project.

The departmental reading list is available on the department's Web site.

Article in lieu of examination As a possible alternative to one of the four written examinations on the nineteenth and twentieth centuries, students may choose to write an article that they will submit for publication to a scholarly journal. The work will be carried out in consultation with a faculty adviser and will focus on a work or works in either poetry or prose (or drama) of the given century. This article will be due on the date that the exam on the given genre is normally scheduled. It is expected that the article will be ambitious in its overview and in its conceptualization of the issue(s) being addressed. The faculty adviser will evaluate the work and will advise the student on publication.

Combined Ph.D. Program with Film and Media Studies

The Department of Slavic Languages and Literatures also offers, in conjunction with the Film and Media Studies Program, a combined Ph.D. in Slavic Languages and Literatures and Film and Media Studies. For further details, see Film and Media Studies and the department's Web site. Applicants to the combined program must indicate on their application that they are applying both to Film and Media Studies and to Slavic Languages and Literatures. All documentation within the application should include this information.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in Slavic Languages and Literatures are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. The Department of Slavic Languages and Literatures does not admit students for the terminal M.A. degree, nor does it award an M.A. en route to the Ph.D. degree. If, however, a student admitted for the Ph.D. leaves the program prior to completion of the doctoral degree, he or she may be eligible to receive a terminal master's degree. He or she

must have completed at least fifteen term courses in Russian literature and linguistics, chosen in consultation with the director of graduate studies. A grade of Honors in at least two term courses and an average of High Pass in the remaining courses must be attained. A reading knowledge of French or German is required, and candidates must pass departmental proficiency examinations in Russian.

Program materials are available upon request to the Chair, Slavic Languages and Literatures, Yale University, PO Box 208236, New Haven CT 06520-8236.

Courses

RUSS 608a, Eighteenth-Century Russian Literature Bella Grigoryan

A comprehensive survey of the main trends in eighteenth-century Russian literature. Topics of interest include normative aesthetics; generic imports and generic diversity; the evolution of the Russian literary language; discourses of imperial statehood in literary, visual, and material culture; the status of the writer; literary and political subjectivity. Key figures under consideration include Trediakovsky, Lomonosov, Sumarokov, Novikov, Fonvizin, Derzhavin, Radishchev, and Karamzin, among others. M 9:25–11:15

RUSS 695b/FILM 778b, Russian Literature and Film in the 1920s and 1930s

Katerina Clark

This course presents a historical overview, incorporating some of the main landmarks of the 1920s and 1930s including works by Pilnyak, Bakhtin, the Formalists, Platonov, Mayakovsky, Bulgakov, Zoshchenko, Eisenstein, Protazanov, Pudovkin, the Vasilyev “brothers,” and G. Aleksandrov. TH 3:30–5:20

RUSS 705b, Life and Popular Culture in Late Imperial Moscow

Vladimir Alexandrov

This seminar studies the texture of daily life and aspects of popular culture from the late nineteenth century to 1917 in Moscow, the city that many Russians considered the country’s “heart” and honored as its “second capital,” even two centuries after the founding of St. Petersburg. Readings include works of narrative and dramatic fiction (e.g., Boborykin, Gorky, Bunin, Shmelev), compilations (e.g., *Povsednevnaia zhizn’ Moskvy: ocherki gorodskogo byta nachala XX veka*), memoirs (e.g., A.F. Koshko, *Ocherki ugolovnogo mira tsarskoi Rossii*; V. Giliarovsky, *Moskva i moskvichi*), film (e.g. Evgenii Bauer, *Posle smerti*), and scholarly and historical studies (e.g., E. Uvarova, *Kak razvlekalis’ v rossiiskikh stolitsakh*; P. Il’in and B. Rubl, eds., *Moskva rubezha XIX i XX stoletii*; V. Mikhailov, *Rasskazy o kinematografe staroi Moskvy*; selections from K. Baedeker, *Russia 1914*; selections from V. Alexandrov, *The Black Russian*). T 3:30–5:20

RUSS 712a/CPLT 840a/FILM 840a/GMAN 652a/HSAR 687a, Moscow/Berlin:

Leftist Avant-Gardes and Interwar Modernism Katerina Clark, Katie Trumpener

From 1918 to the mid-1930s, Moscow and Berlin were central gathering points for left-wing modernists. Each city developed its own modes of modernism, yet in sustained dialogue, given massive Russian emigration to Berlin after 1918, the Weimar obsession with early Soviet aesthetics (and cinema), intellectuals traveling in both directions, and the large-scale emigration of German leftists to the Soviet Union after 1933. And in the late 1940s and ’50s, Soviet intellectuals (and German emigrants returning from Moscow)

shaped a “late modernism” in East Berlin. Centered on literature and film, the course also considers a wide array of art forms (including painting, photography, architecture, music, and aesthetic theory). Works by modernists such as Eisenstein, Pudovkin, Vertov, Nabokov, Shklovsky, El Lissitzky, Rodchenko, Malevich, Tretiakov, Lukács, Moholy-Nagy, Benjamin, Brecht, Richter, Beckmann, Grosz, Heartfield, Höch, Lang, Döblin, Ruttman, Mies van der Rohe, Eisler, Busch, Konrad Wolf, Peter Weiss. T 1:30–3:20

RUSS 834a, Aspects of Russian Grammar and Teaching Methodology

Irina Dolgova

The course examines various aspects of Russian grammar and the use of different teaching methodologies. Special emphasis is placed on the connection between linguistic knowledge and its application for teaching Russian in an English-speaking classroom. Different types of language learners, diverse teaching strategies, and existing resources for teaching Russian are discussed. M 1:30–3:20

RUSS 851b, Proseminar in Russian Literature Ilya Kliger

Introduction to the graduate study of Russian literature. Topics include literary theory, methodology, introduction to the profession. W 3:30–5:20

SLAV 752a, The Slavic Peoples and Their Languages: From Unity to Diversity

Harvey Goldblatt

Examination of the linguistic and cultural history of the Slavs from their prehistoric period up to the formation of the diverse Slavic languages, the individual Slavic states, and their national literatures. TH 9:25–11:15

SLAV 900, Directed Reading

By arrangement with faculty.

SOCIOLOGY

493 College Street, 203.432.3323

www.yale.edu/sociology

M.A., M.Phil., Ph.D.

Chair

Philip Smith

Director of Graduate Studies

Ron Eyerman [Sp]

Acting Director of Graduate Studies [F]

Jeffrey Alexander

Professors Julia Adams, Jeffrey Alexander, Elijah Anderson, Scott Boorman, Nicholas Christakis, Deborah Davis (*on leave*), Ron Eyerman, Philip Gorski, Philip Smith, Frederick Wherry

Associate Professor Andrew Papachristos

Assistant Professors Rene Almeling, Emily Erikson, Lloyd Grieger, Vida Maralani, Jonathan Wyrzten

Fields of Study

Fields include comparative sociology/macrosociology; cultural and historical sociology; economic sociology; life course/social stratification; mathematical sociology; medical sociology; methodology (qualitative and quantitative approaches); networks; political sociology; race/gender/ethnic/minority relations; social change; social demography; social movements; theory (general, critical, hermeneutic); urban sociology.

Special Requirements for the Ph.D. Degree

Qualification for admission to candidacy for the Ph.D. will take place during the student's first three years of study at Yale. A student who has not been admitted to candidacy will not be permitted to register for the seventh term of study. To qualify for candidacy the student must take twelve seminars to be completed in years one and two, four required courses (SOCY 542a, 578a, 580a, 581b), and eight electives, including at least one workshop. After completion of courses, students prepare a research paper and one field exam and defend a dissertation prospectus.

Teaching is an important part of the professional preparation of graduate students in Sociology. Students teach therefore in the third and fourth years of study.

Combined Ph.D. Degree in Sociology and African American Studies

The Department of Sociology offers, in conjunction with the Department of African American Studies, a combined Ph.D. degree in Sociology and African American Studies.

Students accepted to the combined Ph.D. program must meet all of the requirements of the Ph.D. in Sociology with the exception that, excluding the courses required, a research paper, and a field exam, combined-degree students may substitute African

American Studies courses for six of the twelve term courses required to qualify for the Ph.D. in Sociology. For further details see African American Studies.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations.

M.A. (en route to the Ph.D.) Eight term courses are required for the M.A. degree. Two of these courses must include statistics and theory. A grade of High Pass or Honors must be achieved in five of the eight required courses. A student may petition for the M.A. degree in the term following the one in which he/she completes the course requirements.

Program materials are available at www.yale.edu/sociology.

Courses

[SOCY 502a, **Contemporary Sociological Theory: Durkheimian Sociology**]

SOCY 503a/PLSC 522a, Historical Approaches to the Study of Politics Sigrun Kahl
Provides an overview of the how-to, and the payoff, of a historical approach to the study of politics. Covers a wide range of topics, from the classics of political science and sociology up to recent comparative historical work.

SOCY 508b/PLSC 505b, Qualitative Field Research Elisabeth Wood

In this seminar we discuss and practice qualitative field research methods. The course covers the basic techniques for collecting, interpreting, and analyzing ethnographic data, with an emphasis on the core ethnographic techniques of participant observation and in-depth interviewing. All participants carry out a local research project. Open to undergraduates with permission of the instructor.

SOCY 509b^U/LAW 21020, Guns in the United States Andrew Papachristos,
Tracy Meares

This course explores the multifaceted role guns play in the United States by surveying historical, sociological, psychological, legal, and political research. From a firm foundation of the historical and constitutional origins of the Second Amendment, the course focuses on a range of topics around guns in America, including the prevalence and distribution of guns; attitudes and opinions about gun ownership, possession, and use; illegal and legal gun markets; gun crime and injuries; and the varieties of responses to gun injuries and crime, including, importantly, the legislative and political processes that attend their development. MW 8:45–10

[SOCY 510a^U, **Religious Nationalism**]

[SOCY 511b^U, **Social Interaction: Modeling the Emergence of Social Structure**]

[SOCY 512a^U, **Sociology of Islam**]

[SOCY 515a^U, **Urban Poverty and Policy**]

SOCY 519b, The Sociology of Pierre Bourdieu Philip Gorski

M 2:30–4:30

[SOCY 520b, Revolutions in a Comparative Perspective]**SOCY 523b/WGSS 623b, Sociology of Sex and Gender** Rene Almeling

The course provides students with an introduction to major theoretical approaches to sex and gender, and it covers recent empirical research in key arenas, including care work, sex work, work and family, mothering and fathering, reproductive technologies, and health. TH 2:30–4:20

SOCY 534a^U, Cultural Sociology Jeffrey Alexander

Cultural sociology studies “irrational” meanings in supposedly rational, modern societies. Social meanings are symbolic, but also sensual, emotional, and moral. They can deeply divide nations but also powerfully unite them. They affect every dimension of social life, from politics and markets to race and gender relations, class, conflict, and war. We look at how this cultural approach developed, from counterintuitive writings of Durkheim and Weber a century ago, to the breakthroughs of semiotics and anthropology in midcentury, the creation of modern cultural sociology in the 1980s, and new thinking about social performance and material icons today. As we trace this historical arc, we examine ancient and modern religion, contemporary capitalism, the coronation of Elizabeth II, professional wrestling, Americans not eating horses, the Iraq War, the impeachment of Bill Clinton, Barack Obama’s first presidential campaign, and the new cult of vinyl records. TTH 11:35–12:50, 1 HTBA

[SOCY 536a, Fundamentals of Cultural Sociology]**SOCY 542a, Sociological Theory** Emily Erikson

The course seeks to give students the conceptual tools for a constructive engagement with sociological theory and theorizing. We trace the genealogies of dominant theoretical approaches and explore the ways in which theorists contend with these approaches when confronting the central questions of both modernity and the discipline. M 3:30–5:20

[SOCY 543b^U/WGSS 629b, Demography, Gender, and Health]**SOCY 545a^U, Sociology of Markets** Frederick Wherry, Devin Singh

This seminar explores the links between social networks and employment discrimination, religion and wealth, social relationships and financial troubles, culture and industry, and the moral dimensions of selling organs and intimacy. W 2:30–4:20

[SOCY 547a^U, Gender, Race, and Genetic Testing]**SOCY 548b^U/AFST 548b^U, Islamic Social Movements** Jonathan Wyrzten

Social movement and network theory used to analyze the emergence and evolution of Islamic movements from the early twentieth century to the present. Organization, mobilization, and framing of political, nonpolitical, militant, and nonmilitant movements; transnational dimensions of Islamic activism. Case studies include the Muslim Brotherhood, Hamas, Hizbollah, Al-Qaeda, Al-Adl wa-Ihsann, and Tablighi Jama’at. T 1:30–3:20

[SOCY 550a, A Secular Age?]**[SOCY 551b, Comparative and Historical Methods]**

[SOCY 552a^U/LAW 20583, **Punishment and Inequality**]

SOCY 554a/b, Research Topics on Human Nature and Social Networks

Nicholas Christakis

This full-year seminar focuses on ongoing research projects in human nature, behavior genetics, social interactions, and social networks. TH 12:30–2

[SOCY 555b^U, **Social Dimensions of Medicine and Health**]

[SOCY 557b, **Political Sociology**]

[SOCY 558b, **Topics in Social Stratification**]

[SOCY 559a^U/AFST 582a^U, **Comparative Nationalism in North Africa and the Middle East**]

SOCY 560a,b/PLSC 734a,b, Comparative Research Workshop

Jonathan Wrytzen, Emily Erikson

This weekly workshop is dedicated to group discussion of work-in-progress by visiting scholars, Yale graduate students, and in-house faculty from Sociology and affiliated disciplines. Papers are distributed a week ahead of time and also posted on the Web site of the Center for Comparative Research (www.yale.edu/ccr). Students who take the course for a letter grade are expected to present a paper-in-progress the term that they are enrolled for credit. T 11:50–1:20

[SOCY 561b^U, **Civil Society in China**]

[SOCY 562a, **Topics in Cultural Sociology**]

SOCY 563b^U/AFST 573b^U, Imperialism, Insurgency, and State Building in the Middle East and North Africa Jonathan Wrytzen

The historical evolution of political order from Morocco to Central Asia in the past two centuries. Focus on relationships among imperialism, insurgency, and state building. Ottoman, European, and nationalist strategies for state building; modes of local resistance; recent transnational developments; American counterinsurgency and nation-building initiatives in the region. T 9:25–11:15

[SOCY 564a, **Relationalism and Formalism in Contemporary Social Theory**]

[SOCY 565, **Advanced Seminar in Cultural Sociology**]

[SOCY 566b, **Philosophy of the Social Sciences**]

SOCY 567a, Postcolonial Social Theory Jonathan Wrytzen

A critical survey of and engagement with key postcolonial theorists that asks how postcolonial/postorientalist critiques should inform social scientific theory, method, and practice. Emphasis on the social and historical context in which theory was produced, how debates have changed over time, and how theories can be operationalized in social scientific research on a range of topics including development, state formation, empire and colonialism, immigration, gender, race, ethnicity, and nations and nationalism.

T 9:25–11:15

[SOCY 570b, **Social Theory: Trauma and Memory**]

[SOCY 573b, **Social Capital and Small Group Processes**]

[SOCY 576a^U, **Civil Society and Democracy**]

SOCY 578a, Logic of Empirical Social Research Matthew Mahler

The seminar is an intensive introduction into the methodology of the social sciences. It covers such topics as concepts and indicators, propositions and theory, explanation and understanding, observation and measurement, methods of data collection, types of data, units of analysis and levels of variables, research design inference, description and causal modeling, verification and falsification. The course involves both the study of selected texts and the analysis and evaluation of recent research papers. TH 9:25–11:25

SOCY 580a^U, Introduction to Methods in Quantitative Sociology Vida Maralani

Introduction to methods in quantitative sociological research. Covers data description; graphical approaches; elementary probability theory; bivariate and multivariate linear regression; regression diagnostics. Includes hands-on data analysis using Stata. T 1:30–3:20

SOCY 581b, Intermediate Methods in Quantitative Sociology Vida Maralani

Second part of a two-term introduction to statistical analysis for quantitative social science research. Covers review of linear regression; introduction to models for categorical and count data, the analysis of time data, and longitudinal data; overview of missing data and weighting; and discussion of data that are complicated by issues of nonrandom design. Prerequisite: SOCY 580a. T 2:30–3:45, 1 HTBA

[SOCY 582a, **Statistics III: Advanced Quantitative Analysis for Social Scientists**]

[SOCY 583b, **Ethnography of the African American Community**]

[SOCY 585a, **Sociology of the Life Course**]

[SOCY 589b^U, **Classical Social Theory: The Marx-Weber Debate**]

[SOCY 591b^U, **Sociology of the Arts and Popular Culture**]

SOCY 595a,b, Inequality and Life Course Workshop Vida Maralani, Lloyd Grieger, Andrew Papachristos

In this workshop we present and discuss ongoing research work, primarily but not exclusively quantitative analyses. In addition, we address theoretical and methodological issues in the areas of the life course (education, training, labor markets, aging, as well as family demography), social inequality (class structures, stratification, and social mobility), and related topics. TH 12–1:20

SOCY 597a,b, Special Topics in Sociology

Students enroll in Special Topics if they wish to retake a course for credit when there is a new instructor and a substantially different syllabus from the first time they took the course. Only with the permission of the DGS.

SOCY 598a, 599b, Independent Study

By arrangement with faculty. When students register for the course online, the dropdown menu should be completed.

SOCY 602b^U, Poverty and Social Welfare Policy in the United States Lloyd Grierger
Who is poor in America? How has the social safety net evolved over time in the United States? Who is “deserving” of federal assistance? In this course we examine the formation and effectiveness of anti-poverty policies in the United States from a sociological and public policy perspective. Topics include the origins of the modern social safety net, the role of the federal government in constructing and implementing anti-poverty policy, the realities of low-wage work, and the “culture of poverty.” Employment- and family-based policy strategies for alleviating poverty are considered. Applied understanding of quantitative social science research methods is helpful, but not required. W 1:30–3:20

[**SOCY 610b^U/WGSS 745b^U, Race, Gender, and the African American Experience**]

SOCY 612b, Agency and Action Julia Adams

The massive turn toward agency and action in the social sciences is the topic of this seminar. We survey the range of theoretical approaches as they play out across various empirical sites, including politics, firms, social movements, and everyday life. The course allots generous space for students to engage the implications of the material for their own research interest. W 9:25–11:15

[**SOCY 614b, Sociology of the Family and Kinship**]

[**SOCY 616a, Urban Ethnography**]

[**SOCY 620a^U, Material Culture and the Iconic Consciousness**]

SOCY 625a, Analysis of Social Structure Scott Boorman

Emphasizing analytically integrated viewpoints, the course develops a variety of major contemporary approaches to the study of social structure and social organization. Building in part on research viewpoints articulated by Kenneth J. Arrow in *The Limits of Organization* (1974), by János Kornai in an address at the Hungarian Academy of Sciences published in 1984, and by Harrison C. White in *Identity and Control* (2nd ed., 2008), four major species of social organization are identified as focal: (1) social networks, (2) competitive markets, (3) hierarchies/bureaucracy, and (4) collective choice/legislation. This lecture course uses mathematical and computational models – and comparisons of their scientific styles and contributions – as analytical vehicles in coordinated development of the four species. M 9:25–11:15

SOCY 628a,b, Workshop in Cultural Sociology Jeffrey Alexander, Philip Smith, Frederick Wherry

This workshop is designed to be a continuous part of the graduate curriculum. Meeting weekly throughout both the fall and spring terms, it constitutes an ongoing, informal seminar to explore areas of mutual interest among students and faculty, both visiting and permanent. The core concern of the workshop is social meaning and its forms and processes of institutionalization. Meaning is approached as both structure and performance, drawing not only on the burgeoning area of cultural sociology but on the humanities,

philosophy, and other social sciences. Discussions range widely among methodological, theoretical, empirical, and normative issues. Sessions alternate between presentations by students of their own work and by visitors. Contents of the workshop vary from term to term, and from year to year. Enrollment is open to auditors who fully participate and for credit to students who submit written work. F 11–1

SOCY 629b^U, Politics of Reproduction Rene Almeling

Reproduction as a process that is simultaneously biological and social, involving male and female bodies, family formation, and powerful social institutions such as medicine, law, and the marketplace. Sociological research on reproductive topics such as pregnancy, birth, abortion, contraception, infertility, reproductive technology, and aging. Core sociological concepts used to examine how the politics of reproduction are shaped by the intersecting inequalities of gender, race, class, and sexuality. W 2:30–4:20

SOCY 630a,b/AFAM 773a,b, Workshop in Urban Ethnography Elijah Anderson

The ethnographic interpretation of urban life and culture. Conceptual and methodological issues are discussed. Ongoing projects of participants are presented in a workshop format, thus providing participants with critical feedback as well as the opportunity to learn from and contribute to ethnographic work in progress. Selected ethnographic works are read and assessed. M 11:30–1:20

[SOCY 631a, **Sociology of Work**]

[SOCY 632b, **Social Network Analysis**]

[SOCY 636b/E&EB 636b, **Biosocial Science**]

SOCY 647b, Social Processes Scott Boorman

Focus is on identifying and exploring robust alternatives/complements to the rational choice models that have come to dominate so much of the analysis of social (including organizational) processes in recent years. Specifically, emphasis is placed on a range of mathematical models and related analytic approaches originating outside of the rational choice literature—in fields such as social network analysis, evolutionary biology, organization theory, and the law. Possible starting points include the Boorman-Levitt network matching model and its applications to nonprofits and complex statutes; weak ties models of job information transmission and other information transfer in elite social networks; and “garbage can” models of the internal problem-solving dynamics of complex organizations. M 9:25–11:15

SOCY 653b, Workshop in Advanced Sociological Writing and Research

Philip Smith

This class concerns the process of advanced writing and research that converts draft material into work ready for publication, preferably in refereed journals, or submission as a substantial grant proposal. It investigates problem definition, the craft of writing, the structure of argument and data presentation, and the nature of persuasion more generally. The aim is to teach a professional orientation that allows work that is promising to become truly polished and compelling within the full range of sociological genres. Prerequisite: permission of the instructor; participants must enter the class with suitable draft material for group analysis and discussion. W 1:30–3:20

SOCY 656a, Professional Seminar Jeffrey Alexander

This required seminar aims at introducing incoming sociology graduate students to the department and the profession. Yale Sociology faculty members are invited to discuss their research. There are minimum requirements, such as writing a book review. No grades are given; students should take for Audit. Held biweekly. T 4–6

SOCY 658a, Qualitative Research Design Frederick Wherry

This seminar leads students through six biweekly modules on designing and conducting qualitative research. The main goal is to design a publishable paper suitable for a sociological or other scholarly journal. F 1:30–3:20

SPANISH AND PORTUGUESE

82-90 Wall Street, 203.432.5439, 203.432.1151

<http://span-port.yale.edu>

M.A., M.Phil., Ph.D.

Chair

Rolena Adorno

Director of Graduate Studies

Noël Valis

Professors Rolena Adorno, Roberto González Echevarría, Aníbal González-Pérez, K. David Jackson, Noël Valis

Associate Professor Susan Byrne

Assistant Professor Leslie Harkema

Senior Lector Ame Cividanes

Fields of Study

Fields include Spanish Peninsular literature, Spanish American literature, Portuguese and Brazilian literatures.

The doctoral program offers: (1) a concentration in Spanish specializing in a single field of study (medieval, Renaissance/Golden Age, modern Spanish Peninsular, colonial Spanish American, contemporary Spanish American); (2) a joint concentration in Spanish and Portuguese offering the student the opportunity to work in both the Luso Brazilian and Spanish/Spanish American fields. In addition, the department participates in (1) a combined Ph.D. program in Spanish and Portuguese and African American Studies offered in conjunction with the Department of African American Studies and (2) a combined Ph.D. program in Spanish and Portuguese and Renaissance Studies offered in conjunction with the Renaissance Studies Program.

Special Admissions Requirements

Thorough command of the language in which the student plans to specialize and a background in its literature, as well as command of at least one of the three additional languages in which the student will need to fulfill requirements, are required.

Application must include GRE scores, a personal statement, and an academic writing sample in the language of the proposed specialization, not to exceed twenty-five pages in length. Students whose native language is not English must submit scores of the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

The department requires two years of course work, sixteen term courses, a grade of Honors in at least two of these courses each year, and a minimum grade average of High Pass. Course work includes two required courses, SPAN 500, History of the Spanish Language,

and SPAN 790, Methodologies of Modern Language Teaching, and two courses in a related field taken outside the department. Also required are reading knowledge of Latin and a second appropriate language. In the third year, the student is expected to pass the qualifying examination (written and oral components) and submit and receive approval of the dissertation prospectus. Upon completion of all predissertation requirements, including the dissertation prospectus, students are admitted to candidacy for the Ph.D. The entire program, including the dissertation, can be completed in five years.

Participation in the department's teaching and pedagogy program is a degree requirement. It consists of taking the required course SPAN 790 in the second year and teaching one section per term of a course in the beginning language sequence during the third and fourth years of study. Viewed as an integral part of the course of study for the doctorate, this program includes supervision by the director of the language program and course directors.

Combined Ph.D. Programs

SPANISH AND PORTUGUESE AND AFRICAN AMERICAN STUDIES

The Department of Spanish and Portuguese also offers, in conjunction with the Department of African American Studies, a combined Ph.D. in Spanish and Portuguese and African American Studies. For further details, see African American Studies.

SPANISH AND PORTUGUESE AND RENAISSANCE STUDIES

The Department of Spanish and Portuguese also offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in Spanish and Portuguese and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Degree Requirements under Policies and Regulations. Additionally, students in Spanish and Portuguese are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.) The M.A. en route is awarded upon the satisfactory completion of eight term courses and two of the three language requirements (Latin and one other language).

Courses

PORT 925a, Brazilian Modernist Poetry K. David Jackson

This course studies the generation of major poets who were part of Brazilian modernism, centered on the "Modern Art Week" of 1922 and the poetry written to express the individuality and character of Brazil's language and culture at the onset of modernization, urbanization, and industrialization. Major poets include Manuel Bandeira, Carlos Drummond de Andrade, Cecília Meireles, Murilo Mendes, Mário de Andrade, Raul Bopp, Luís Aranha, Oswald de Andrade, Jorge de Lima, and Vinícius de Moraes. Points of analysis include form, use of language, themes of memory and modernization, cultural characterization, humor, and ethical and existential concerns. W 1:30–3:20

PORT 964b, Machado de Assis: The Literary World K. David Jackson

A study, in translation, of the novelistic world of J.M. Machado de Assis (1839–1908), considered the master of the Brazilian novel, examining his philosophical stance (skepticism and Menippean satire), narrative innovations (use of graphics, emblems, emptying content, etc.), social critique, encyclopedic referentiality, and contributions to modern prose. We read selected short stories and novels as well as critical essays and studies of Machado's five major novels (called "Carioca quintet"). Students with Portuguese may read in the original. M 1:30–3:20

PORT 991a, Tutorial

By arrangement with faculty.

PORT 991b, Tutorial

By arrangement with faculty.

SPAN 528a, Novels in Renaissance Spain Susan Byrne

A study of various forms of "novel" in Renaissance Spain. We read the works and study the development of the form. Primary texts to be read are *Cárcel de amor* (Diego de San Pedro), *La Celestina* (Fernando de Rojas), *Lazarillo de Tormes* (anonymous), *La Galatea* (Miguel de Cervantes), *La vida del Buscón* (Francisco de Quevedo), *La Dorotea* (Lope de Vega), and *El Criticón* (Baltasar Gracián). In Spanish. TH 3:30–5:20

SPAN 713a, Spain and the Romantic Mode Leslie Harkema

Was there such a thing as Spanish Romanticism? The seminar takes up this often-posed question, analyzing and interrogating prevailing understandings of Western intellectual history, international influence, and periodization that often differentiate or even estrange romanticism in Spain from its manifestations elsewhere in Europe. The course begins with discussion of the rise of romanticism in Germany (and the role played by medieval Spanish literature in the development of that movement) and the response to it by Spanish literary critics and artists in the early nineteenth century (Böhl de Faber, Blanco White, Larra, Espronceda, Saavedra). It then moves on to the height of Spanish romantic poetry in the late 1800s (Bécquer, de Castro), concluding with an evaluation of even more belated, twentieth-century texts that explicitly or implicitly identify themselves with romantic characteristics (Cernuda, Díaz Fernández). In Spanish. T 1:30–3:20

SPAN 750a, Spanish Narrative in Transition (1975–1995) Noël Valis

On the literary production of post-Franco Spain (1975–1995). The course focuses on the cultural-historical landscape in which these novels appeared and their narrative art. Authors include Carmen Martín Gaité, Javier Marías, Antonio Muñoz Molina, Rosa Montero, Juan Marsé, and others. In Spanish. M 1:30–3:20

SPAN 790b, Methodologies of Modern Language Teaching Ame Cividanes

Preparation for a teaching career through readings, lectures, classroom discussions, and presentations on current issues in foreign/second language acquisition theory and teaching methodology. Classroom techniques at all levels. In Spanish. M 3:30–5, practicum M 5–6:30

SPAN 812b, The Polemics of Possession in Early Spanish American Narrative

Rolena Adorno

Fundamental writings on the Spanish Indies from Columbus's "Letter of Discovery" of 1493 to the writings by authors of indigenous American heritage in the first quarter of the seventeenth century: their observations of New World realities, their debates about the meanings and rights of Spanish sovereignty, and their literary relationships to one another. The concept of "the polemics of possession"—their varied claims to territorial, political, cultural, and/or literary authority—orients the readings of the seminar. Prose texts by Cristóbal Colón, Hernán Cortés, Bartolomé de las Casas, Juan Ginés de Sepúlveda, Hernán Pérez de Oliva, Álgar Núñez Cabeza de Vaca, Bernal Díaz del Castillo, El Inca Garcilaso de la Vega, and Felipe Guaman Poma de Ayala are complemented by Alonso de Ercilla's enduring narrative epic poem. In Spanish. T 1:30–3:20

SPAN 913b/CPLT 940b, Magical Realism and Its Sequels in Modern Latin American Fiction Roberto González Echevarría

The course concentrates on the major writers who practiced what is called "magical realism"—Alejo Carpentier, Gabriel García Márquez, Carlos Fuentes, and others—after studying the trend's antecedents in the colonial, post-independence, and early twentieth century. The role of Jorge Luis Borges in the beginnings of magical realism, the works of writers such as Miguel Ángel Asturias and Juan Rulfo, and those of more recent writers who rejected the trend, such as Roberto Bolaño and Fernando Vallejo. The considerable critical corpus on the topic is studied. In Spanish. W 3:30–5:20

SPAN 919b, *Modernismo: Literatura, periodismo, filología* Aníbal González-Pérez

A comprehensive study of the first autonomous Spanish American literary movement and its foundational role in modern Spanish American literature. *Modernismo's* cosmopolitanism and its relation to the discourses of philology, journalism, and literature are examined through readings of *modernista* poetry, novels, short stories, essays, and *crónicas*. Authors include Delmira Agustini, Rubén Darío, Manuel Díaz Rodríguez, Julián del Casal, Enrique Gómez Carrillo, Manuel Gutiérrez Nájera, Julio Herrera y Reissig, Enrique Larreta, Leopoldo Lugones, José Martí, José Enrique Rodó, José Asunción Silva, and José María Vargas Vila. In Spanish. W 1:30–3:20

SPAN 991a, Tutorial

By arrangement with faculty.

SPAN 991b, Tutorial

By arrangement with faculty.

STATISTICS

24 Hillhouse Avenue, 203.432.0666

<http://statistics.yale.edu>

M.A., Ph.D.

Chair

Harrison Zhou

Directors of Graduate Studies

John Emerson (24 Hlh, john.emerson@yale.edu)

David Pollard (24 Hlh, david.pollard@yale.edu)

Professors Donald Andrews (*Economics*), Andrew Barron, Joseph Chang, John Hartigan (*Emeritus*), Theodore Holford (*Public Health; Biostatistics*), Peter Phillips (*Economics*), David Pollard, Heping Zhang (*Public Health; Biostatistics*), Hongyu Zhao (*Public Health; Biostatistics*), Harrison Zhou

Associate Professors John Emerson (*Adjunct*), Sekhar Tatikonda (*Electrical Engineering*)

Assistant Professors Jessi Cisewski, Sahand Negahban

Senior Lecturer Jonathan Reuning-Scherer

Fields of Study

Fields comprise the main areas of statistical theory (with emphasis on foundations, Bayes theory, decision theory, nonparametric statistics), probability theory (stochastic processes, asymptotics, weak convergence), information theory, bioinformatics and genetics, classification, statistical computing, and graphical methods.

Special Admissions Requirements

GRE scores for the General Test and for the Subject Test in the area closest to the undergraduate major should accompany an application; for the Ph.D. program, the Math Subject Test is strongly recommended. All applicants should have a strong mathematical background, including advanced calculus, linear algebra, elementary probability theory, and at least one course providing an introduction to mathematical statistics. An undergraduate major may be in statistics, mathematics, computer science, or in a subject in which significant statistical problems may arise. For those whose native language is not English, the Test of English as a Foreign Language (TOEFL) scores are required. This requirement is waived only for applicants who, prior to matriculation at Yale, will have received a baccalaureate degree or its international equivalent from a college or university where English is the primary language of instruction.

Special Requirements for the Ph.D. Degree

There is no foreign language requirement. Students take at least twelve courses, usually during the first two years. The department strongly recommends that students take STAT 551 (Stochastic Processes), STAT 600 (Advanced Probability), STAT 610

(Statistical Inference), STAT 612 (Linear Models), STAT 625 (Case Studies), and STAT 661 (Data Analysis), and requires that students take STAT 626 (Practical Work). Substitutions are possible with the permission of the DGS. For further details, see the departmental Web site. The qualifying examination consists of three parts: a written report on an analysis of a data set, a written examination on theoretical statistics, and an oral examination. The examinations are taken as scheduled by the department, with provision for one subsequent reexamination of one or more parts in the event that a student does not pass the first time. All parts of the qualifying examination must be completed before the beginning of the third year. A prospectus for the dissertation should be submitted no later than the first week of March in the third year. The prospectus must be accepted by the department before the end of the third year if the student is to register for a fourth year. Upon successful completion of the qualifying examination and the prospectus (and meeting of Graduate School requirements), the student is admitted to candidacy. Students are expected to attend weekly departmental seminars.

Master's Degree

M.A. (en route to the Ph.D.) This degree may be awarded upon completion of eight term courses in Statistics with an average grade of HP or higher, and two terms of residence.

Terminal Master's Degree Program Students are also admitted directly to a terminal master's degree program. To qualify for the M.A., the student must successfully complete an approved program of eight term courses in Statistics with an average grade of HP or higher, chosen in consultation with the director of graduate studies (DGS). Full-time students must take a minimum of four courses per term. Part-time students are also accepted into the master's degree program. See Terminal M.A./M.S. Degrees, under Policies and Regulations.

Program information is available online at <http://statistics.yale.edu>.

Courses

STAT 500b^U, Introductory Statistics Jessi Cisewski

An introduction to statistical reasoning. Topics include numerical and graphical summaries of data, data acquisition and experimental design, probability, hypothesis testing, confidence intervals, correlation and regression. Application of statistical concepts to data; analysis of real-world problems. MWF 10:30–11:20

STAT 501–506, Introduction to Statistics

A basic introduction to statistics, including numerical and graphical summaries of data, probability, hypothesis testing, confidence intervals, and regression. Each course focuses on applications to a particular field of study and is taught jointly by two instructors, one specializing in statistics and the other in the relevant area of application. The first seven weeks are attended by all students in STAT 501–506 together as general concepts and methods of statistics are developed. The course separates for the last six and a half weeks, which develop the concepts with examples and applications. Computers are used for data analysis. These courses are alternatives; they do not form a sequence and only one may be taken for credit.

[STAT 501a^U/E&EB 510a^U, Introduction to Statistics: Life Sciences]**STAT 502a^U, Introduction to Statistics: Political Science** Kelly Rader

Statistical analysis of politics, elections, and political psychology. Problems presented with reference to a wide array of examples: public opinion, campaign finance, racially motivated crime, and public policy. TTH 1–2:15

STAT 503a^U, Introduction to Statistics: Social Sciences Jonathan Reuning-Scherer

Descriptive and inferential statistics applied to analysis of data from the social sciences. Introduction of concepts and skills for understanding and conducting quantitative research. TTH 1–2:15

STAT 505a^U, Introduction to Statistics: Medicine Jonathan Reuning-Scherer

Statistical methods relied upon in medicine and medical research. Practice in reading medical literature competently and critically, as well as practical experience performing statistical analysis of medical data. TTH 1–2:15

[STAT 506a^U, Introduction to Statistics: Data Analysis]**STAT 530b^U, Introductory Data Analysis** John Emerson

Survey of statistical methods: plots, transformations, regression, analysis of variance, clustering, principal components, contingency tables, and time series analysis. The R computing language and Web data sources are used. Prerequisite: STAT 500b or 501a or the equivalent, or permission of the instructor. TTH 9–10:15

STAT 538a^U, Probability and Statistics Joseph Chang

Fundamental principles and techniques of probabilistic thinking, statistical modeling, and data analysis. Essentials of probability: conditional probability, random variables, distributions, law of large numbers, central limit theorem, Markov chains. Statistical inference with emphasis on the Bayesian approach: parameter estimation, likelihood, prior and posterior distributions, Bayesian inference using Markov chain Monte Carlo. Introduction to regression and linear models. Computers are used throughout for calculations, simulations, and analysis of data. Prerequisite: differential calculus of several variables; some acquaintance with matrix algebra and computing is assumed. TTH 1–2:15

STAT 541a^U, Probability Theory Harrison Zhou

A first course in probability theory: probability spaces, random variables, expectations and probabilities, conditional probability, independence, some discrete and continuous distributions, central limit theorem, Markov chains, probabilistic modeling. Prerequisite: calculus of functions of several variables. MWF 9:25–10:15

STAT 542b^U, Theory of Statistics Andrew Barron

Principles of statistical analysis: maximum likelihood, sampling distributions, estimation, confidence intervals, tests of significance, regression, analysis of variance, and the method of least squares. Prerequisite: STAT 541a. MWF 9:25–10:15

STAT 551b^U, Stochastic Processes David Pollard

Introduction to the study of random processes, including Markov chains, Markov random fields, martingales, random walks, Brownian motion, and diffusions. Techniques

in probability such as coupling and large deviations. Applications chosen from image reconstruction, Bayesian statistics, finance, probabilistic analysis of algorithms, genetics, and evolution. MW 1–2:15

STAT 600b^U, Advanced Probability David Pollard

Measure theoretic probability, conditioning, laws of large numbers, convergence in distribution, characteristic functions, central limit theorems, martingales. Some knowledge of real analysis is assumed. TTH 2:30–3:45

STAT 610a, Statistical Inference Harrison Zhou

A systematic development of the mathematical theory of statistical inference covering methods of estimation, hypothesis testing, and confidence intervals. An introduction to statistical decision theory. Knowledge of probability theory at the level of STAT 541a is assumed. TTH 10:30–11:45

[STAT 611b, Decision Theory]

STAT 612a^U, Linear Models Taylor Arnold

The geometry of least squares; distribution theory for normal errors; regression, analysis of variance, and designed experiments; numerical algorithms (with particular reference to the R statistical language); alternatives to least squares. Prerequisites: linear algebra and some acquaintance with statistics. MW 11:35–12:50

STAT 625a, Case Studies John Emerson

Statistical analysis of a variety of statistical problems using real data. Emphasis on methods of choosing data, acquiring data, assessing data quality, and the issues posed by extremely large data sets. Extensive computations using R.

STAT 626b, Practical Work

Individual one-term projects, with students working on studies outside the department, under the guidance of a statistician.

STAT 627a and b, Statistical Consulting John Emerson

Statistical consulting and collaborative research projects often require statisticians to explore new topics outside their area of expertise. This course exposes students to real problems, requiring them to draw on their expertise in probability, statistics, and data analysis. Students complete the course with individual projects supervised jointly by faculty outside the department and by one of the instructors. Students enroll for both terms and receive one credit at the end of the year. F 2:30–4:30

[STAT 645b/BIS 692b/CB&B 645b, Statistical Methods in Genetics and Bioinformatics]

STAT 660b^U, Multivariate Statistical Methods for the Social Sciences

Jonathan Reuning-Scherer

An introduction to the analysis of multivariate data. Topics include principal components analysis, factor analysis, cluster analysis (hierarchical clustering, k-means), discriminant analysis, multidimensional scaling, and structural equations modeling. Emphasis is placed on practical application of multivariate techniques to a variety of examples in the

social sciences. Students complete extensive computer work using either SAS or SPSS. Prerequisites: knowledge of basic inferential procedures, experience with linear models (regression and ANOVA). Experience with some statistical package and/or familiarity with matrix notation is helpful but not required. Requirements: regular assignments and a final project. TTH 1–2:15

STAT 661a^U, Data Analysis Jessi Cisewski

By analyzing data sets using the R statistical computing language, a selection of statistical topics are studied: linear and nonlinear models, maximum likelihood, resampling methods, curve estimation, model selection, classification, and clustering. Prerequisite: after or concurrent with STAT 542b. MW 2:30–3:45

[STAT 662a, Statistical Computing]

STAT 664b^U/ENAS 954b^U, Information Theory Andrew Barron

Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithmic complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, redundancy, mutual information, channel capacity. Basic theorems of data compression, data summarization, and channel coding. Applications in statistics. TTH 4–5:15

STAT 665b^U, Data Mining and Machine Learning Taylor Arnold

Techniques for data mining and machine learning are covered from both a statistical and a computational perspective, including support vector machines, bagging, boosting, neural networks, and other nonlinear and nonparametric regression methods. The course gives the basic ideas and intuition behind these methods, a more formal understanding of how and why they work, and opportunities to experiment with machine-learning algorithms and apply them to data. Prerequisite: after or concurrent with STAT 542b.

STAT 667b/AMTH 605b/ENAS 503b, Probabilistic Networks, Algorithms, and Applications

This course examines probabilistic and computational methods for the statistical modeling of complex data. The emphasis is on the unifying framework provided by graphical models, a formalism that merges aspects of graph theory and probability theory. Graphical models: Markov random fields, Bayesian networks, and factor graphs. Algorithms: filtering, smoothing, belief-propagation, sum-product, and junction tree. Variational techniques: mean-field and convex relaxations. Markov processes on graphs: MCMC, factored HMMs, and Glauber dynamics. Some statistical physics techniques: cavity and replica methods. Applications to error-correcting codes, computer vision, bio-informatics, and combinatorial optimization. MW 2:30–3:45

STAT 674b/F&ES 781b, Applied Spatial Statistics Jonathan Reuning-Scherer

An introduction to spatial statistical techniques with computer applications. Topics include spatial sampling, visualizing spatial data, quantifying spatial association and autocorrelation, interpolation methods, fitting variograms, kriging, and related modeling techniques for spatially correlated data. Examples are drawn from ecology, sociology, public health, and subjects proposed by students. Four to five lab/homework

assignments and a final project. The class makes extensive use of the R programming language as well as ArcGIS. TTH 10:30–11:50

[STAT 679a, **High-Dimensional Statistical Estimation**]

[STAT 680a, **Nonparametric Statistics**]

STAT 682a, High-Dimensional Function Estimation Andrew Barron

Modern developments of high-dimensional function estimation, building from classical one-dimensional ingredients. Theory and methods for approximation, estimation, and computation. The blessing and the curse of high-dimensionality. Piece-wise polynomial, sinusoidal, and sigmoidal (artificial neural network) models. Product and ridge-basis models. Selection criteria. Deterministic and stochastic optimization strategies, including gradient methods, greedy algorithms, annealing and the associated theory of evolution of the parameters of the function estimates. Students are responsible for a literature-based theory project/presentation and a computational project/presentation. MW 9–10:15

STAT 690a or b, Independent Study

By arrangement with faculty. Approval of DGS required.

Non-Degree-Granting Programs, Councils, and Research Institutes

ATMOSPHERIC SCIENCE

Advisory Committee Hagit Affek (*Geology & Geophysics*), Sarbani Basu (*Astronomy*), Michelle Bell (*Forestry & Environmental Studies*), William Boos (*Geology & Geophysics*), Alexey Fedorov (*Geology & Geophysics*), Debra Fischer (*Astronomy*), Gary Haller (*Chemical & Environmental Engineering; Chemistry*), Xuhui Lee (*Forestry & Environmental Studies*), Mark Pagani (*Geology & Geophysics*), Ronald Smith (*Geology & Geophysics*), Mitchell Smooke (*Mechanical Engineering & Materials Science; Applied Physics*), Trude Storelvmo (*Geology & Geophysics*), Mary-Louise Timmermans (*Geology & Geophysics*), John Wettlaufer (*Applied Mathematics; Geology & Geophysics; Physics*)

A number of departments of the Graduate School offer courses dealing with the physics, dynamics, and chemistry of the atmosphere, and the interactions of the atmosphere with the biosphere, oceans, and cryosphere, including all biogeochemical cycles. The mathematical and physical science basis for these phenomena is developed in course work and research foci across a range of departments. In order to permit students whose interests lie in the field of atmospheric science to develop an integrated program of studies, an interdisciplinary program is offered. Typical areas of interest included in the scope of the program are theory of weather and climate, computational fluid dynamics, air pollution from industrial and natural sources, urban environmental health, global climatic change, paleoclimatology, hydrometeorology, and dynamics of atmospheric and oceanic motions. The program is individually planned for each student through a faculty adviser system.

Special Admissions Requirements

A student should, on the basis of scientific orientation, seek admission to one of the participating departments. The Department of Geology and Geophysics is the focus for studies of physical and dynamical meteorology, oceanography, and atmospheric chemistry, with allied methods and approaches in the Program on Applied Mathematics. The departments of Applied Physics, Public Health, and Engineering & Applied Science (which includes the programs of Biomedical Engineering, Chemical & Environmental Engineering, Electrical Engineering, and Mechanical Engineering & Materials Science) provide additional courses in environmental health and atmospherically related processes. The Ph.D. and M.Phil. requirements are those of the admitting departments (see entries in this bulletin).

COMBINED PROGRAM IN THE BIOLOGICAL AND BIOMEDICAL SCIENCES (BBS)

Sterling Hall of Medicine L-203A, 203.785.5663

<http://bbs.yale.edu>

Director

Anthony Koleske

Fields of Study

The Yale Combined Program in the Biological and Biomedical Sciences (BBS) offers unprecedented access to Yale's extensive array of bioscience resources, encompassing everything the University has to offer in one comprehensive, interdisciplinary graduate program. BBS has no boundaries, either departmental or geographical. Students therefore have access to courses, seminars, and faculty labs in every department. Moreover, students can participate in research activities anywhere — on the main University campus, West Campus, or the School of Medicine.

Within BBS there are approximately 350 participating faculty, several dozen courses, and a great many seminars from which to choose. BBS is currently divided into seven interest-based “tracks”:

- Biochemistry, Biophysics, and Structural Biology
- Computational Biology and Bioinformatics
- Immunology
- Microbiology
- Molecular Cell Biology, Genetics, and Development
- Molecular Medicine, Pharmacology, and Physiology
- Neuroscience

Students apply to and, upon matriculation, affiliate with one of these seven tracks. It is important to note that, regardless of a student's home track, all courses, faculty, and research opportunities at the University remain available.

Year 1 Each track has a faculty director who helps first-year students select courses and find suitable lab rotations. Students typically take two to three courses per term and conduct two to four lab rotations over the course of the year.

Year 2 Just prior to the start of the second year, students select a thesis adviser in whose lab they will conduct their doctoral research. They also then leave their BBS track and formally join one of twelve Ph.D.-granting programs:

- Cell Biology
- Cellular and Molecular Physiology
- Computational Biology and Bioinformatics
- Experimental Pathology
- Genetics
- Immunobiology
- Interdepartmental Neuroscience Program
- Microbiology

Molecular Biophysics and Biochemistry
 Molecular, Cellular, and Developmental Biology
 Neurobiology
 Pharmacology

Students in year 2 complete the course requirements for the graduate program they have joined, take a qualifying exam, act as teaching assistants in lecture or lab courses, and begin thesis research.

Year 3 and beyond Students focus primarily on thesis research, publishing their results, and presenting their work at scientific meetings.

The average time to degree is 5.5 years.

For the duration of their studies all students receive a stipend, full tuition, and health coverage. Financial support comes from university fellowships, National Institutes of Health (NIH) training grants, and grants from foundations and companies.

Special Admissions Requirements

Entrance requirements to BBS are track-specific but include the following: GRE General Test scores; relevant GRE Subject Test scores (strongly recommended but not a strict requirement); undergraduate major in a relevant biological, chemical, or physical science; three letters of recommendation addressing the student's academic performance and/or laboratory training; and TOEFL exam scores for students whose native language is not English. Track-specific requirements are listed below.

BIOCHEMISTRY, BIOPHYSICS, AND STRUCTURAL BIOLOGY

All applicants are expected to meet general BBS requirements for entrance. Successful applicants will have a firm foundation in the sciences. Desirable courses include biology; biochemistry; general, organic, and physical chemistry; physics; and math. A pertinent GRE Subject Test is strongly recommended.

COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

All applicants are expected to meet general BBS requirements for entrance. In addition, successful applicants will have a strong foundation in the basic sciences such as biology, chemistry, and mathematics. Training in computing/informatics is also essential and should include significant computer programming experience. The GRE Subject Test in cellular and molecular biology, biology, biochemistry, chemistry, computer science, or other relevant discipline is recommended. The MCAT is also accepted.

IMMUNOLOGY

All applicants are expected to meet general BBS requirements for entrance. In addition, successful applicants are expected to have a firm foundation in the biological and physical sciences. It is preferred that students have taken courses in biology, organic chemistry, biochemistry, genetics, cell biology, physics, and mathematics. Actual course requirements are not fixed, however, and students with outstanding records in any area of the biological sciences may qualify for admission. There are no specific grade requirements for prior course work, but a strong performance in basic science courses is of great importance for admission. In special cases the Medical College Admission Test (MCAT) may be substituted.

MICROBIOLOGY

No additional requirements or recommendations.

MOLECULAR CELL BIOLOGY, GENETICS, AND DEVELOPMENT

In addition to general BBS requirements, the GRE Subject Test in Biochemistry, Cell and Molecular Biology, Biology, or Chemistry is recommended.

MOLECULAR MEDICINE, PHARMACOLOGY, AND PHYSIOLOGY

All applicants are expected to meet general BBS requirements for entrance. Successful applicants should have a strong background in the biological, chemical, and/or physical sciences. For example, an undergraduate major/degree in biology, biochemistry, physiology, genetics, chemistry, physics, mathematics, engineering, or computer science could be appropriate. Courses in biology, biochemistry, organic and physical chemistry, and mathematics through elementary calculus are strongly recommended.

NEUROSCIENCE

All applicants are expected to meet general BBS requirements for entrance. Successful applicants will have a firm foundation in the sciences. The Neuroscience track will accept the Medical College Admission Test (MCAT) in lieu of the Graduate Record Examination (GRE) General Test.

Integrated Graduate Program in Physical and Engineering Biology (PEB)

Students applying to the Computational Biology and Bioinformatics track, the Molecular Cell Biology, Genetics, and Development track, the Neuroscience track, or the Biochemistry, Biophysics, and Structural Biology track of the BBS program may also apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and <http://peb.yale.edu> for more information about the benefits of this program and application instructions.

Program materials are available upon request to Bonnie Ellis, Assistant Administrative Director, BBS Program, Yale University, PO Box 208084, New Haven CT 06520-8084; telephone 203.785.5663; fax 203.785.3734; e-mail, bbs@yale.edu; Web site, <http://bbs.yale.edu>.

*Courses***B&BS 503b, RCR Refresher for Senior BBS Students** Anthony Koleske

This course meets the NIH requirement that students receive training in the responsible conduct of research at least every four years. The course has two components: (1) one large-group session is held for all fourth-year BBS students; the main topics are scientific misconduct and authorship; and (2) each Ph.D. program will subsequently host one or two additional sessions just for fourth-year students in its program. Attendance is taken, and students who attend both components of the course receive a grade of Satisfactory. The course is graded Satisfactory/Unsatisfactory.

THE COWLES FOUNDATION

30 Hillhouse Avenue, 203.432.3702

<http://cowles.econ.yale.edu>

Director

Larry Samuelson

The Cowles Foundation for Research in Economics at Yale University has as its purpose the conduct and encouragement of research in economics. The Cowles Foundation seeks to foster the development and application of rigorous logical, mathematical, and statistical methods of analysis. Members of the Cowles research staff are faculty members with appointments and teaching responsibilities in the Department of Economics and other departments. Among its activities, the Cowles Foundation provides financial support for research, visiting faculty, postdoctoral fellowships, workshops, and graduate students. Cowles regularly sponsors conferences and publishes a working paper series and research monographs.

THE ECONOMIC GROWTH CENTER

27 Hillhouse Avenue, 203.432.3610
www.econ.yale.edu/~egcenter

Director

Mark Rosenzweig

The Economic Growth Center is a research organization within the Yale Department of Economics that was created in 1961 to analyze, both theoretically and empirically, economic growth and development. The research program emphasizes the search for regularities in the process of growth and changes in economic structure. In recent years the center has also undertaken new and continuing long-term panel studies and is carrying out randomized field experiments in a number of countries to provide new information on and analyses of the consequences and mechanisms of development. An increasing share of the research involves historical analysis of long-term processes as part of the Economic History Program that is housed in the Economic Growth Center. Current projects in the center include research on technology adoption; microfinance and credit markets; formal insurance; household consumption; investment and demographic behavior; the role of networks; agricultural research and productivity growth; labor markets and the returns to education of women and men; entrepreneurship; income distribution; domestic and international migration; the relationship between trade and development; and international political economy. The center's research faculty hold appointments in the Department of Economics and other departments and schools at Yale, and accordingly have teaching as well as research responsibilities.

The center sponsors a number of activities, including a regular series of workshops on development, trade, and economic history, and provides competitive research grants to graduate students and faculty as well as graduate student fellowships.

The Economic Growth Center Collection, housed in a separate facility at the Center for Science and Social Science Information, is a special collection focused on the statistical, economic, and planning documents of developing countries, including government documents.

The center administers, jointly with the Department of Economics, the Yale master's degree training program in International and Development Economics.

HUMANITIES: MELLON PROGRAM

Director of Graduate Studies

Pamela Schirmeister (pamela.schirmeister@yale.edu)

Advisory Committee Julia Adams (*Sociology*), Dudley Andrew (*Comparative Literature; Film & Media Studies*), Emily Bakemeier (*Deputy Provost; Dean of Faculty Affairs, FAS*), Howard Bloch (*French*), Rüdiger Campe (*German*), Tamar Gendler (*Philosophy*), Daniel Harrison (*Music*), Edward Kamens (*East Asian Languages & Literatures*), Mary Miller (*History of Art*), Marc Robinson (*Theater Studies; English; on leave [Sp]*), Pamela Schirmeister (*Dean for Strategic Initiatives, Yale College, Graduate School of Arts and Sciences, FAS*), Gary Tomlinson (*Music; on leave [Sp]*), Katie Trumpener (*Comparative Literature*)

The Mellon-funded program Re-imagining Humanities Education at Yale runs from 2012 through 2016 and includes related initiatives at the undergraduate, graduate, and postdoctoral levels. Collectively, these initiatives work to address the well-recognized challenges of narrowly focused courses and the effects on the curriculum, and, in particular, the limitations of such courses in preparing graduates for the future and attracting undergraduates in the present. At each level, albeit in different ways, the idea is to establish a flow of new ideas among a community of scholars that would seamlessly extend from those teaching undergraduates through graduate students and postdoctoral fellows, making it possible for students and faculty alike to participate in broader conversations across the humanities disciplines.

Special Admissions Requirement

At the graduate level, the program offers a nondegree course of study for students enrolled in any of Yale's Ph.D. programs in the humanities and humanistic social sciences. Students normally apply to the graduate concentration in their second or third year of study.

Requirements for the Graduate Certificate of Concentration

The program centers on a core seminar, the topic of which changes each year. The core seminars are team-taught, interdisciplinary, yearlong courses aimed at developing students' intellectual breadth beyond the scope of their home discipline. While in the concentration students take between one and three additional courses concomitant with the core seminar. At least one of these courses must be outside of the student's home department or program. During this year, students will work on exam and prospectus preparation for their home department, but students may not teach. Instead they are provided an additional year of University fellowship for the year. In years four through six, students are expected to assist in teaching a total of four courses, one per term. Most students will teach at least one course outside of their home department, a course at the introductory level, and, when possible, will team-teach a course with someone working in another discipline. In years four and beyond, students are also expected to participate in working groups that will be formed within each cohort of the program. The 2015–16 core seminar is the third and final one in the program.

Courses

HUMS 901/AMST 906, (En)Visualizing Knowledge: Text Mining, Mapping,

Network Analysis, and Big Data Inderpal Grewal, Laura Wexler

Digital media and technology have opened an epochal chasm in our ways of knowing, as books, newspapers, libraries, whole universities, and worlds of scholarship are pulled into the digital realm only to reemerge in different forms. Many scholars have begun to explore how this new convergence alters knowledge production, visual culture, theories of representation and visibility, and the many and varied practices of everyday life. Text mining, mapping, network analysis, and big data visualization are among the most powerful forces now manifesting the everyday life world of the globe. This Mellon advanced graduate seminar examines these changes and convergences, investigating the legal, philosophical, scientific, artistic, and social implications of the new modes of creation and transmission of knowledge. Alongside such investigations, we examine existing projects in digital humanities and learn new tools and techniques for research in digital humanities. Students work individually and collaboratively to generate knowledge that can be demonstrated in a final term project.

INSTITUTION FOR SOCIAL AND POLICY STUDIES

77 Prospect Street, 203.432.3234

<http://isps.yale.edu>

Director

Jacob Hacker

Executive Committee Nicholas Christakis, John Dovidio, Heather Gerken, James Levinsohn, Ian Shapiro, Jody Sindelar, Ebonya Washington

The Institution for Social and Policy Studies (ISPS) facilitates interdisciplinary social science inquiry on important public policy subjects in order to advance research, shape policy outcomes, and educate the next generation of policy thinkers and leaders.

Recognizing that important social problems cannot be studied adequately by a single discipline, the Yale Corporation established ISPS in 1968 to stimulate interdisciplinary collaboration within the University. Today, as a hub for interdisciplinary policy research and discussion at Yale, ISPS hosts a number of major programs, including the University Interdisciplinary Center for Bioethics; the Center for the Study of American Politics; the Program in Ethics, Politics, and Economics; and ISPS Health, a new health policy program linking scholars from across the University. Through these programs and other policy initiatives, ISPS sponsors high-level conferences, interdisciplinary faculty seminars, targeted research projects on key policy issues, graduate and undergraduate fellowship programs, postdoctoral appointments, and the undergraduate major in Ethics, Politics, and Economics. ISPS has a particular interest in three broad areas of inquiry: inequality, health care, and the performance of our democratic institutions.

Through our work in these areas and others, ISPS seeks to provide intellectual leadership in the social sciences; foster sound and creative research on public policies of local, national, and international significance; and inform both teaching at Yale and academic and public debates beyond Yale.

INTERNATIONAL SECURITY STUDIES

31 Hillhouse Avenue, 203.432.6242

<http://iss.yale.edu>

Director

Paul Kennedy

International Security Studies (ISS) at Yale was founded in 1988 and is supported by the Smith Richardson Foundation and the Friends of ISS. The Brady-Johnson Program in Grand Strategy, directed by John Lewis Gaddis, operates under ISS's auspices.

Although ISS is not a degree-granting program, its faculty members, fellows, and affiliates write and teach about numerous aspects of international history and world affairs. Their interests range from high politics and economic change to cultural transfer and nongovernmental activism. ISS strives to understand the genealogy of the present through diverse historical and methodological approaches, and to develop and apply holistic insights into the most pressing concerns of global life.

ISS organizes an array of extracurricular activities each academic year. It hosts lectures, dinner debates, conferences, colloquia, and discussion groups. In addition to hosting a running graduate and faculty forum on the historical roots of contemporary issues, ISS provides competitive summer grants to support language training and archival research for Yale students. Postdoctoral fellowships and predoctoral fellowships are available to scholars from other universities. ISS also provides academic fellowships and visiting affiliations to serving members of the U.S. Armed Forces.

Inquiries should be directed to iss@yale.edu or to International Security Studies, Yale University, PO Box 208353, New Haven CT 06520-8353. Further information on ISS can be found at <http://iss.yale.edu>.

JACKSON INSTITUTE FOR GLOBAL AFFAIRS

Horchow Hall, 203.432.6253

<http://jackson.yale.edu>

Director

James Levinsohn (*Global Affairs; School of Management*)

Faculty

For faculty listings, see the section on Global Affairs under Degree-Granting Departments and Programs in this bulletin.

The Jackson Institute for Global Affairs promotes education and scholarship on global affairs at Yale. The institute serves the entire University through courses and core teaching programs in global affairs, career counseling, and public lectures. The institute's mission is to inspire and prepare Yale students for global leadership and service.

Jackson's academic programs are interdisciplinary, embedded in Yale, and designed to help students gain a comprehensive understanding of global affairs. Jackson Institute faculty study, teach, and research global affairs across disciplines ranging from diplomacy to public health and from international finance to law. For a full list of faculty affiliated with Jackson, see <http://jackson.yale.edu/faculty>.

Each year the Jackson Institute hosts Senior Fellows, leading practitioners in government, business, international organizations, the NGO community, and other global affairs fields. Senior Fellows spend a term or full academic year at Yale, teaching classes and mentoring students. For a full list of Senior Fellows, see <http://jackson.yale.edu/senior-fellows>.

Jackson's Career Services Office provides career counseling services to all Yale students interested in careers in public service and other areas of international affairs.

As of 2015, the Jackson Institute is also home to Yale's World Fellows program and the Global Health Initiative.

For more information, visit <http://jackson.yale.edu>, e-mail jackson.institute@yale.edu, or call 203.432.6253.

JUDAIC STUDIES

451 College Street, 203.432.0843

<http://judaicstudies.yale.edu>

Chair

Steven Fraade

Director of Graduate Studies

Steven Fraade [F]

Ivan Marcus [Sp]

Professors John J. Collins (*Divinity; Religious Studies*), Steven Fraade (*Religious Studies*), Paul Franks (*Philosophy; on leave [Sp]*), Christine Hayes (*Religious Studies; on leave [F]*), Hannan Hever (*Comparative Literature; on leave [Sp]*), Yotam Hotam (*Visiting, Religious Studies*), Daniel Lasker (*Visiting, Religious Studies*), Ivan Marcus (*History; Religious Studies; on leave [Sp]*), Paul North (*German*), Moshe Rosman (*Visiting, History*), Maurice Samuels (*French; on leave*), David Sorkin (*History; on leave [F]*), Francesca Trivellato (*History*), Laura Wexler (*Women's, Gender & Sexuality Studies; American Studies*), Robert Wilson (*Divinity; Religious Studies*)

Associate Professors Joel Baden (*Divinity*), Eliyahu Stern (*Religious Studies; History; on leave*)

Senior Research Scholar Margaret Olin (*Divinity; History of Art; Religious Studies*)

Senior Lecturer Peter Cole (*Comparative Literature*)

Lecturers Asaf Angermann (*Philosophy*), Shaun Halper (*History*), Liran Yadgar (*History*)

Senior Lector II Ayala Dvoretzky (*Near Eastern Languages & Civilizations*)

Senior Lector Shiri Goren (*Near Eastern Languages & Civilizations*)

Lector Dina Roginsky (*Near Eastern Languages & Civilizations*)

Judaic Studies offers an interdisciplinary approach to the critical study of the languages, history, literature, religion, and culture of the Jews. Jewish society, texts, ideologies, and institutions are studied in comparative historical perspective in relation to the surrounding societies and cultures.

Graduate-level programs are available through the following departments: History (Ancient, Medieval, and Modern Jewish History), Religious Studies (History and Literature of Ancient Judaism, Medieval and Modern Jewish History), Near Eastern Languages and Civilizations (Northwest Semitic, Hebrew Language and Literature), Comparative Literature (Hebrew and Comparative Literature). Applications are made to a specific department, and programs of study are governed by the degree requirements of that department.

Other resources include the Judaica collection of Sterling Memorial Library and its Judaica bibliographer, the Fortunoff Archive for Holocaust Testimonies, the biweekly

faculty/graduate student Judaic Studies Seminar, several lecture series, postdoctoral fellowships, and graduate fellowships in Judaic Studies.

Program materials are available on request to the director of graduate studies of the department of intended specialization, or to the Chair, Program of Judaic Studies, Yale University, PO Box 208282, New Haven CT 06520-8282, and at <http://judaicstudies.yale.edu>.

Courses

JDST 651b^U/PHIL 617b^U, Critical Theory and the Frankfurt School

Asaf Angermann

This course is an introduction to the thought and writings of the philosophers known as the Frankfurt School, who founded and developed the idea of Critical Theory. Taken in its original meaning as a method or even a practice, rather than a systematic theory, Critical Theory suggests a way of thinking about the interrelations between philosophy and society, culture and politics, and on the complex relation between philosophical concepts and social reality. By reading key texts of Frankfurt School authors such as Adorno, Horkheimer, Marcuse, Benjamin, Kracauer, and Fromm, the course inquires into the meaning of concepts such as critique, history, freedom, individuality, emancipation, and aesthetic experience. T 3:30–5:20

JDST 670/PERS 505, Introduction to Pahlavi (Middle Persian) Oktor Skjaervo

A two-term course. TH 1:30–3:20

JDST 689b^U/HEBR 509b^U, Reading Academic Texts in Modern Hebrew

Dina Roginsky

The course addresses the linguistic needs of English-speaking students who would like to be able to read with ease and accuracy contemporary Hebrew-language scholarship in the fields of Judaic studies, religious studies, history, political science, sociology, Near Eastern studies, and other related fields. Particularly, this course confronts reading comprehension problems through straightforward exposition of the grammar supported by examples from scholarly texts. Conducted in Hebrew. Prerequisite: two years of modern or biblical Hebrew, or permission of the instructor. TTH 11:35–12:50

JDST 692b/HSAR 731b/RLST 798b, Witnessing, Remembrance, Commemoration

Margaret Olin

Memory and its expressions structure and inform many aspects of contemporary visual culture. This seminar pursues readings about memory and witnessing chosen from among the works of such writers as Sigmund Freud, Albert Camus, Frances Yates, Maurice Halbwachs, and the authors of the Book of Genesis, as well as writings about commemoration by James Young and Pierre Nora, among others. Discussions apply these readings to the study of witnessing and memorializing as artistic practices, and examine visual realizations of such works, including some monuments and memorials near campus, but with a nonexclusive emphasis on Jewish examples, such as videos in the Fortunoff archive. Student projects center on theory or on special cases of witnessing or commemoration, ritual, memorial practice, and monuments, whether built, written, aural, electronic, or played out on the streets. M 3:30–5:20

JDST 694a^U/CPLT 575a^U/GMAN 558a^U, Georg Lukács: Literature and Politics

Kirk Wetters, Hannan Hever

Lukács is presented through his complex and multifaceted development as a crucial and enigmatic figure, at once a leading Jewish intellectual and perhaps the most important of all twentieth-century Marxist theorists. Following the Second World War, while he was still alive, his legacy had already become polarized in terms of “young Lukács” vs. “old Lukács,” East vs. West, romantic vs. realist vs. modernist, revolutionary vs. reactionary. Though Lukács’s influence rose and fell in conjunction with the Cold War, key critical terms and methods (such as “reification”) survived and are very much a part of current political problems and contemporary critical approaches (e.g., Jameson, Moretti, Honneth). TH 1:30–3:20

JDST 695/HEBR 563^U, From Biblical to Modern Hebrew Dina Roginsky

This course aims to support students who have reading knowledge of Biblical Hebrew but cannot read or converse in Modern Hebrew. The course concentrates on reading and aims at enabling students to use Modern Hebrew for research purposes. The texts chosen are tailored to students’ particular areas of interest. Prerequisite: two years of Biblical or Modern Hebrew studies, or permission of the instructor. Conducted in English.

JDST 721b^U/RLST 751b^U, Introduction to Judaism in the Ancient World: From Temple to Talmud Steven Fraade

The emergence of classical Judaism in its historical setting. Jews and Hellenization; varieties of early Judaism; apocalyptic and postapocalyptic responses to suffering and catastrophe; worship and atonement without sacrificial cult; interpretations of scriptures; law and life; the rabbi; the synagogue; faith in reason; Sabbath and festivals; history and its redemption. MW 11:35–12:50

JDST 725a^U/RLST 757a^U, The Dead Sea Scrolls and the History of Ancient Judaism:**Legal Polemic and Identity Formation in Ancient Judaism** Steven Fraade

Study focuses on one of the most important of the recently published Dead Sea Scrolls: *Miqsat Manaseh Torah* (4QMMT), which polemically defines the author’s community by distinguishing its religious practices and history from those of its opponents. How does this text elucidate the debates between ancient Jewish groups as reported in second temple and early rabbinic literatures? How does such legal discourse, and its narrative accompaniments, rhetorically contribute to the socio-religious self-understanding of the Qumran covenantal community? Prerequisite: reading fluency in ancient Hebrew. W 9:25–11:15

JDST 736a^U/RLST 746a^U, Midrash Seminar: Rabbinic Interpretations of the Song of Moses (Deuteronomy 32) Steven Fraade

Close reading of the earliest running commentary to Moses’ farewell song in Deuteronomy 32, as found in the collection *Sifre Haazinu*. The rhetoric and early rabbinic methods of scriptural interpretation; the commentary’s place in the history of interpretation and its contributions to the historical study of ancient Jewish society and culture. Prerequisite: reading fluency in ancient Hebrew. TH 9:25–11:15

JDST 760b/RLST 772b, Rabbinics Research Seminar Christine Hayes

An in-depth survey of research debates and of methods and resources employed in the study of classical (pre-Geonic) rabbinic literature of all genres. Required of graduate students in ancient Judaism. Prerequisites: knowledge of Hebrew and Aramaic, ability to read academic Hebrew, and permission of the instructor. T 3:30–5:20

JDST 761a^U/HIST 596a^U/RLST 773a^U, Jewish History and Thought to Early Modern Times Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire. Focus on the formative period of classical rabbinic Judaism and on the symbiotic relationships among Jews, Christians, and Muslims. Jewish society and culture in its biblical, rabbinic, and medieval settings. TTH 11:35–12:50

JDST 774b^U, Jews of East Europe, 1500–1900 Moshe Rosman

This course surveys and analyzes the social, economic, cultural, and political history of the Jews in historical Poland and Russia in the early modern and modern periods.

JDST 785a^U/NELC 592a^U, State and Society in Israel Dina Roginsky

The interplay between state and society in Israel; current Israeli discourse on controversial issues such as civil rights in a Jewish-democratic state, Jewish-Arab relations, right and left politics, orthodoxy, military service, globalization, and multiculturalism. Sociopolitical changes that have taken place in Israel since the establishment of the state led to the reshaping of Israeli Zionist ideology. Conducted in English. MW 11:35–12:50

JDST 790a/HIST 601a/RLST 776a, Jewish History, Thought, and Narratives in Medieval Societies Ivan Marcus

Research seminar that focuses on the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain). TH 9:25–11:15

JDST 832a^U, Zionism Shaun Halper

Introduction to the core ideas of the Zionist movement from the mid-nineteenth century to the mid-twentieth. Focus on internal Jewish debates and criticism of the movement by European and Middle Eastern intellectuals. Social, political, cultural, and messianic ideological strands within the movement and their interpretations of various historical experiences and ideas located in the Jewish tradition.

JDST 837a^U, Twentieth-Century German-Jewish Thought Yotam Hotam

In this course we explore the relations between secular and theological notions in the writings of selected twentieth-century German-Jewish thinkers: Gershom Scholem, Leo Strauss, Hans Jonas, Hannah Arendt, among others. To this end, the course focuses on these scholars' ongoing engagements with topics like godly love, the conflict between reason and revelation, the relations between Judaism and Christianity, this worldliness and transcendence, and mysticism. It then explores how these topics reflect shared interests in questions of modern Jewish identity, the meaning of secularization, faith and crisis, and how, within this modern context, theology becomes for these scholars not only attuned with critical thinking but conducive to it.

JDST 838a^U/CPLT 690a^U/RLST 762a^U, Diaspora, Nationalism, and Sovereignty:

Introduction to Modern Hebrew Literature Hannan Hever

An overview of the poetics, culture, history, and political dynamics of modern Hebrew literature over the past 250 years. No background in Jewish literature and Jewish culture is required. All readings are in English translation. W 3:30–5:20

JDST 844b/HIST 595b/RLST 692b, Introduction to Modern Jewish History:

History and Historiography David Sorkin

This course introduces students to European Jewish history since approximately 1648. It teaches the major historiographical traditions as well as the major themes of European Jewish history. Its audience is students specializing in Jewish history but also other historians who wish to add an understanding of Jewish history to their understanding of Europe. M 3:30–5:20

For course offerings in the Hebrew language and in Israeli society and culture, see Near Eastern Languages and Civilizations.

THE WHITNEY AND BETTY MACMILLAN CENTER FOR INTERNATIONAL AND AREA STUDIES AT YALE

Luce Hall, 203.432.9368
www.yale.edu/macmillan

Director

Ian Shapiro (*Political Science*)

For more than four decades the Whitney and Betty MacMillan Center for International and Area Studies at Yale has been the University's principal institution for encouraging and coordinating teaching and research on international affairs and on societies and cultures around the world. The MacMillan Center endeavors to make understanding the world outside the borders of the United States an integral part of liberal education and professional training at the University. It brings together scholars from all relevant schools and departments to provide insightful interdisciplinary comparative and problem-oriented teaching and research on regional, international, and global issues.

The MacMillan Center provides nine degree programs. The six undergraduate majors include African Studies; East Asian Studies; Latin American Studies; Modern Middle East Studies; Russian and East European Studies; and South Asian Studies. The three graduate degree programs award master's degrees in African Studies, East Asian Studies, and European and Russian Studies. There are joint-degree graduate programs with the schools of Forestry & Environmental Studies, Law, Management, and Public Health. Additionally, the programs offer four graduate certificates of concentration: in African Studies, European Studies, Latin American and Iberian Studies, and Modern Middle East Studies.

The many councils, committees, and programs at the MacMillan Center support research and teaching across departments and professions, support doctoral training, advise students at all levels, and provide extracurricular learning opportunities, as well as funding resources for student and faculty research related to their regions and subject areas. Regional studies programs include African Studies, British Studies, Canadian Studies, East Asian Studies, European Studies, Hellenic Studies, Latin American and Iberian Studies, Middle East Studies, South Asian Studies, and Southeast Asia Studies. Comparative and international programs include the Center for the Study of Globalization; Conflict, Resilience, and Health Program; European Union Studies; Genocide Studies; the Gilder Lehrman Center for the Study of Slavery, Resistance, and Abolition; Global Health; Global Justice; International and Comparative Political Economy; Order, Conflict, and Violence; and the Program on Democracy.

The MacMillan Center's regional councils regularly teach all levels of eight foreign languages (Modern Greek, Hindi, Indonesian, Sanskrit, Swahili, Vietnamese, Yorùbá, Zulu). Together with central MacMillan resources, they collaborate with the Center for Language Study (CLS) in supporting Directed Independent Language Study of another sixty-four languages for undergraduate, graduate, and professional school students. Regional councils and language faculty participate actively in the Cornell, Columbia, and Yale shared course initiative led by CLS, using distance learning technology for Bengali, Modern Greek, Romanian, Tamil, Yorùbá, and Zulu.

The MacMillan Center provides opportunities for scholarly research and intellectual innovation; awards nearly 500 fellowships and grants each year; encourages faculty/student interchange; sponsors some 750 lectures, conferences, workshops, seminars, and films each year (most of which are free and open to the public); produces a range of working papers and other academic publications; and contributes to library collections comprising 1.4 million volumes in the languages of various areas. Through the Programs in International Educational Resources (PIER), the MacMillan Center brings international education and training to educators, K–12 students, and the community at large. The MacMillan Center supports *The MacMillan Report*, an online show that features Yale faculty in international and area studies and their research in a one-on-one interview format. Webisodes can be viewed at www.yale.edu/macmillanreport. The MacMillan Center is also home to *Yale Global Online*.

For details on degrees, programs, and faculty leadership, please consult www.yale.edu/macmillan.

Graduate Certificates of Concentration in Area Studies

GENERAL GUIDELINES — PROGRAM DESCRIPTION

The Whitney and Betty MacMillan Center for International and Area Studies at Yale, through the regional councils on African, European, Latin American and Iberian, and Middle East Studies, sponsors graduate certificates of concentration that students may pursue in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools. The certificate is intended for students seeking to demonstrate substantial preparation in the study of one of four areas of concentration: Africa, Europe, Latin America, and the Middle East.

Candidates for the certificate must demonstrate expertise in the area of concentration through their major graduate or professional field, as well as show command of the diverse interdisciplinary, geographic, and cultural-linguistic approaches associated with expertise in the area of concentration. Admission to the graduate certificate is contingent on the candidate's acceptance into a Yale graduate-degree program. Award of the graduate certificate, beyond fulfilling the relevant requirements, is contingent on the successful completion of the candidate's Yale University degree program.

Application Procedure

Specific requirements of each council are reflected in its application, monitoring, and award procedures. Application forms can be picked up at the relevant council or downloaded from its Web site. Prospective students should submit a completed application form to the relevant council.

Applications may be submitted by students admitted to a graduate program at Yale or during their program of study but no later than the beginning of the penultimate term of study. Each council may set limits on the number of candidates for its program in any given year. For further information, see the council administrator.

Summary of General Requirements

While the general requirements are consistent across all councils of the MacMillan Center, the specific requirements of each council may vary according to the different expertise required for its area of concentration. In addition to the specific requirements, students pursuing the certificate are expected to be actively engaged in the relevant council's intellectual community and to be regular participants at its events, speaker series, and other activities. Serious study, research, and/or work experience overseas in the relevant region is highly valued. The requirements:

1. Six courses in the area of concentration (in at least two different fields).
2. Language proficiency in at least one language relevant to the area of concentration beyond proficiency in English. For some councils and for some individual circumstances, proficiency in two languages beyond English is required.
3. Interdisciplinary research paper focused on the area of concentration.

Further Details on General Requirements

1. Course work

Students must complete a total of six courses focused on the area from at least two different fields including a Foundations Course if designated by the council. Of the remaining five courses only two may be “directed readings” or “independent study.” Please note:

- No more than four courses may count from any one discipline or school.
- Courses from the home field of the student are eligible. Courses may count toward the student's degree as well as toward the certificate.
- Literature courses at the graduate level may count toward the six-course requirement, but elementary or intermediate language courses may not. At the discretion of the faculty adviser, an advanced language course at the graduate level may be counted if it is taught with substantial use of field materials such as literature, history, or social science texts and journals relevant to the area.
- Course work must demonstrate broad comparative knowledge of the region rather than focus on a specific country.
- Course work must demonstrate a grasp of the larger thematic concerns affecting the region, such as environment, migration, or global financial movements.
- Only those courses listed on the Graduate Course Listings provided by the area council may be used to fulfill course requirements. For courses not listed there, please consult the certificate adviser. Non-listed courses may only be counted with prior approval of the council adviser, not after the fact.
- A minimum grade of HP must be obtained or the course will not be counted toward the certificate.
- Only course work taken during the degree program at Yale may be counted toward the certificate.

2. Language proficiency

In the major-area language targeted for meeting the proficiency requirement, students must demonstrate the equivalent ability of two years of language study at Yale with a grade of B+ or better. Language proficiency must encompass reading, writing,

speaking, and listening skills plus grammar. Students may demonstrate proficiency by completing course work, by testing at Yale, or by other means as approved by the council adviser. When a second major language of the region beyond English is required, the relevant council will specify the target level. The typical departmental graduate reading exam is not sufficient for certifying the four-skill language requirement of the certificate.

Normally, when the candidate is a native speaker of one of the area's major languages, he/she will be expected to develop language proficiency in a second major area language.

3. Interdisciplinary research paper

A qualifying research paper is required to demonstrate field-specific research ability focused on the area of concentration. After they have completed substantial course work in the area of concentration, students must seek approval from the council faculty adviser for the research project they propose as the qualifying paper. Normally, the student will submit the request no later than the fourth week of the term in which he or she plans to submit the qualifying paper.

The interdisciplinary research paper may be the result of original research conducted under the supervision of a faculty member in a graduate seminar or independent readings course or in field research related to the student's studies. An M.A. thesis, Ph.D. prospectus, or dissertation may also be acceptable if it is interdisciplinary as well as focused on the area of concentration. The qualifying paper should examine questions concerning the area of concentration in a comparative and/or interdisciplinary context. It should also use relevant international and area-focused resource materials from a relevant region and/or resource materials in the language(s) of a relevant region or regions. Normally the paper should incorporate at least two of the following elements:

- Address more than one country relevant to the area of concentration
- Draw on more than one disciplinary field for questions or analytic approaches
- Address a transregional or transnational theme relevant to the area of concentration

The paper will be read by two faculty members selected in agreement with the council adviser. The readers will be evaluating the paper for the quality of research, knowledge of the relevant literature, and depth of analysis of the topic. The qualifying paper must be fully footnoted and have a complete bibliography. The council adviser may call for a third reader as circumstances warrant.

Progress Reports and Filing for the Award of the Certificate/Qualification

Students should submit a progress report along with a copy of their unofficial transcript to the council faculty adviser at the end of each term. Ideally, this will include a brief narrative describing the student's engagement in the relevant council's intellectual community and participation in its events, speaker series, and the like, as well as any planned or newly completed experience overseas.

A student who intends to file for the final award of the certificate should contact the council no later than the end of the term prior to award. By the fourth week of the term

of the expected award at the latest, the candidate should demonstrate how he/she has or will have completed all the requirements on time.

At the end of the term as grades are finalized, the council will confirm that the candidate is cleared to receive the home degree and has fulfilled all the requirements of the certificate. The final award will require review and clearance by the deputy director of the MacMillan Center.

Pursuit of Two Certificates by a Single Student

No courses may overlap between the two certificates. Any application for two certificates by a single student must robustly fulfill all of the requirements for each of the two certificates. Each certificate must be approved independently by each respective council's certificate adviser.

In addition to the approval of both council advisers, any award of two certificates will require review and approval by the deputy director of the MacMillan Center.

COUNCIL ON AFRICAN STUDIES

The MacMillan Center

309 Luce Hall, 203.432.9903

www.yale.edu/macmillan/african

Graduate Certificate of Concentration in African Studies

Chair

Michael Cappello (*Pediatrics; Public Health*)

Faculty

For faculty listings, see the section on African Studies under Degree-Granting Departments and Programs in this bulletin.

Special Requirements for the Graduate Certificate of Concentration in African Studies

The Graduate Certificate of Concentration in African Studies enables graduate and professional school students in fields other than African Studies to demonstrate interdisciplinary area expertise, language proficiency, and research competence in African Studies. The certificate program is intended to complement existing fields of studies in other M.A. and Ph.D. programs and to provide the equivalent of such specialization for students in departments and schools without Africa-related fields of study. The certificate program is designed to be completed within the time span of a normal Ph.D. residence. Professional school students and M.A. students in the Graduate School may require an additional term of registration to complete the certificate requirements depending on the requirements of specific programs.

The certificate program includes interdisciplinary course work, language study, and research components. The specific requirements are:

1. Successful completion of at least six courses in African Studies from at least two departments or schools, one of which is a core course in African Studies (AFST 764b, Topics in African Studies, or AFST 501a, Research Methods in African Studies).
2. Demonstration of proficiency in an African language.
3. Evidence of research expertise in African Studies. Research expertise may be demonstrated by completion of an interdisciplinary thesis, dissertation prospectus, or dissertation or by completion of a substantive research seminar paper or the equivalent as approved by the faculty adviser.

The certificate courses and research work should be planned to demonstrate clearly fulfillment of the goals of the certificate. Certificate candidates should design their course schedules in consultation with the director of graduate studies for African Studies. Ideally, students should declare their intention to complete the certificate requirements early in their program at Yale. Graduate and professional school students who intend to complete the certificate program must declare their intention to do so no later than during their penultimate term of enrollment.

For course listings, see African Studies under Degree-Granting Departments and Programs in this bulletin.

Program materials are available upon request to the Director of Graduate Studies, Council on African Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail, africanstudies@yale.edu.

COUNCIL ON EAST ASIAN STUDIES

The MacMillan Center
320 Luce Hall, 203.432.3426
<http://ceas.yale.edu>

Chair

Jing Tsu (*East Asian Languages & Literatures; Comparative Literature*)

Faculty

For faculty listings, see the section on East Asian Studies, under Degree-Granting Departments in this bulletin.

The Council on East Asian Studies (CEAS) was founded in 1961 and continues a long tradition of East Asian Studies at Yale. CEAS provides an important forum for academic exploration and support related to the study of China, Japan, and Korea. Its mission is to facilitate the training of undergraduate and graduate students and to foster outstanding education, research, and intellectual exchange about East Asia. For more than fifty years, it has promoted education about East Asia both in the Yale curriculum and through lectures, workshops, conferences, film series, cultural events, and other educational activities open to students, faculty, K–16 educators, and the general public. With nearly thirty core faculty and more than twenty language instructors spanning thirteen departments on campus, East Asian Studies remains one of Yale's most extensive area studies programs. Its interdisciplinary emphasis encourages collaborative linkages across fields and departments and contributes to diversity across the curriculum and in the classroom. Approximately one hundred fifty courses on East Asia in the humanities and social sciences are offered each year.

CEAS administers Bachelor of Arts (B.A.) and Master of Arts (M.A.) programs. While the B.A. program focuses on the study of either a country or an area within East Asia, the M.A. program focuses on the study of China, Japan, or a transnational region in East Asia. Graduates of the East Asian Studies B.A. and M.A. programs have gone on to distinguished careers in the fields of academia, business, nonprofit organizations, and government service. For details on the M.A. program, see the section on East Asian Studies, under Degree-Granting Departments in this bulletin.

Every year, CEAS welcomes domestic and international scholars to campus as guest lecturers, visiting fellows, research scholars, and professors. The CEAS Postdoctoral Associates Program brings talented individuals into the community of scholars at Yale to conduct research and teach advanced undergraduate seminars. East Asian Studies endowments make it possible for CEAS to offer grants and fellowships for Yale students conducting East Asian-related research and language study, as well as to support student organization programming.

Study and research in East Asian Studies at Yale are supported by one of the finest library collections in the country. The Chinese-, Japanese-, and Korean-language print resources in the East Asia Library at Sterling Memorial Library constitute one of the oldest and largest collections found outside of East Asia. The Asian art collection at the Yale University Art Gallery also supports classroom instruction, faculty research, and community outreach activities.

CEAS is committed to providing leadership in the study and understanding of East Asia on campus and in the region through support of educational and outreach activities with emphasis on joint endeavors across institutions both regionally and internationally.

EUROPEAN STUDIES COUNCIL

The MacMillan Center

332 Luce Hall, 203.432.3423

www.yale.edu/macmillan/europeanstudies

Graduate Certificate of Concentration in European Studies

Chair

Francesca Trivellato (*History*)

Faculty and Participating Staff

For faculty listings, see the section on European and Russian Studies under Degree-Granting Departments and Programs in this bulletin.

The European Studies Council promotes research programs on European politics, culture, economy, society, and history. The geographical scope of the council's activities extends from Ireland to Italy, and from Portugal to the lands of the former Soviet Union. The council's definition of Europe transcends conventional divisions between Western, Central, and Eastern Europe, and includes the Balkans and Russia. The U.S. Department of Education has repeatedly designated the council a National Resource Center and a FLAS Center under its HEA Title VI program.

The European Studies Council builds on existing programmatic strengths at Yale while serving as a catalyst for the development of new initiatives. Yale's current resources in European Studies are vast and include the activities of many members of the faculty who have teaching and research specialties in the area. Such departments as Comparative Literature, Economics, English, History, History of Art, Political Science, Slavic Languages and Literatures, and Sociology regularly offer courses with a European focus. These are complemented by the rich offerings and faculty strength of the French, German, Italian, Slavic, and Spanish and Portuguese language and literature departments, as well as the European resources available in the professional schools and other programs, such as Film and Media Studies. By coordinating Yale's existing resources, including those in the professional schools, encouraging individual and group research, and promoting an integrated comparative curriculum and degree programs, the council strongly supports the disciplinary and interdisciplinary study of European regions and their interactions. The council is also home to special programs in European Union Studies, British Studies, Baltic Studies, Russian Studies, and Hellenic Studies; a Polish cultural initiative; and the Center for Historical Enquiry and the Social Sciences (CHESS).

In addition to the M.A. degree program, the council offers students in the University's doctoral and other professional degree programs the chance to obtain a Graduate Certificate of Concentration in European Studies by fulfilling a supplementary curriculum. The undergraduate major in Russian and East European Studies is administered by the Department of Slavic Languages and Literatures.

The benefits provided to the Yale community by the European Studies Council include its affiliation with interuniversity and international organizations that can offer specialized training programs and research grants for graduate students (see <http://studentgrants.yale.edu>), support conferences among European and North American scholars, and subsidize European visitors to Yale. The Fox International Fellowship

Program, for example, offers generous fellowship support to qualified students who undertake research at specified institutions in the United Kingdom, Germany, France, and Russia; and the Geneva Exchange supports Yale doctoral students who wish to study at the Graduate Institute of International and Development Studies in Geneva, Switzerland. Furthermore, the council supplements the regular Yale curriculum with film series, lectures, and seminars by eminent scholars, artists, diplomats, and political officials. The European Studies Council constantly expands its formal connections with a variety of European institutions and regularly hosts a European Union Fellow sponsored by the European Commission.

Fields of Study

European and Slavic languages and literatures; economics; history; music; political science; law; sociology and other social sciences.

Graduate Certificate of Concentration in European Studies

Yale graduate students may pursue the Graduate Certificate of Concentration in European Studies in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools. Candidates will choose to focus on one of two areas of concentration, either (1) Russia and Eastern Europe or (2) Central and Western Europe. Admission is contingent on the candidate's acceptance and matriculation into a Yale graduate-degree program. To complete the certificate, candidates must demonstrate expertise in the area through their major graduate or professional field, as well as show command of the diverse interdisciplinary, geographic, and cultural-linguistic approaches associated with expertise in the area of concentration. In order to be awarded the certificate, a candidate needs to fulfill all requirements detailed below, as well as complete his or her Yale University graduate degree program.

Certificate candidates must comply with the general requirements for all MacMillan Center graduate certificates, as described at www.yale.edu/macmillan/grad_certificates.htm.

ADDITIONAL REQUIREMENTS SPECIFIC TO EUROPEAN STUDIES

1. Minimum L4 language proficiency in two modern European languages, in addition to English. Students wishing to focus on Russia and Eastern Europe must demonstrate knowledge of Russian or an Eastern European language; those focusing on Central and Western Europe must demonstrate knowledge of one of the appropriate languages. Students must demonstrate proficiency in oral (speaking/listening), reading, and writing skills.
2. Six courses in the area of concentration, of which:
 - a. three courses must offer transnational approaches to Europe-related issues, and
 - b. of the remaining three courses, students focusing on Russia and Eastern Europe must take at least one course concerning the nations of Central and Western Europe. For those focusing on Central and Western Europe, at least one course must concern Russia and Eastern Europe.

3. Interdisciplinary research qualifying paper written either in the context of one of the six courses in the area of concentration, or as independent work under faculty supervision. The paper is required to demonstrate field-specific research ability in the area of concentration. After they have completed substantial course work in the area, students must seek approval from the council faculty adviser for the research project they propose as the qualifying paper. Normally, students will submit their proposals no later than the fourth week of the term in which they plan to submit the qualifying paper.

For course listings, see European and Russian Studies under Degree-Granting Departments and Programs in this bulletin.

For more information, write to European Studies Council, Yale University, PO Box 208206, New Haven CT 06520-8206; or call 203.432.3423.

COUNCIL ON LATIN AMERICAN AND IBERIAN STUDIES

The MacMillan Center

232 Luce Hall, 203.432.3422

www.yale.edu/macmillan/lais

Graduate Certificate of Concentration in Latin American and Iberian Studies

Chair

Susan Stokes (*Political Science*)

Professors Rolena Adorno (*Spanish & Portuguese*), Ned Blackhawk (*History; American Studies*), Richard Burger (*Anthropology*), Hazel Carby (*African American Studies; American Studies*), Carlos Eire (*History; Religious Studies*), Eduardo Fernandez-Duque (*Anthropology*), Paul Freedman (*History*), Roberto González Echevarría (*Spanish & Portuguese*), Aníbal González-Pérez (*Spanish & Portuguese*), K. David Jackson (*Spanish & Portuguese*), Gilbert Joseph (*History*), Efstathios Kalyvas (*Political Science*), Daniel Markovits (*Law*), Mary Miller (*History of Art*), Stephen Pitti (*History; on leave*), Susan Rose-Ackerman (*Law; Political Science*), Alicia Schmidt Camacho (*American Studies*), Stuart Schwartz (*History; on leave* [Sp]), Susan Stokes (*Political Science*), Robert Thompson (*History of Art*), Noël Valis (*Spanish & Portuguese*), Frederick Wherry (*Sociology*), Elisabeth Wood (*Political Science*)

Associate Professors Jafari Allen (*Anthropology; African American Studies*), Susan Byrne (*Spanish & Portuguese*), Rodrigo Canales (*Management*), Ana De La O Torres (*Political Science*), Moira Fradinger (*Comparative Literature; on leave* [Sp])

Assistant Professors Vanessa Agard-Jones (*Women's, Gender, & Sexuality Studies*), Ryan Bennett (*Linguistics*), Oswaldo Chinchilla (*Anthropology*), Marcela Echeverri (*History*), Anne Eller (*History*), Leslie Harkema (*Spanish & Portuguese*), Seth Jacobowitz (*East Asian Languages & Literatures; on leave*), Erica James (*History of Art; African American Studies*), Albert Laguna (*American Studies*), Dixa Ramirez (*American Studies; on leave*)

Senior Lectors and Lectors (Spanish & Portuguese) Sybil Alexandrov, Marta Almeida, Maria Pilar Asensio-Manrique, Mercedes Carreras, Ame Cividanes, Fabiana DePaula, Sebastián Díaz, María de La Paz García, Oscar González-Barreto, María Jordán, Rosamaría León, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé, Barbara Safille, Terry Seymour, Margherita Tortora, Sonia Valle, Selma Vital

Others Jane Edwards (*Associate Dean, Yale College*), Jana Krentz (*Curator, Latin American Collection, Library*), Florencia Montagnini (*Senior Research Scientist, Forestry & Environmental Studies*), Nancy Ruth (*Lecturer, Political Science*)

A variety of Latin American Studies options are available for graduate students in history and other humanities disciplines, the social sciences, and the professional schools. Latin American area course offerings are available in twenty-five disciplines with distinct strengths in Anthropology, History, Political Science, and Spanish and Portuguese. Latin Americanist faculty specialize in the Andes (Burger), Brazil (Jackson, Jacobowitz,

Schwartz), the Caribbean (Carby, Echeverri, Eller, Thompson), Central America (Chinchilla, Joseph, Miller, Wood), Colombia (Echeverri), Costa Rica (Wherry), Cuba (Allen, Laguna), Mexico (Canales, De La O Torres, Joseph, Miller, Pitti, Schmidt Camacho), and the Southern Cone (Fradinger, Stokes). F&ES faculty (Ashton, Bell, Berlyn, Clark, Dove, Geballe, Gentry, Mendelsohn, Montagnini) have tropical research interests or participate in educational exchanges with Argentina, Brazil, Chile, Costa Rica, Dominica, Ecuador, Haiti, Honduras, Mexico, Nicaragua, Panama, Peru, and Venezuela. Latin American content courses are also offered in the Schools of Law, Management, and Public Health.

Students may pursue the Graduate Certificate of Concentration in Latin American and Iberian Studies in conjunction with graduate degree programs in the Graduate School of Arts and Sciences and the professional schools. To complete the certificate, candidates must demonstrate expertise in the area through their major graduate or professional field, as well as show command of the diverse interdisciplinary, geographic, cultural, and linguistic approaches associated with expertise in Latin America or Iberia.

Admission is contingent on the candidate's acceptance into a Yale graduate degree program, and award of the certificate, beyond fulfilling the relevant requirements, requires the successful completion of the candidate's Yale University degree program. Active participation in the council's extracurricular and research programs and seminars is also strongly encouraged.

Limited financial resources, such as the LAIS Summer Research grants and Tinker Field Research grants, are available to graduate and professional school students for summer research. Information on grants is available at <http://studentgrants.yale.edu>.

Specific Requirements for the Graduate Certificate of Concentration

Language proficiency The equivalent of two years' study of one language and one year of the other, normally Spanish and Portuguese. Less frequently taught languages, such as Nahuatl, Quechua, or Haitian Creole, may also be considered for meeting this requirement.

Course work Six graduate courses in at least two different disciplines. No more than four courses may count in any one discipline.

Geographical and disciplinary coverage At least two countries and two languages must be included in the course work or thesis.

Research A major graduate course research paper or thesis that demonstrates the ability to use field resources, ideally in one or more languages of the region, normally with a focus on a comparative or regional topic rather than a single country.

The certificate adviser of the Council on Latin American and Iberian Studies will assist graduate students in designing a balanced and coordinated curriculum. The council will provide course lists and other useful materials.

Academic Resources of the Council

The council supplements the graduate curriculum with annual lecture and film series, special seminars, and conferences that bring visiting scholars and experts to campus.

The council also serves as a communications and information center for a vast variety of enriching events in Latin American studies sponsored by the other departments, schools, and independent groups at Yale. It is a link between Yale and Latin American centers in other universities, and between Yale and educational programs in Latin America and Iberia.

The Latin American Collection of the University library has approximately 556,000 volumes printed in Latin America, plus newspapers and microfilms, CD-ROMs, films, sound recordings, and maps. The library's Latin American Manuscript Collection is one of the finest in the United States for unpublished documents for the study of Latin American history. Having the oldest among the major Latin American collections in the United States, Yale offers research opportunities unavailable elsewhere.

Information about the Graduate Certificate of Concentration in Latin American Studies may be requested from the Council on Latin American and Iberian Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; or call 203.432.3422.

COUNCIL ON MIDDLE EAST STUDIES

The MacMillan Center

346 Rosenkranz Hall, 203.436.2553

www.yale.edu/macmillan/cmcs

Graduate Certificate of Concentration in Modern Middle East Studies

Chair

Frank Griffel (*Religious Studies; on leave* [F])

Acting Chair [F]

Kishwar Rizvi (*History of Art*)

Professors Abbas Amanat (*History*), Harold Attridge (*Divinity*), Gerhard Böwering (*Religious Studies*), Adela Yarbro Collins (*Divinity*), John J. Collins (*Divinity*), John Darnell (*Near Eastern Languages & Civilizations*), Stephen Davis (*Religious Studies*), Owen Fiss (*Emeritus, Law*), Steven Fraade (*Religious Studies*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Frank Griffel (*Religious Studies; on leave* [F]), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Christine Hayes (*Religious Studies; on leave* [F]), Hannan Hever (*Comparative Literature; on leave* [Sp]), Frank Hole (*Emeritus, Anthropology*), Marcia Inhorn (*Anthropology*), Anthony Kronman (*Law*), J.G. Manning (*Classics*), Ivan Marcus (*History; on leave* [Sp]), Alan Mikhail (*History; on leave* [Sp]), A. Mushfiq Mobarak (*School of Management*), Robert Nelson (*History of Art*), W. Michael Reisman (*Law*), Maurice Samuels (*French; on leave*), Lamin Sanneh (*Divinity*), Harvey Weiss (*Near Eastern Languages & Civilizations*), Robert Wilson (*Divinity*)

Associate Professors Zareena Grewal (*American Studies; on leave* [F]), Kaveh Khoshnood (*Public Health*), Andrew March (*Political Science*), Kishwar Rizvi (*History of Art*)

Assistant Professors Rosie Bsheer (*History*), Thomas Connolly (*French*), Robyn Creswell (*Comparative Literature; on leave*), Narges Erami (*Anthropology*), Adria Lawrence (*Political Science*), Mark Lazenby (*Nursing*), Julia Stephens (*History*), Jonathan Wyrzten (*Sociology*)

Senior Lecturers and Lecturers Adel Allouche (*History; Religious Studies*), Karla Britton (*Architecture*), Karen Foster (*Near Eastern Languages & Civilizations; History of Art*), Tolga Köker (*Economics*), Saghar Sadeghian (*Council on Middle East Studies*), Kathryn Slanski (*Near Eastern Languages & Civilizations*), Eric van Lit (*Council on Middle East Studies; Religious Studies*)

Senior Lectors (I, II) and Lectors Sarab Al Ani (*Arabic*), Muhammad Aziz (*Arabic*), Ayala Dvoretzky (*Hebrew*), Jonas Elbousty (*Arabic*), Etem Erol (*Turkish*), Shiri Goren (*Hebrew*), Dina Roginsky (*Hebrew*), Farkhondeh Shayesteh (*Persian*)

Librarians and Curators Roberta Dougherty (*Near East Collection*), Ulla Kasten (*Babylonian Collection*), Susan Matheson (*Ancient Art, Yale University Art Gallery*), Elizabeth Payne (*Babylonian Collection*), Nanette Stahl (*Judaica Collection*)

The Council on Middle East Studies is part of the Whitney and Betty MacMillan Center for International and Area Studies. The council brings together faculty and students sharing an interest in the Middle East by sponsoring conferences, discussions, films, and lecture series by scholars from Yale as well as visiting scholars. It provides information concerning grants, fellowships, research programs, and foreign study opportunities. It also administers research projects in a variety of Middle East-related areas.

In addition to the resources of the individual departments, Yale's library system has much to offer the student interested in Middle East studies. Of particular note are the collections of Arabic and Persian manuscripts, as well as large holdings on the medieval and modern Middle East.

The Council on Middle East Studies administers the Middle East Studies National Resource Center at Yale, which is funded by the U.S. Department of Education under HEA Title VI. As a National Resource Center, the council supports a number of projects and activities, including summer- and academic-year language fellowships and an extensive outreach program.

The council also offers a Graduate Certificate of Concentration in Modern Middle East Studies. Students with an interest in the Middle East should first apply to one of the University's degree-granting departments, such as Anthropology, History, Linguistics, Near Eastern Languages and Civilizations, Political Science, Religious Studies, or Sociology, and then apply for the graduate certificate of concentration no later than the beginning of their penultimate term of study.

Graduate Certificate of Concentration in Modern Middle East Studies

The certificate represents acknowledgment of substantial preparation in Middle East Studies, both in the student's major graduate or professional field and also in terms of the disciplinary and geographical diversity required by the council for recognized competency in the field of Middle East Studies. As language and culture are the core of the area studies concept, students are required to attain or demonstrate language proficiency.

REQUIREMENTS

1. Language proficiency: the equivalent of two years of study at a passing grade in one of the four languages of the Middle East—Arabic, Hebrew, Persian, and Turkish.
2. Course work: six graduate courses in at least two different disciplines. No more than four courses may count in any one discipline. Included in these six courses must be an introductory Middle East history course, such as *State and Society and Culture in the Middle East* (taken with special supplemental graduate readings and assignments), and a foundations course, such as *Culture and Politics in the Contemporary Middle East*.
3. Interdisciplinary coverage: both courses and any research project undertaken in lieu of a course must reflect experience of at least two disciplines.
4. Research: a major graduate course research paper, dissertation prospectus, dissertation, or thesis that demonstrates ability to use field resources, ideally in one or more languages of the region.

For more information on the Graduate Certificate and inquiries about Middle East Studies, contact the Council on Middle East Studies, Yale University, PO Box 208206, New Haven CT 06520-8206, or the council e-mail, cmes@yale.edu.

SOUTH ASIAN STUDIES COUNCIL

The MacMillan Center
210 Luce Hall, 203.436.3517
www.yale.edu/macmillan/southasia

Chair

Karuna Mantena (*Political Science*)

Professors Tim Barringer (*History of Art*), Michael Dove (*Forestry & Environmental Studies*), Phyllis Granoff (*Religious Studies*), Inderpal Grewal (*Women's, Gender & Sexuality Studies*), Alan Mikhail (*History; on leave*), Kalyanakrishnan Sivaramakrishnan (*Anthropology*), Shyam Sunder (*School of Management*), Christopher Udry (*Economics*), Steven Wilkinson (*Political Science*)

Associate Professors Nihal DeLanerolle (*School of Medicine*), Ashwini Deo (*Linguistics*), Zareena Grewal (*American Studies; Religious Studies; on leave [F]*), Karuna Mantena (*Political Science*), Andrew Quintman (*Religious Studies; on leave*), Kishwar Rizvi (*History of Art*)

Assistant Professors Rohit De (*History*), Mayur Desai (*Psychiatry/VAMC*), Daniel Keniston (*Economics*), Tamara Sears (*History of Art*), Julie Stephens (*History*), Tariq Thachil (*Political Science*)

Senior Lecturer Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*)

Lecturer Carol Carpenter (*Forestry & Environmental Studies*)

Senior Lectors David Brick (*Sanskrit*), Seema Khurana (*Hindi*), Swapna Sharma (*Hindi*)

Students with an interest in South Asian Studies should apply to one of the University's degree-granting departments, such as Anthropology, History, Political Science, Economics, or Religious Studies. The South Asian Studies Council is part of the MacMillan Center for International and Area Studies. It has been organized to provide guidance to graduate students who desire to use the resources of the departments of the University that offer South Asia-related courses.

The South Asian Studies Council aims to bring together faculty and students sharing an interest in South Asia, and it supplements the curriculum with seminars, conferences, and special lectures by scholars from Yale as well as visiting scholars. It provides information concerning grants, fellowships, research programs, and foreign study opportunities.

Language instruction is offered in Hindi and Sanskrit. Students planning to undertake field research or language study in South Asia may apply to the council for summer fellowship support.

For information and program materials, contact the South Asian Studies Council, Yale University, PO Box 208206, New Haven CT 06520-8206; or see www.yale.edu/macmillan/southasia.

Courses

HNDI 510a^U, Elementary Hindi Seema Khurana, Swapna Sharma

An in-depth introduction to modern Hindi, including the Devanagari script. Through a combination of graded texts, written assignments, audiovisual material, and computer-based exercises, the course provides cultural insights and increases proficiency in understanding, speaking, reading, and writing Hindi. Emphasis placed on spontaneous self-expression in the language. No prior background in Hindi assumed.

510a-1: MTWTHF 10:30–11:20

510a-2: MTWTHF 1:30–2:20

HNDI 520b^U, Elementary Hindi II Swapna Sharma, Seema Khurana

Continuation of HNDI 510a.

520b-1: MTWTHF 10:30–11:20

520b-2: MTWTHF 1:30–2:20

HNDI 530a^U, Intermediate Hindi I Seema Khurana, Swapna Sharma

First half of a two-term sequence designed to develop proficiency in the four language skill areas. Extensive use of cultural documents including feature films, radio broadcasts, and literary and nonliterary texts to increase proficiency in understanding, speaking, reading, and writing Hindi. Focus on cultural nuances and various Hindi literary traditions. Emphasis on spontaneous self-expression in the language. Prerequisite: HNDI 520b or equivalent. MTWTHF 11:30–12:20

HNDI 532a^U, Accelerated Hindi I Swapna Sharma

Development of increased proficiency in the four language skills. Focus on reading and higher language functions such as narration, description, and comparison. Reading strategies for parsing paragraph-length sentences in Hindi newspapers. Discussion of political, social, and cultural dimensions of Hindi culture as well as contemporary global issues. TTH 4–5:15

HNDI 540b^U, Intermediate Hindi II Swapna Sharma, Seema Khurana

Continuation of HNDI 530a, focusing on further development of proficiency in the four language skill areas. Prerequisite: HNDI 530a or equivalent. MTWTHF 11:30–12:20

HNDI 542b^U, Accelerated Hindi II Swapna Sharma

Continuation of HNDI 532a. Development of increased proficiency in the four language skills. Focus on reading and higher language functions such as narration, description, and comparison. Reading strategies for parsing paragraph-length sentences in Hindi newspapers. Discussion of political, social, and cultural dimensions of Hindi culture as well as contemporary global issues. Prerequisite: HNDI 532a or equivalent. TTH 4–5:15

HNDI 550a^U, Advanced Hindi Seema Khurana

An advanced language course aimed at enabling students to engage in fluent discourse in Hindi and to achieve a comprehensive knowledge of formal grammar. Introduction to a variety of styles and levels of discourse and usage. Emphasis on the written language, with readings on general topics from newspapers, books, and magazines. Prerequisite: HNDI 540b or permission of instructor. TTH 4–5:15

HNDI 559b, Hindi Literature and Public Culture Seema Khurana

An advanced language course that develops language skills through selected readings of Hindi literature and the study of popular culture. Focus on the adaptations of literary works of Premchand, Mannoo Bhandhari, Sharat Chandra, and Amrita Pritam in popular culture, cinema, theater, and television dramas. Prerequisite: HNDI 550a or permission of the instructor. TTH 4–5:15

HNDI 598a^u or b^u, Advanced Tutorial Swapna Sharma, Seema Khurana

For students with advanced Hindi language skills who wish to engage in concentrated reading and research on material not otherwise offered by the department. The work must be supervised by an adviser and must terminate in a term paper or its equivalent. Prerequisites: HNDI 540b, and submission of a detailed project proposal and its approval by the language studies coordinator. 1 HTBA

SKRT 510a^u/LING 515a^u, Introductory Sanskrit I David Brick

An introduction to Sanskrit language and grammar. Focus on learning to read and translate basic Sanskrit sentences in the Indian Devanagari script. No prior background in Sanskrit assumed. Credit only on completion of SKRT 520b/LING 525b. MTWTHF 9:25–10:15

SKRT 520b^u/LING 525b^u, Introductory Sanskrit II David Brick

Continuation of SKRT 510a/LING 515a. Focus on the basics of Sanskrit grammar; readings from classical Sanskrit texts written in the Indian Devanagari script. Prerequisite: SKRT 510a/LING 515a. MTWTHF 9:25–10:15

SKRT 530a^u/LING 538a^u, Intermediate Sanskrit I David Brick

The first half of a two-term sequence aimed at helping students develop the skills necessary to read texts written in Sanskrit. Readings include selections from the *Hitopadesa*, *Kathasaritsagara*, *Mahabharata*, and *Bhagavad Gita*. Prerequisite: SKRT 520b or equivalent. MTWTHF 10:30–11:20

SKRT 540b^u/LING 548b^u, Intermediate Sanskrit II David Brick

Continuation of SKRT 530a, focusing on Sanskrit literature from the *kavya* genre. Readings include selections from the *Jatakamala of Aryasura* and the opening verses of Kalidasa's *Kumarasambhava*. Prerequisite: SKRT 530a or equivalent. MTWTHF 10:30–11:20

SKRT 550b^u, Advanced Sanskrit: Dharmasastra David Brick

Introduction to Sanskrit commentarial literature, particularly to *Dharmasastra*, an explanation and analysis of dharma (law or duty). Discussion of normative rules of human behavior; historical traditions of writing on the Indian subcontinent. Prerequisite: SKRT 540b. F 1:30–3:20

SAST 560a, Introduction to Bhakti Literature Swapna Sharma

The goal of this course is to provide an introduction to the medieval bhakti (devotional) literature of north India. A brief introduction to the philosophy of bhakti is followed by a study of some of the rich hagiographical literature that recounts the life and great deeds of the bhakti poets. Students then read selections of the devotional poetry that has been written in honor of Krsna, Rama, and the formless god or Nirguna bhakti. The course

concludes with a section on contemporary expressions of devotion. Among the poets read are Surdas, Mira Bai, Kabir, Tulasi, the Muslim poets Rahim and Raskhan, and the founder of the Sikh tradition, Guru Nanak. All readings are in translation. W 3:30–5:20

SAST 640b^U/PLSC 615b^U, Indian Political Thought Karuna Mantena

This seminar is a historical survey of modern political thought in the Indian subcontinent, with a special focus on the texts, ideas, and debates that have come to shape the theory and practice of Indian democracy. Writings by R.M. Roy, Phule, Naoroji, Vivekananda, Tagore, Aurobindo, Tilak, Savarkar, Iqbal, Gandhi, Ambedkar, MN Roy, Azad, Nehru, and Lohia are considered. Topics include the analysis and critique of colonialism; modernity, tradition, and the challenge of equality; nationalism, diversity, and community; constitutionalism and the rule of law; multiculturalism, secularism, and toleration.

SAST 820b/HIST 896b, Readings in South Asia: Across the Disciplines Rohit De, Julia Stephens

Since the emergence of subaltern studies in the 1980s, South Asian historiography has been dominated by debates over the methods and theory that have come to influence the broader discipline of history. The seminar introduces participants to the major debates in South Asian studies through reading the original texts alongside newer scholarship addressing the themes of bureaucracy, secularism, visual media, political economy, and the environment. M 7–8:50

SAST 900a and b/ANTH 942a and b, Research Seminar in Anthropology of South Asia Kalyanakrishnan Sivaramakrishnan

This seminar is for students preparing to become scholars of South Asia. It consists of systematic reading, analysis, discussion, and writing about the anthropological literature in English. It deals with a selection of key ethnographic monographs that cover important topics and debates in the anthropology of South Asia and India, including caste, class, community, gender, language, development, environment, politics, and popular culture. Students actively prepare and lead discussions and write either a proposal or research paper at the end of the term. The seminar is designed for doctoral students working on South Asia. Others with appropriate background and interests may be admitted with permission of the instructor. M 3:30–5:20

COUNCIL ON SOUTHEAST ASIA STUDIES

The MacMillan Center

311 Luce Hall, 203.432.3431, seas@yale.edu

www.yale.edu/seas

Chair

Michael Dove (*Forestry & Environmental Studies*)

Professors Michael Dove (*Forestry & Environmental Studies*), J. Joseph Errington (*Anthropology*), Benedict Kiernan (*History*), James Scott (*Political Science*), Frederick Wherry (*Sociology*), Mimi Hall Yiengpruksawan (*History of Art*)

Associate Professor Erik Harms (*Anthropology; on leave [F]*)

Lecturers and Lectors (I, II) Dinny Risri Aletheiani (*Southeast Asian Languages*), Carol Carpenter (*Forestry & Environmental Studies*), Amity Doolittle (*Forestry & Environmental Studies*), Quang Phu Van (*Southeast Asian Languages*), Indriyo Sukmono (*Southeast Asian Languages*)

Curators Ruth Barnes (*Indo-Pacific Art, Yale University Art Gallery*), Richard Richie (*Southeast Asia Collection, Yale University Library*)

Yale does not offer higher degrees in Southeast Asia Studies. Instead, students apply for admission to one of the regular degree-granting departments and turn to the Council on Southeast Asia Studies for guidance regarding the development of their special area interest, courses outside their department, and instruction in Southeast Asian languages related to their research interest. Faculty members of the SEAS council are available to serve as Ph.D. advisers and committee members. The council aims to bring together faculty and students sharing an interest in Southeast Asia and supplements the graduate curriculum with an annual seminar series, periodic conferences, and special lectures.

Yale offers extensive library and research collections on Southeast Asia in Sterling Memorial Library, the Economic Growth Center, the Peabody Museum of Natural History, and the Human Relations Area Files. Further information on library resources is available from Richard Richie, Curator, Southeast Asia Collection, Sterling Memorial Library (203.432.1858, rich.richie@yale.edu).

Language instruction is offered to graduate and undergraduate students in two Southeast Asian languages, Indonesian and Vietnamese. The council supports language tables and tutoring in other Southeast Asian languages by special arrangement. Students planning to undertake predissertation field research or language study in Southeast Asia may apply to the council for summer fellowship support.

For information on program activities and participating faculty, contact the Council on Southeast Asia Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail seas@yale.edu; or visit our Web site, www.yale.edu/seas.

Courses

Courses in Indonesian and Vietnamese languages at the elementary, intermediate, and advanced levels are listed in *Yale College Programs of Study*.

INDN 570a/b, Readings in Indonesian Indriyo Sukmono, Dinny Risri Aletheiani
For students with advanced Indonesian language skills preparing for academic performance and/or research purposes. Prerequisites: advanced Indonesian and permission of the instructor.

VIET 570b, Readings in Vietnamese Quang Phu Van
For students with advanced Vietnamese language skills who wish to engage in concentrated reading and research. Prerequisite: permission of the instructor.

INTEGRATED GRADUATE PROGRAM IN PHYSICAL AND ENGINEERING BIOLOGY (PEB)

<http://peb.yale.edu>

peb@yale.edu

Director

Lynne Regan (*Molecular Biophysics & Biochemistry; Chemistry*)

Assistant Director

Dorotyya Noble

Executive Committee Joerg Bewersdorf (*Cell Biology; Biomedical Engineering*), Enrique De La Cruz (*Molecular Biophysics & Biochemistry*), Eric Dufresne (*Mechanical Engineering & Materials Science; Physics; Cell Biology*), Thierry Emonet (*Molecular, Cellular, & Developmental Biology; Physics*), Jonathon Howard (*Molecular Biophysics & Biochemistry; Physics*), Megan King (*Cell Biology*), Andre Levchenko (*Biomedical Engineering*), Kathryn Miller-Jensen (*Biomedical Engineering; Molecular, Cellular, & Developmental Biology*), Simon Mochrie (*Physics; Applied Physics*), Corey O'Hern (*Mechanical Engineering & Materials Science; Physics; Applied Physics*), Thomas Pollard (*Molecular, Cellular, & Developmental Biology; Molecular Biophysics & Biochemistry*), Anna Pyle (*Molecular, Cellular, & Developmental Biology; Chemistry*), Lynne Regan (*Molecular Biophysics & Biochemistry; Chemistry*), Corey Wilson (*Chemical & Environmental Engineering; Biomedical Engineering; Molecular Biophysics & Biochemistry*)

The Yale PEB program brings together faculty from the physical, engineering, and biological sciences, who carry out collaborative, interdisciplinary research and teaching. Participation in the PEB program is open to any graduate student who is interested in applying quantitative, physical approaches to study important biological questions. PEB-participating departments, tracks, and degree-granting programs include Applied Physics; Biochemistry, Biophysics, and Structural Biology (BBS track); Biomedical Engineering; Cell Biology; Chemical & Environmental Engineering; Computational Biology and Bioinformatics (BBS track and also degree-granting program); Mechanical Engineering & Materials Science; Molecular, Cellular, and Developmental Biology; Molecular Cell Biology, Genetics, and Development (BBS track); Neurobiology; Neuroscience (BBS track and also degree-granting program); and Physics.

Upon completion of their Ph.D. in a home department, and satisfaction of the PEB curriculum, students receive a Certificate from the Integrated Graduate Program in Physical and Engineering Biology.

Students interested in participating in the PEB program may indicate their interest on their graduate application for admission to a home department or track. Students may also join the PEB after they have matriculated at Yale. After arriving at Yale, students should e-mail peb@yale.edu to express their interest in the PEB, and the leadership will review their application materials.

PEB students acquire a depth of knowledge in their home department and also a breadth of knowledge across disciplines from PEB courses and activities. They will become skilled at applying physical and engineering methods and quantitative reasoning

to biological problems, and at identifying and tackling cutting-edge problems in the life sciences, and they will be proficient at combining theory and computation with wet lab experiments. In addition, students will become comfortable working in an interdisciplinary and collaborative research environment and adept at communicating with scientists from a variety of disciplines as well as with nonscientists.

PEB Curriculum

The PEB curriculum consists of four core courses, which all students, regardless of their undergraduate background, take together. Methods and Logic in Interdisciplinary Research (MB&B 517/ENAS 517/MCDB 517/PHYS 517) and Integrated Workshop (MB&B 591/ENAS 991/MCDB 591/PHYS 991) are typically taken in the first year. The Integrated Workshop is typically taken by BBS students in place of the third rotation, and by physics and engineering students in place of the Spring Special Investigation (SI). The third course, Biological Physics (ENAS 541/MB&B 523/PHYS 523), and the fourth, either Dynamical Systems in Biology (MCDB 562/AMTH 765/CB&B 562/ENAS 561/MB&B 562/PHYS 562) or Introduction to Dynamical Systems in Biology (MCDB 561/PHYS 561), should be completed by the end of the second year. With permission of the PEB leadership, one of the following three courses may be substituted to satisfy the fourth course requirement: (1) Systems Biology of Cell Signaling (ENAS 567), (2) Bioinformatics: Practical Application of Simulation and Data Mining (MB&B 752/CB&B 752/CPSC 752/MCDB 752), and (3) Genomic Methods for Genetic Analysis (GENE 760).

Two primer courses are also offered (but not required). Boot Camp Biology (MB&B 520) is a primer course for students entering PEB with little or no background in biology, and Mathematical Methods in Biophysics (MB&B 635/ENAS 518) is a primer course for students entering PEB with little or no background in mathematics and computation.

In addition to the formal courses, there are a multitude of enrichment activities available to PEB students; see <http://peb.yale.edu>.

WOMEN'S, GENDER, AND SEXUALITY STUDIES

315 William L. Harkness Hall, 203.432.0845

<http://wgss.yale.edu>

Chair

To be announced

Director of Graduate Studies

Jafari Allen

Professors Elizabeth Alexander (*African American Studies*), Carol Armstrong (*History of Art*), Seyla Benhabib (*Political Science; on leave [Sp]*), Jill Campbell (*English; on leave [F]*), Hazel Carby (*African American Studies; American Studies*), Kang-i Sun Chang (*East Asian Languages & Literatures; on leave [Sp]*), George Chauncey (*History*), Glenda Gilmore (*History; American Studies; African American Studies*), Jacqueline Goldsby (*English; African American Studies*), Inderpal Grewal (*Women's, Gender & Sexuality Studies; American Studies; Anthropology*), Dolores Hayden (*Architecture; American Studies; on leave [Sp]*), Margaret Homans (*English; Women's, Gender & Sexuality Studies*), Marianne LaFrance (*Psychology; Women's, Gender & Sexuality Studies*), Kathryn Lofton (*American Studies; Religious Studies*), Mary Lui (*American Studies; History*), Joanne Meyerowitz (*History; on leave*), Sally Promey (*American Studies; Institute of Sacred Music; Religious Studies*), Alicia Schmidt Camacho (*American Studies*), Michael Warner (*English*), Laura Wexler (*American Studies; Women's, Gender & Sexuality Studies*)

Associate Professors Jafari Allen (*African American Studies; Anthropology*), Crystal Feimster (*African American Studies; American Studies; on leave*), Moira Fradinger (*Comparative Literature; on leave [Sp]*), Zareena Grewal (*American Studies; Religious Studies; on leave [F]*), Karen Nakamura (*Anthropology*), Naomi Rogers (*History of Science & Medicine*)

Assistant Professors Vanessa Agard-Jones (*Women's, Gender & Sexuality Studies*), Rene Almeling (*Sociology*), Joseph Fischel (*Women's, Gender & Sexuality Studies; on leave*), Erica James (*History of Art; African American Studies*), Greta LaFleur (*American Studies; on leave*), Vida Maralani (*Sociology*)

Senior Lecturers Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*), Becky Conekin (*MacMillan Center; History*), Maria Trumpler (*Women's, Gender & Sexuality Studies*)

Lecturers Melanie Boyd (*Women's, Gender & Sexuality Studies*), Karen Foster (*Near Eastern Languages & Civilizations*)

Fields of Study

The Program in Women's, Gender, and Sexuality Studies considers gender and sexuality as fundamental categories of social and cultural analysis and offers critical perspectives upon them as a basis from which to study the diversity of human experience. Gender (the social and historical meanings of the distinction between the sexes) and sexuality (the

domain of sexual practices, identities, discourses, and institutions) are studied as they intersect with class, race, ethnicity, nationality, and other axes of human difference. The introduction of these perspectives into all fields of knowledge necessitates new research, criticism of existing research, and the formulation of new paradigms and organizing concepts.

The Certificate (previously known as the Qualification) in Women's, Gender, and Sexuality Studies is open to students already enrolled in a Ph.D. program at Yale. Interested students are strongly encouraged to register for the certificate by meeting with the director of graduate studies (DGS) during their first year. Students who wish to receive the certificate must (1) complete a graduate course on the theory of gender and sexuality; (2) complete two electives, including one course that must be drawn from the WGSS curriculum; (3) complete one term of WGSS 900, the WGSS Certificate Workshop; (4) demonstrate the capacity to pursue independent, interdisciplinary research in Women's, Gender, and Sexuality Studies by presenting a qualifying paper at a meeting of the WGSS Colloquium; and (5) fulfill a teaching requirement. Each of these requirements must be met in consultation with the DGS and the individual WGSS graduate adviser. Students who fulfill these expectations will receive a letter from the DGS, indicating that they have completed the work for the certificate.

Program information and the requirements for the certificate are available on the Women's, Gender, and Sexuality Studies Web site, or by contacting 203.432.0845 or wgss@yale.edu.

Courses

WGSS 623b/SOCY 523b, Sociology of Sex and Gender Rene Almeling

The course provides students with an introduction to major theoretical approaches to sex and gender, and it covers recent empirical research in key arenas, including care work, sex work, work and family, mothering and fathering, reproductive technologies, and health. TH 2:30–4:20

[WGSS 629b/SOCY 543b^U, Demography, Gender, and Health]

WGSS 633b/AMST 747b/ANTH 594b, Affect and Materiality Kathryn Dudley

Recent scholarship in the fields of affect studies and the new materialisms raises important questions about the ethnographic encounter and the kind of knowledge it produces. Refusing to grant ontological status to classic oppositions between nature/culture, self/other, subject/object, and human/nonhuman, this work encourages anthropologically inclined ethnographers to rethink longstanding assumptions about the composition of the “social” and the “political” in an anthropocentric world that ignores the vulnerabilities and agential capacities of global ecosystems at its peril. Reading across ossifying disciplinary divides, this seminar examines the intellectual projects of writers such as Jane Bennett, Bruno Latour, Lauren Berlant, and Kathleen Stewart, among others. Our objective is to theorize the intersection between public and private feelings and human and nonhuman materiality in ways that bring the political and aesthetic implications of ethnographic research and writing to the fore. TH 1:30–3:20

WGSS 651a^U/ANTH 651a^U, Intersectionality and Women's Health Marcia Inhorn

This interdisciplinary seminar explores how the intersections of race, class, gender, and other axes of "difference" (age, sexual orientation, disability status, nation, religion) affect women's health, primarily in the contemporary United States. Recent feminist approaches to intersectionality and multiplicity of oppressions theory are introduced. In addition, the course demonstrates how anthropologists studying women's health issues have contributed to social and feminist theory at the intersections of race, class, and gender. T 9:25–11:15

WGSS 659a^U/ANTH 655a^U, Masculinity and Men's Health Marcia Inhorn

This interdisciplinary seminar—designed for students in Anthropology; Women's, Gender, and Sexuality Studies; and Global Health—explores in an in-depth fashion ethnographic approaches to masculinity and men's health around the globe. The course begins with two theoretical texts on masculinity, followed by eleven anthropological ethnographies on various dimensions of men's health and well-being. Students gain broad exposure to a number of exigent global men's health issues, issues of ethnographic research design and methodology, and the interdisciplinary theorizing of masculinity scholars in anthropology, sociology, and cultural studies. In particular, the course demonstrates how anthropologists studying men's health issues in a variety of Western and non-Western sites, including the Middle East, Africa, Latin America, and Asia, have contributed to both social theory and ethnographic scholarship of importance to health policy. TH 9:25–11:15

WGSS 667a/HIST 667a, History of Sexuality in Modern Europe Carolyn Dean

This reading class provides an introduction to the various lines of inquiry informing the history of sexuality. The course asks how historians and others constitute sexuality as an object of inquiry and addresses different arguments about the evolution of sexuality in Europe, including the relationship between sexuality and the state and sexuality and gender. T 1:30–3:20

WGSS 701b^U/ANTH 508b^U, Queer Ethnographies Karen Nakamura

Explores both classic and contemporary ethnographies of gender and sexuality. Emphasis on understanding anthropology's contribution to, and relationship with, gay and lesbian studies and queer theory. M 7–8:50

WGSS 712b/AMST 866b/HIST 775b, Readings in the History of Sexuality

George Chauncey

Selected topics in the history of sexuality, especially the emergence of the category of "sexuality" itself and how it has articulated with hierarchies of gender, race, class, age, nation, and empire. The course also considers sexuality as a source of public and personal identity, a component of social organization and subcultural social life, an object of scientific study, government management, and legal regulation, and a site of political and cultural conflict. W 1:30–3:20

WGSS 730b/HIST 943b/HSHM 736b, Health Politics, Body Politics Naomi Rogers

A reading seminar on struggles to control, pathologize, and normalize human bodies, with a particular focus on science, medicine, and the state, both in North America and in a broader global health context. Topics include disease, race, and politics; repression

and regulation of birth control; the politics of adoption; domestic and global population control; feminist health movements; and the pathologizing and identity politics of disabled people. W 1:30–3:20

WGSS 736b/AFAM 709b/AMST 709b/HIST 736b, Research in Twentieth-Century U.S. Political and Social History Glenda Gilmore

Projects chosen from the post-Civil War period, with an emphasis on twentieth-century social and political history, broadly defined. TH 9:25–11:15

[WGSS 745b^U/SOCY 610b^U, Race, Gender, and the African American Experience]

WGSS 751a^U/AMST 869a^U, Photography, History, Memory: Public and Private Lives Laura Wexler

An interdisciplinary seminar that examines the role of photographic representation in archives of public and private memory. We examine the social and expressive functions of photography under the aegis of museums, libraries, art galleries, government, police, and personal albums. Critical theory includes discussions of gender, race, ethnicity, sexuality, class, and nation as they help construct remembering.

WGSS 767/PSYC 777, Research Topics in Gender and Psychology

Marianne LaFrance

The “Gender Lab” meets weekly to consider research being done in the Psychology department that bears on some gender-related issue.

WGSS 768b/AMST 806b/HSAR 723b/RLST 701b, Studies in “New” Materialities:

Agency, Ontology, Embodiment, Cognition Sally Promey

This advanced research course invites students to engage and interrogate a set of “new” ideas about objects and materiality emerging in disciplines as far-ranging as political science, cultural anthropology, ethics, history of art, cognitive science, religious studies, and gender and sexuality studies. One concern is to explore how these ideas, far from being “new,” have a deep, and deeply political, history in relation to Western efforts to make sense of and order the material (and spiritual) world and to mark and distinguish Western modernity and “civilization.” In the second half of the term, research projects take the shape of applying some of these theoretical models to case studies concerning specific objects, bodies, and materials. Note that a course on the same subject is being offered simultaneously at another institution, with students and professors in both courses entering into various sorts of conversation during the term. TH 1:30–3:20

WGSS 783b/FREN 958b, Social Mobility in Contemporary French Literature

Morgane Cadieu

Mobility in the French social landscape and representations of class in contemporary French literature. The question of social change through gender, sexuality, and race; the representation of work and the workplace; the interaction between social class and literary style. Works by Ernaux, Genet, Duras, Eribon, Louis, Angot, Marivaux, Balzac, Mirbeau. Theoretical readings by Rancière, Marx, Bourdieu, Angela Davis, Foucault. Conducted in French. F 1:30–3:20

WGSS 788b/AFAM 736b/HSAR 785b, Bodies and Borders: Psychoanalysis, Race, and Representation Kobena Mercer

Introducing methods from cultural studies, postcolonial studies, and psychoanalysis, this seminar examines representations of black bodies in modern art and visual culture. Abolitionist, Orientalist, and primitivist painting and sculpture are investigated through concepts of fetishism, fantasy, and the gaze, and in light of post-1960s artistic practices addressing interracial border zones as sites of cross-cultural hybridity. Artists include Carl Van Vechten, Wifredo Lam, Adrian Piper, Robert Mapplethorpe, Kara Walker, and Renée Cox; texts include Mikhail Bakhtin, Homi Bhabha, Frantz Fanon, and Griselda Pollock. W 3:30–5:20

WGSS 834b/AFAM 834b/AMST 658b, The Politics of Representation: Visual and Literary Culture and the Black Female Body Hazel Carby

Utilizing collections held in the Yale Art Gallery, the Center for British Art, and the Beinecke Library, this course juxtaposes literary texts and visual culture to create interdisciplinary conversations about the representation of the black female body with particular emphasis on issues of sexuality, gender, and racial formation. F 1:30–3:20

WGSS 900a,b, WGSS Certificate Workshop Jafari Allen

Built around the WGSS graduate Colloquium and Working Group series, with the addition of several sessions on topics of interdisciplinary methodology, theory, and professionalization. Offered in both fall and spring. As of 2014–2015, enrollment in one term of WGSS 900 is required of all students for completion of the certificate in WGSS. Graded Satisfactory/Unsatisfactory. For further information, contact the instructor at jafari.allen@yale.edu.

YALE CENTER FOR THE STUDY OF GLOBALIZATION

Betts House, 203.432.1900, globalization@yale.edu
www.ycsg.yale.edu

Director

Ernesto Zedillo

The Yale Center for the Study of Globalization (YCSG) is devoted to examining the impact of our increasingly integrated world on individuals, communities, and nations. The center's purpose is to support the creation and dissemination of ideas for seizing the opportunities and overcoming the challenges resulting from globalization's impact on the world's people and places. The center also studies problems that, even if they do not result directly from globalization, are global in nature and can therefore be effectively addressed only through international cooperation. In pursuit of this mission, and to assist in Yale's effort to become a more international institution, the core of our strategy is collaboration both with the Yale community and with a variety of institutions and individuals across the globe.

One of the center's strengths, and an important area of focus, is its ability to engage with multilateral institutions and global organizations in activities pertinent to its mission, thereby connecting academia with the world of public policy. Through these projects, YCSG produces reports, policy papers, and other publications that contribute toward influencing the attitudes and actions of policy makers, academics, and institutions. Natural opportunities exist to present the results of this work at Yale through seminars, colloquia, and public lectures.

The center's strategy comprises four pillars. First, we focus on issues that are truly core to globalization, like international trade, global finance, inclusion, and the provision of key global public goods. Second, relying on a diversity of means—from closed brainstorming sessions among highly specialized thinkers to large multidisciplinary conferences—the center serves at Yale as a catalyst for debate and cutting-edge thought with a view to generate policy-relevant proposals. Third, in addition to our priority task of interacting with the Yale community, we seek actively to collaborate with a variety of institutions and individuals across the globe to leverage our own resources, reinforce the policy pertinence of our work, and support Yale's internationalization efforts. And fourth, in the endeavor of disseminating critical analysis and stirring constructive debate, we apply ourselves to reach not only the academic and policy worlds with printed publications, but also to communicate with a wide audience of informed citizens around the world.

On campus, the center hosts international conferences, organizes workshops and panels, and works constantly to bring to the Yale community individuals who have input on international policy. YCSG's Distinguished Visiting Fellows interact with faculty and students and are expected to produce one or more publications during their tenure.

YALE CLIMATE AND ENERGY INSTITUTE

<http://climate.yale.edu>

Director Mark Pagani

The Yale Climate and Energy Institute (YCEI) seeks to understand Earth's climate system, energy resources, and the ecological, economic, and social consequences of changing climate and energy regimes. Interdisciplinary research and teaching supported by YCEI aim at helping the world mitigate and adapt to climate change, while satisfying future energy needs, with practical solutions and policies that can be implemented at local, regional, or global levels.

YCEI activities consist of core programs and focused research initiatives. Core programs include postdoctoral fellowships, seed grants for interdisciplinary research, grants for workshops and symposia, and an Energy Studies program for undergraduates.

YALE INITIATIVE FOR THE STUDY OF ANTIQUITY AND THE PREMODERN WORLD

401 Phelps Hall
www.yale.edu/yisap

Graduate Coordinators

Edward Kamens (*East Asian Languages & Literatures*)

J.G. Manning (*Classics; History*)

Steering Committee (2015–18) Joel Baden (*Divinity*), Ruth Barnes (*Art Gallery*), Oswald Chinchilla (*Anthropology*), John J. Collins (*Divinity*), Steven Davis (*Religious Studies*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Milette Gaifman (*Classics; History of Art*), Edward Kamens (*East Asian Languages & Literatures*), Noel Lenski (*Classics; History*), J.G. Manning (*Classics; History*), Susan Matheson (*Art Gallery*), Irene Peirano Garrison (*Classics*)

The Yale Initiative for the Study of Antiquity and the Premodern World (YISAP) aims to bring together faculty and students sharing an interest in antiquity and the premodern. It supplements the curriculum with seminars, conferences, and special lectures by scholars from Yale as well as visiting scholars, and offers a graduate qualification. Students with an interest in YISAP should apply to one of the University's degree-granting departments, and should meet the entrance standards of the admitting department. Departments and schools currently participating in YISAP are Classics, East Asian Languages and Literatures, History, History of Art, Judaic Studies, Near Eastern Languages and Civilizations, Religious Studies, and the Divinity School; students from other relevant units should contact the YISAP graduate coordinators.

The qualification program provides enhanced training to graduate students with wide-ranging interests in the ancient and premodern world to extend their studies beyond departmental lines. Program students are expected to fulfill the requirements of the home department, but their course of study is individually modified to allow for interdisciplinary work through classes, examinations, and guidance by faculty in several departments.

Graduate students who are enrolled in and funded by participating departments will earn a qualification upon satisfactory completion of the requirements. Students should apply to the department that coincides best with their backgrounds and their prospective areas of specialization, and they should indicate an interest in the interdepartmental program at the time of their application to that department. Students in participating Ph.D. programs earn the qualification en route to the doctorate. The qualification in YISAP is open to Yale Ph.D. students and to students at the Divinity School.

A program of study for completion of the qualification must include the Core Seminar—or, in special cases, an approved alternative seminar—introducing students to issues in the study of the premodern world. In addition, a minimum of three other courses plus a capstone project is required, the courses to be selected in consultation from offerings of advanced language study and seminars related to the premodern world at the graduate level. The course of study must be approved by YISAP's graduate coordinator and by

the director of graduate studies (DGS) of the student's home department, who together with the student will lay out a blueprint for completing the requirements, articulating a field of concentration and a direction for the capstone project, and identifying potential mentors.

Requirements for the Qualification

1. A team-taught Core Seminar – or, in special cases, an approved alternative seminar – introducing students to issues in the study of antiquity and the premodern world, from a cross- and multidisciplinary perspective. Initiative students normally take the Core Seminar in the first year of study. Offered each year in the spring, the seminar is normally a team-taught class sponsored by two or more of the cooperating departments. There will be supplementary sessions in the Yale collections (e.g., the Yale Art Gallery or the Beinecke) and a required monthly colloquium component. Specific topics vary, but each seminar has significant interdisciplinary and comparative dimensions emphasizing the methodologies and techniques of the fields involved.
2. A minimum of three pre-approved courses, of which at least two must be seminar or seminar-type courses, chosen in consultation with YISAP's graduate coordinator and the DGS of the student's home department from courses offered across the University. These will in most cases be courses that also fill requirements for the student's home department, and must be at a level that would normally be accepted for graduate study in that department.
3. A capstone project that demonstrates the student's capacity to pursue independent, interdisciplinary research (the equivalent of 1 or 2 course units, depending on the scope), to be approved in consultation with YISAP's graduate coordinator and the DGS of the student's home department (e.g., an exhibition, documentary, research paper, conservation project).
4. Regular participation in events hosted by YISAP throughout the academic year, especially the monthly meetings of the Ancient Societies Workshop.

Students who fulfill these requirements will receive a letter from the DGS of the Classics department, indicating that they have completed the work for the qualification.

Core Seminar

CLSS 841b/ANTH 741b/ARCG 741b/HIST 502b/NELC 841b, *Frontier and Province in the Premodern World* Andrew Johnston, William Honeychurch

From Achaemenid India or Han China to Roman Gaul and Egypt to Iraqi Kurdistan, the province and its organizational equivalents (e.g., nomes in Egypt, commanderies in China) have long constituted one of the fundamental building blocks of states, ancient and modern, and a fascinatingly complex site of cultural and political negotiation in imperial encounters. The aim of this year's core seminar is to explore social equilibria between governance and the governed in the premodern world, via the interaction – religious, artistic, linguistic, administrative, economic – between local units and large imperial frameworks. As an object of comparative study, the province, representing the intersection of imperial power and local communities, allows us to combine “top-down” and “bottom-up” approaches to the ancient world, to investigate some of the key practices

and discourses of empire while attempting to recover the agency and voices of subaltern provincial actors. It offers as well a chance to reconsider the “center-periphery” paradigm taken over from world-systems theory, and to propose new models for understanding the complex relationships between an imperial “center” and the governance of territories. This interdisciplinary seminar examines a wide range of aspects of the province as a transhistorical phenomenon – law, economy, art, literature, religion, monumentality, urbanism, and politics – across the ancient Mediterranean world and beyond, making use of the unique resources and collections at Yale, especially the Art Gallery and Beinecke Library.

Policies and Regulations

ADMISSIONS

<http://gsas.yale.edu/admission-graduate-school>

Application for admission to any of the Graduate School's programs should begin in the summer or fall of the academic year prior to the one in which the applicant proposes to matriculate. Application can be made to only one department, program, or combined program. The Graduate School utilizes an online application. Access to this application as well as application procedures, guidelines, requirements, fees, deadline dates, and all other information that an applicant will need are available at the Web site listed above.

Holders of American Ph.D. or Sc.D. degrees, or their international equivalents, are not eligible for admission to the Graduate School in the field in which they have already earned a degree. They may, however, apply in other fields and are also eligible to apply for admission to the Division of Special Registration as special students for nondegree study (see Nondegree Study below for more information or visit the Web site listed above). With the approval of the appropriate associate dean, holders of master's degrees are eligible for admission to a terminal master's degree program in the same field at the Graduate School provided that there is significant curricular distinction between the previous and proposed programs of study.

Individual program descriptions, prerequisites, special admissions requirements, and links to these programs are available via the Admissions Web site. Although programs may have varying prerequisites and special requirements for admission, all programs will require, in addition to an application and the application fee, three letters of recommendation, transcripts from each academic institution previously attended, and the results of the Graduate Record Examinations (GRE) General Test, which is administered in the United States and abroad by Educational Testing Service (ETS). This examination, in addition to any GRE Subject Tests that may be required by the student's program of study, should be taken as early as possible to ensure that official scores are released and received no later than the stated deadline of the program for which the student is applying.

Applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language (TOEFL), which is administered by ETS, or the International English Language Testing System (IELTS). This requirement is waived only for applicants who, prior to matriculation at Yale, will have received a baccalaureate degree or its international equivalent from a college or university where English is the primary language of instruction. The applicant must have studied in residence at the baccalaureate institution for at least three years to receive a waiver. The TOEFL, if required, should be taken as early as possible to ensure that official scores are released and received no later than the stated deadline of the program for which the student is applying.

Students who do not demonstrate sufficient proficiency in English may be retested or asked to take courses in English for speakers of other languages. A higher level of proficiency will be required in order for students to serve as teaching fellows.

International applicants who accept offers of admission will be required to give appropriate evidence of necessary financial support before the University will be able to issue visa documents.

The application contains questions regarding prior or pending criminal convictions and disciplinary actions. When an applicant answers affirmatively to either of these questions, the Graduate School will evaluate the circumstances outlined by the applicant to determine if they are potentially relevant to his or her participation in the Yale community as a graduate student. In cases where such charges are pending, the Graduate School may decide to admit the applicant contingent upon the charges being resolved or to defer the decision on admission until the charges are resolved. If new criminal or disciplinary charges are filed against an applicant after submission of the application but prior to matriculation, applicants are required to notify the Graduate School Admissions Office of this fact in writing. Failure to do so may result in rejection of an application or rescission of an offer of admission.

It is the policy of the Graduate School to verify all credentials in support of an application. All transcripts, recommendations, publications, standardized test scores, and supplemental materials may be traced to their sources in order to confirm their authenticity. Written materials submitted by an applicant may be subject to review for the purpose of identifying plagiarism.

Applicants are typically notified of decisions regarding their applications during the months of February and March. Official notification is sent from the Graduate School of Arts and Sciences only.

All entering students must have obtained the bachelor's degree or its international equivalent. Offers of admission are contingent on a student providing an official transcript indicating that the student has been awarded a baccalaureate degree (or its international equivalent) prior to matriculation. Students who are not able to provide such evidence will not be permitted to register. Those who have been engaged in graduate work at Yale or another university must also present an official transcript giving evidence of degree(s) awarded and/or satisfactory completion of the previous year's work.

Applicants who have been previously denied admission to the Graduate School of Arts and Sciences three times may not apply again.

The Office of Graduate Admissions will not release application materials, including standardized test scores, letters of recommendation, or transcripts, to the applicant or other institutions or agencies for any purpose. Students will need to contact ETS, recommenders, or educational institutions they have previously attended in order to furnish such materials to a third party.

PROGRAMS OF STUDY

Full-Time Degree Candidacy

Most students enrolled in the Graduate School are registered for full-time study as they pursue a Ph.D. or master's degree program. These students devote their full effort to course work, preparation for qualifying examinations, gaining teaching experience, and the research and writing leading to the completion of the dissertation.

Part-Time Study

In rare circumstances, qualified individuals who are unable to devote their full time to graduate study may apply and be admitted as part-time students in either doctoral or terminal master's programs. For more complete information, see Part-Time Study under Degree Requirements, below.

Nondegree Study

Qualified individuals who wish to study at the graduate level as nondegree candidates may be admitted to the Division of Special Registration (DSR). Admission to the DSR is for one term or for one year only and carries with it no commitment by the Graduate School for further study. Students admitted for the academic year must demonstrate satisfactory academic performance in the first term in order to register for the second term. Students in the DSR may obtain transcripts indicating the appropriate credit for work completed.

DSR students engaged in course work or a combination of course work and research are identified as *Special Students*. Although normally admitted for full-time study, Special Students who are U.S. citizens or permanent residents may be admitted for part-time study and are charged tuition on a per-course basis, whether for credit or audit. Please refer to Financing Graduate School below for a schedule of tuition and fee charges. Students admitted to the DSR as Special Students are not eligible for financial aid, including federal and most nonfederal student loans.

Advanced graduate students who are degree candidates (at the master's or Ph.D. level) at another university and who have made arrangements with a specific Graduate School faculty member for a research project under his or her direct supervision may be admitted to the DSR as *Visiting Assistants in Research*. Undergraduate students in combined or simultaneous B.S./M.S., B.A./M.A., or similar programs are not considered advanced graduate students. Student research conducted at Yale must be part of the visiting student's thesis or dissertation. The extent and location of the research completed at Yale must be cited in the completed thesis or dissertation. Any proposal for the admission of a Visiting Assistant in Research must be discussed by the relevant departmental director of graduate studies and the appropriate associate dean. The Graduate School does not provide financial support to Visiting Assistants in Research. Such students either hold standard graduate student Assistantship in Research appointments that are funded by the faculty adviser, or provide their own funding through external awards or personal resources. Please refer to Financing Graduate School below for a schedule of tuition and fee charges.

Detailed information, requirements, and access to the online DSR application are available at <http://gsas.yale.edu/admissions/application-process/non-degree-programs-division-special-registration>. DSR applicants must provide evidence of health care for the duration of their studies at Yale at the time of application.

Some departments at Yale have formal exchange agreements with universities in other countries that have been approved by the Graduate School. Graduate students who are admitted to Yale under such approved exchange agreements may be registered as *Visiting International Exchange Students*. Visiting International Exchange Students normally are not charged tuition.

In rare circumstances, students may apply for a second year of registration in the DSR; however, cumulative enrollment is limited to two years. Students enrolled in the DSR who are subsequently admitted to degree programs in the Graduate School may receive academic and tuition credit for no more than four courses completed while enrolled in the DSR, provided that the department recommends such credit and the appropriate associate dean approves.

Interdisciplinary Study

All graduate students are formally associated with one department or program, and in the case of students in combined-degree programs, with two. Students may, however, be encouraged to take one or more courses in related departments. Students are often advised by faculty members from more than one department during their dissertation research. Students in the Graduate School, with permission of the director of graduate studies and the relevant school, may take advantage of particular course or research opportunities in Yale College and in Yale's professional schools.

Combined and Joint-Degree Programs

Students interested in African American Studies, Film and Media Studies, and Renaissance Studies pursue a combined Ph.D. with departments in related fields. In addition to these academic programs, there are several formal interdisciplinary Ph.D. programs in the Graduate School listed under the appropriate departmental entries of this bulletin. Ad hoc programs may also be approved. A student who is interested in an ad hoc program should prepare a written proposal for review and approval by the relevant departments and associate deans before the student has advanced to candidacy.

Students are encouraged to contact the appropriate directors of graduate studies about specific opportunities for interdisciplinary study throughout the Graduate School and the University.

The Graduate School also participates in the following formal joint-degree programs with the professional schools: the J.D./M.A. and J.D./Ph.D. programs in cooperation with the Law School; the M.D./Ph.D. program in cooperation with the School of Medicine; the M.A./M.B.A. and Ph.D./M.B.A. programs in cooperation with the School of Management; the M.A./M.P.H. program in cooperation with the School of Public Health; and the M.A./M.F.S. and M.A./M.E.S. programs in cooperation with the School of Forestry & Environmental Studies. For all joint-degree programs except the M.D./Ph.D., students are required to submit formal applications to both the professional school and the Graduate School indicating their interest in enrolling in the joint program. Individuals interested in the M.D./Ph.D. program apply directly to the School of Medicine (see Requirements for Joint-Degree Programs, below).

Exchange Scholar Program

<http://gsas.yale.edu/academics/exchanges>

Graduate students in Yale Ph.D. programs may petition to enroll full- or part-time for a term or for an academic year as exchange scholars at the University of California at Berkeley, Brown, University of Chicago, Columbia, Cornell, Harvard, MIT, University

of Pennsylvania, Princeton, and Stanford. The Exchange Scholars Program enables students to take advantage of special educational opportunities not available at their home institutions. Applications are available at the Web site listed above. Please direct questions to Assistant Dean Robin Ladouceur (robin.ladouceur@yale.edu). Applications must be received at least six weeks prior to the beginning of the term for which the student is applying.

International Graduate Student Exchange Agreements

All international exchange agreements must be approved in advance by the Graduate School to ensure that they meet University policy and Graduate School guidelines. Departments interested in establishing an exchange program must prepare a statement that demonstrates that there is a clear academic and reciprocal need for such a program, and that the program will conform to the established guidelines for all such exchange agreements.

INTERNATIONAL EXCHANGE PROGRAMS

Agrarian Studies

Amsterdam School for Social Science Research, Netherlands

Chemical and Environmental Engineering

Université de Cergy-Pontoise, France

Computer Science

University of Science and Technology of China, Beijing

Council on East Asian Studies

Inter-University Center for Japanese Language Studies, Yokohama; Inter-University Program for Chinese Language Studies, Tsinghua University, Beijing; International Chinese Language Program, National Taiwan University, Taipei; University of Tokyo, Japan; Beida, Peking University, China; Sophia University, Tokyo, Japan

Economic Growth Center

Research Institute for Economics and Business Administration, Kobe University, Japan

Economics

Institut d'Études Politiques de Paris, France; Università Bocconi, Milan, Italy; Universität Mannheim, Germany; Universität Bonn, Germany

Graduate School

Royal Holloway College, University of London, England; Connecticut Department of Education and the State of Baden-Württemberg Exchange, Germany; Universität Konstanz, Germany; University College London, England

French

École Normale Supérieure, Paris, France; Institut d'Études Politiques de Paris, France

German

Freie Universität, Berlin, Germany; Goethe-Universität, Frankfurt, Germany

History

Institut d'Études Politiques de Paris, France; University of Sussex, Brighton, England; Beida, Peking University, China

History of Science and Medicine

École des Hautes Études en Sciences Sociales, Paris, France; École Normale Supérieure, Paris, France

Linguistics

Gakushuin University, Tokyo, Japan; Tokyo Metropolitan University, Japan

MacMillan Center for International and Area Studies

Fox International Fellowship Program (Moscow State University; University of Cambridge; Freie Universität, Berlin; Fudan University, Shanghai; University of Tokyo; El Colegio de México, Mexico City; Institut d'Études Politiques de Paris; Jawaharlal Nehru University, New Delhi); Graduate Institute of International and Development Studies, Geneva, Switzerland

Molecular, Cellular, and Developmental Biology

Peking University, Beijing, China

Political Science

Nuffield College, University of Oxford, England; Institut d'Études Politiques de Paris, France; Beida, Peking University, China

Slavic Languages and Literatures

Russian State University for the Humanities, Moscow, Russia

Sociology

Institut d'Études Politiques de Paris, France; University of Copenhagen, Denmark

Summer Study

Doctoral students are funded year-round and are expected to make progress toward the completion of their degrees during the summer months (see Summer Registration under Registration Status and Leaves of Absence, below). See individual departmental policies in this bulletin regarding specific expectations for degree programs during the summer. Although the Graduate School does not offer courses in the summer, intensive language instruction is available through the Yale Summer Session, and graduate students may wish to take advantage of those programs while in New Haven. For further details on summer offerings at Yale, please consult the Yale Summer Session Web site at <http://summer.yale.edu>.

DEGREE REQUIREMENTS

The requirements set forth in the pages that follow are the minimum Graduate School degree requirements and apply to all degree candidates. Students should consult the listings of individual departments and programs for additional specific departmental requirements.

Requirements for the Degree of Doctor of Philosophy

LENGTH OF STUDY

In most fields of study, six years should normally be sufficient for the completion of the Ph.D., although it is understood that seven years may be needed by students in fields requiring extensive fieldwork or the mastery of difficult foreign languages. Departments and programs make every effort to design a course of study and to provide advice and guidance to make it possible for students to complete their work within six years. Normally three, or at most three and one-half, years are devoted to the completion of predissertation requirements (courses, examinations, selection of a dissertation topic). The remaining time, typically two to three years, is devoted to conducting research and writing the dissertation. Advanced standing that has been granted for work done in a Yale M.A./M.S. program is counted as part of the six years (for further information, see Transfer Credit and Advanced Standing, below).

RESIDENCE REQUIREMENT

Students seeking the Ph.D. degree are required to be in residence in the New Haven area during at least three academic years. This is an academic requirement, distinct from and independent of the tuition requirement described below. The residence requirement must normally be met within the first four years of study. Any exception to the residence requirement must be approved by the department and by the appropriate associate dean.

TUITION REQUIREMENT AND THE CONTINUOUS REGISTRATION FEE

All Ph.D. candidates are charged four years (eight terms) of full tuition, or proportionately less if all degree requirements, including submission of the dissertation, are completed in less than four continuous years of full-time study from the date of matriculation in the Ph.D. program.

Once the full-tuition obligation has been completed, registered students are charged the Continuous Registration Fee (CRF).

TRANSFER CREDIT AND ADVANCED STANDING

The Graduate School does not award transfer credit for graduate work completed before matriculation at Yale. A department may, with the approval of the Graduate School, waive a portion of the Ph.D. course requirement (normally a maximum of three courses) in recognition of previous graduate-level work done at Yale or elsewhere. Such a waiver does not affect the full-tuition requirement. Courses taken previous to matriculation at Yale will not appear on the student's Graduate School transcript.

With the approval of the department, a student who is currently enrolled may petition for advanced standing in the Graduate School of up to one year for work completed in a Yale master's or professional doctoral program that is relevant to the student's Ph.D. program. This petition must be received by the appropriate associate dean in the Graduate School before the end of the student's first year of study in the Ph.D. program. Such students may also be offered admission with advanced standing by the department and the Graduate School. Such advanced standing will reduce the four-year tuition requirement and eligibility for Graduate School fellowship aid accordingly. The normal six-year period of registration will be similarly reduced.

LANGUAGE REQUIREMENT

Language requirements are set by individual departments and programs. Specific language requirements are explained in the individual department listings. All departmental requirements are subject to initial approval by the Executive Committee of the Graduate School and are monitored by the divisional degree committees. A department cannot make exceptions to its own requirements without authorization by the appropriate degree committee.

Graduate students taking undergraduate language courses will be graded according to the Yale College grading scale. Where applicable, language courses may count toward graduate degree requirements in some programs (see program descriptions). Undergraduate language courses may not count toward the Honors requirement.

The required level of proficiency in foreign languages, and the method for demonstrating it, are determined by the individual departments. Most give their own examinations. A few permit the requirement to be satisfied by passing particular courses. Students are urged to be prepared to meet language requirements at the beginning of their first year of study.

COURSE AND HONORS REQUIREMENTS

The course requirements for the Ph.D. degree are set individually by each department or program. Each course offered in the Graduate School counts for a single credit or, in rare cases, one-half credit. Only courses offered by the Graduate School and officially numbered on the graduate level (i.e., 500 or higher), and receiving a qualitative grade of Honors, High Pass, or Pass, can fulfill requirements for the doctoral degree, with the exception of certain language courses or where specified in advance by the department or program. Although departments may set more stringent requirements, to meet the minimum Graduate School quality requirement for the Ph.D., students must achieve the grade of Honors in at least one full-year or two full-term graduate courses taken after matriculation in the Graduate School and during the nine-month academic year. The Honors requirement must be met in courses other than those concerned exclusively with dissertation research and preparation.

A student who has not met the Honors requirement at the end of the fourth term of full-time study will not be permitted to register for the fifth term. A student who is not in good academic standing with regard to course work or research as defined by the minimum standards established by the Graduate School and the expectations outlined by the student's department or program may be dismissed from the Graduate School. Such dismissal will be recorded on the student's transcript.

QUALIFYING EXAMINATION

Each Ph.D. student must pass a general examination, separate from course examinations, in the major subject offered and in such subordinate subjects as may be required by the department. Such examinations are described in the individual department listings. Students should consult with the director of graduate studies for further information about this requirement.

PROSPECTUS

The dissertation topic, in the form of a prospectus, must be approved by the department. Certification of this approval, together with a copy of the prospectus, must be filed with the Graduate School registrar at least six months prior to the submission of the dissertation. By the time a prospectus is submitted, the department must approve a member of the graduate faculty to serve as the primary adviser for the dissertation. Students who plan to submit the dissertation before the end of the fourth year of study should be sure to reserve time to satisfy this requirement.

The prospectus should be viewed as a preliminary statement of what the student proposes to do in his or her dissertation and not as an unalterable commitment. However, substantive deviation from the dissertation project outlined in a prospectus (as determined by the director of graduate studies and associate dean) will require that the student draft a new prospectus to be approved by the dissertation committee at least six months prior to the submission of the dissertation.

In consultation with their faculty advisers and directors of graduate studies, students should give serious thought to the scale of proposed dissertation topics. There should be a reasonable expectation that the project can be completed during the stipulated duration of the degree program.

The appropriate form and typical content of a prospectus inevitably vary from field to field. In most cases, however, a prospectus should contain the following information:

1. The name of the dissertation adviser.
2. A statement of the topic of the dissertation and an explanation of its importance. What in general might one expect to learn from the dissertation that is not now known, understood, or appreciated?
3. A concise review of what has been done on the topic in the past. Specifically, how will the proposed dissertation differ from or expand upon previous work? A basic bibliography should normally be appended to this section.
4. A statement of where most of the work will be carried out—for example, in the Yale library or another library or archive, in the laboratory of a particular faculty member, or as part of a program of fieldwork at specific sites in the United States or abroad.
5. If the subject matter permits, a tentative proposal for the internal organization of the dissertation—for example, major sections, subsections, sequence of chapters.
6. A provisional timetable for completion of the dissertation.

ADMISSION TO CANDIDACY

Admission to candidacy indicates that the department and the Graduate School consider the student prepared to do original and independent research. Students will be admitted to candidacy when they have completed all predissertation requirements, including the dissertation prospectus and excluding any required teaching. Admission to candidacy will normally take place by the end of the third year of study. Any programmatic variations from this pattern that have been approved by the Executive Committee of the Graduate School are described in the individual department statements. Training in teaching can occur both before and after a student is admitted to candidacy. A student who has not been admitted to candidacy at the expected time will not be permitted to register for the following term. At the time of advancement to candidacy, students who have not

petitioned for or received en route degrees (e.g., M.A., M.S., M.Phil.) will automatically be considered for such degrees. If a student advances to candidacy after the deadline to submit a petition for the degree in that term, the student will be considered for a degree in the following term.

TRAINING IN TEACHING

The Teaching Fellow Program (TFP) is the principal framework at Yale in which graduate students learn to become effective teachers. Learning to teach and to evaluate student work is fundamental to the education of graduate students. Teaching is required in many departments and is an expectation for all doctoral students. The TFP provides opportunities for graduate students to develop teaching skills, under faculty guidance, through active participation in the teaching of Yale undergraduates. Teaching fellows who encounter problems or difficulties related to their teaching appointments are encouraged to meet with their associate dean. A student must be registered in the Graduate School, at least half-time, to be appointed as a teaching fellow (TF) or as a part-time acting instructor (PTAI). TFs assist faculty in teaching relatively large undergraduate courses. PTAIs are responsible for small undergraduate courses, subject to guidance and advice by department faculty. For a more detailed description of these types of appointments, see Teaching Fellow Levels under Financing Graduate School.

Faculty should clearly communicate to students and teaching fellows their expectations about evaluation of work, feedback to students, and grading policies. Faculty are expected to prepare course syllabi, assignments, and examinations. Typically, they should not ask teaching fellows to give lectures when they are unable to attend class, although they are encouraged to offer occasional opportunities for student lectures when they can attend and advise. While on rare occasions teaching fellows may be asked to assist with administrative activities (such as placing course material on library reserve or online, making photocopies for class, ensuring that audiovisual resources are available and working, and the like), in general such activities should not be done by students.

Graduate students may occasionally serve as graders for graduate-level courses, but only in highly quantitative courses with grading demands for frequent assignments. To avoid conflicts of interest, teaching fellows should not normally be assigned to evaluate the work of graduate student peers. However, in courses requiring extensive quantitative work, teaching fellows may score quantitative homework and exams submitted by graduate students, using nondiscretionary scoring keys approved by the faculty instructor. In these instances, the faculty member should review the teaching fellow's scoring and must assign the final grade. In courses that are double-titled with both graduate and undergraduate numbers, the same guidelines hold for the grading of assignments; all other grading of graduate students should be done by the faculty member.

The Graduate School requires that all students who teach be in good academic standing. In addition, they must be fluent in English, except for those who solely grade. Graduate students whose native language is not English are required to meet the oral English proficiency standard before they may begin teaching. The standard may be met by (1) passing the SPEAK test, (2) passing the Center for Language Study oral exam, (3) passing the speaking section of the iBT TOEFL, (4) passing the speaking portion of the IELTS exam, or (5) having received an undergraduate baccalaureate degree or its

equivalent from an institution where the principal language of instruction is English. In some instances, a student's academic dean or director of graduate studies may require that students with an undergraduate degree from English-speaking institutions also pass an oral English exam to satisfy the language requirement.

DEFERRAL OF TEACHING YEAR

In the humanities and social sciences, students in a teaching year, normally years three and four, may defer a teaching year or term into the fifth or sixth year for compelling academic reasons. Such reasons include but are not limited to a need to conduct research in absentia or undertake additional preparation for teaching.

DISSERTATION

The dissertation should demonstrate the student's mastery of relevant resources and methods and should make an original contribution to knowledge in the field. Normally, it is expected that a dissertation will have a single topic, however broadly defined, and that all parts of the dissertation will be interrelated, but can constitute essentially discrete units. Beyond this principle, the faculty will apply the prevailing intellectual standards and scholarly practices within their fields in advising students with regard to the suitable scope, length, and structure of the dissertation, including what constitutes an original contribution to that field.

In accord with the traditional scholarly ideal that the candidate for a doctorate must make a contribution to knowledge, all dissertations that have been accepted by the Graduate School are published on microfilm by University Microfilms International and then deposited in the Manuscripts and Archives section of the Sterling Memorial Library. As such, classified or restricted research is not acceptable as part of the dissertation. Exceptions must be approved in advance by the appropriate degree committee.

Dissertations must be written in and submitted in English except in some disciplines in which there are strong academic reasons for the submission of a dissertation in a foreign language. At the time of the submission of their prospectus, students must petition for permission to submit all or a portion of their dissertations in a foreign language. The petition should be submitted in the form of a letter explaining the academic reasons for using a foreign language and will be evaluated by the DGS and the appropriate associate dean. Petitions for writing and submitting a dissertation in a foreign language will not be accepted after students have advanced to candidacy. A dissertation may not be translated into English by someone other than the student.

Dissertations must be submitted to the Graduate School by the respective deadlines in the academic calendar to be considered for December or May degrees. No exceptions are made to these deadlines, which have been established to allow sufficient time for departments to receive evaluations from readers and recommend students to the degree committees. Once the adviser and committee have approved a dissertation for submission and the director of graduate studies has been notified, the student submits one unbound copy of the dissertation, softbound copies that will be distributed to each reader, a completed set of required forms (<http://gsas.yale.edu/sites/default/files/files-forms/dissertationsubmission2015.pdf>), and any requisite fees to the Graduate School. The department must submit to the Graduate School a fully completed "Notification of Readers" form that has been approved by the director of graduate studies.

Registered doctoral candidates must have a principal adviser with an appointment on the Graduate School faculty. The Graduate School requires that each dissertation be read by at least three persons but not more than five, at least two of whom are ladder or ladder-track faculty members at Yale. All readers must hold the Ph.D. degree as well as a faculty position or be considered otherwise qualified to evaluate the dissertation. The process for assigning readers is determined by the department, which is responsible for confirming the qualifications, contact information, and willingness of all readers before notifying the Graduate School of these appointments. All appointments of readers are subject to review by the associate deans. The department is responsible for reassigning readers as necessary, and this process will not extend the deadline for readers' reports to be returned to the Graduate School. The Graduate School will send each student a copy of the readers' reports and place a copy in the student's permanent academic record.

Award of the Ph.D. will be considered by the degree committee only if all readers' evaluations have been received by the Graduate School and are positive, all other degree requirements have been met, and the department has recommended the awarding of the degree. Should a reader indicate that a dissertation contains significant errors in typing, grammar, spelling, reference citations, or other textual matters, the student will be required to revise the dissertation by a date provided by the registrar. Corrected pages or a new unbound copy of the dissertation must be submitted to the Graduate School, as well as a letter from the director of graduate studies indicating that the student has addressed the readers' concerns, before the dissertation can be recommended for a degree. In the event that a dissertation is evaluated as failing, departmental practice determines the number of reevaluations normally permitted.

The Graduate School does not require departments to evaluate the dissertations of degree candidates who are no longer registered. The decision to review such dissertations rests with the department.

Requirements for the Degree of Master of Philosophy

The Master of Philosophy is awarded en route to the Ph.D. in many departments. The minimum general requirements for this degree are that a student shall have completed all requirements for the Ph.D. except required teaching, the prospectus, and dissertation. Students will not generally have satisfied the requirements for the Master of Philosophy until after two years of study, except where graduate work done before admission to Yale has reduced the student's graduate course work at Yale. In no case will the degree be awarded for less than one year of residence in the Yale Graduate School.

Not all departments offer the M.Phil. degree. Information regarding special departmental requirements for the degree, if any, are stated in the individual department listings.

Requirements for the Degree of Master of Arts or Master of Science

Except in the case of programs listed below under Terminal M.A.S./M.A./M.S. Degrees, students are not admitted as candidates for the Master of Arts or Master of Science degree. However, students in most doctoral departments may be awarded the M.A. or M.S. en route to the Ph.D. degree.

Although departments may set more stringent requirements, the minimum general requirements must comply with the credit hour standards set by the U.S. Department of Education and include the (1) completion of a minimum of seven courses leading to the Ph.D. or the equivalent of such courses, with grades that satisfy the departmental requirements; (2) completion of one academic year in full-time residence, or the equivalent, at Yale; (3) recommendation by the department for award of the degree, subject to final review and approval by the appropriate degree committee. In no case may courses taken prior to matriculation in the Graduate School, or in Yale College or other summer programs, be applied toward the requirements for the Master of Arts or Master of Science degree.

Some departments do not offer the M.A. or M.S. en route to the Ph.D., or award it only to students who are withdrawing from the Ph.D. program. For information about this or any special departmental requirements additional to the general requirements stated above, see the department listings.

Students enrolled in a Ph.D. program may receive a master's degree from another department provided that it is in a related field of study and deemed necessary for the completion of the proposed dissertation research. The student's proposed program of study must receive formal approval in writing from the director of graduate studies in both departments and the appropriate associate dean prior to enrollment in courses that will fulfill master's degree requirements in another department. Courses taken toward a master's degree in another department must be part of the student's course requirement for the Ph.D., as approved by the director of graduate studies in both departments. However, such course work cannot also be counted toward a master's degree in the department to which the student was admitted. A student may not advance to candidacy until all requirements have been completed for both the en route master's degree in the program to which the student was admitted and the proposed master's degree in a related field. Students who wish to obtain a master's degree in a field that is not directly related to the doctoral degree must apply for a personal leave from the Ph.D. program and submit an application for admission to the master's program. Any financial aid offered to the student for a Ph.D. program may not be transferred to a master's degree course of study. Students enrolled in combined programs normally receive combined en route degrees as well.

TERMINAL M.A.S./M.A./M.S. DEGREES

The M.A.S./M.A./M.S. degrees are offered as terminal degrees in nineteen departments and programs: African Studies, American Studies, Applied Mathematics, Applied Physics, Archaeological Studies, Computational Biology and Bioinformatics, Computer Science, East Asian Studies, Engineering and Applied Science, English, European and Russian Studies, Global Affairs, History, International and Development Economics (IDE), Medieval Studies, Music, Near Eastern Languages and Civilizations, Public Health, and Statistics.

The residence and tuition requirements for a terminal M.A.S./M.A./M.S. degree are a minimum of one year of full tuition and course work in residence in one-year programs, or a minimum of two years of full tuition and course work in residence in two-year programs. For information about which departments offer one-year programs and which offer two-year programs, see the department listings.

With the approval of the department and the appropriate associate dean, a student may be admitted for part-time study toward the master's degree. In that case, tuition will be charged on a per-course basis. Part-time study does not change the one- or two-year full-tuition obligation described above. Part-time students must complete all degree requirements within five years of matriculation.

Individual departments establish the specific course and language requirements for these degrees. Although departments may set more stringent requirements, the minimum Graduate School requirement for students admitted for M.A.S./M.A./M.S. degrees is an overall grade average of High Pass, including a grade of Honors in at least one full-term graduate course (for students enrolled in one-year programs), or in at least two full-term graduate courses (for students enrolled in two-year programs). In order to maintain the minimum average of High Pass, each grade of Pass on the student's transcript must be balanced by one grade of Honors. Each grade of Fail must be balanced by two grades of Honors. If a student retakes a course in which he or she has received a failing grade, only the newer grade will be considered in calculating this average. The initial grade of Fail, however, will remain on the student's transcript. A grade awarded at the conclusion of a full-year course in which no grade is awarded at the end of the first term would be counted twice in calculating this average.

Each course offered in the Graduate School counts for one or one-half credit. Only courses offered by the Graduate School and officially numbered on the graduate level can fulfill requirements for the master's degree, with the exception of certain language courses or when specified in advance by the department or program. A student who has not fulfilled the course requirements for the degree at the conclusion of the standard duration of the program can, at the discretion of the department and associate dean, be granted one additional term to fulfill degree requirements. If the student has not taken the requisite number of courses but has fulfilled the tuition requirement, the student will be charged the Continuous Registration Fee. If the student must take additional courses beyond the number required, the student will be charged tuition on a per-course basis.

No credit will be awarded toward the M.A.S./M.A./M.S. degree for courses taken prior to matriculation in the Graduate School, or taken in Yale or other summer programs. Students in one of Yale's professional schools who matriculate in the Graduate School to complete a joint master's degree may, however, with the permission of their director of graduate studies, count courses already completed in their professional school program toward the joint degree. See the individual program or department listings.

The master's degree may also be earned jointly with the B.A./B.S. in certain departments by students enrolled in Yale College. For further information, see *Yale College Programs of Study*, available from the Office of the Dean of Yale College.

Requirements for Joint-Degree Programs

Students who are candidates for degrees in any of the joint programs sponsored by the Graduate School and Yale's professional schools must meet the requirements established by each school for the degree they are seeking. Degree requirements in the Graduate School include both the Graduate School's general requirements and any special requirements set by the relevant department or program. In all cases the Honors requirement

must be fulfilled in non-research courses offered primarily for Graduate School students, taken after matriculation in the Graduate School.

In addition to the J.D./Ph.D., J.D./M.A., M.D./Ph.D., and Ph.D./M.B.A. programs described below, joint-degree programs with other professional schools have been approved for students in European and Russian Studies, Global Affairs, and International and Development Economics. These programs are described in the individual department listings.

J.D./PH.D. AND J.D./M.A. PROGRAMS

Admission to the Graduate School joint-degree programs with the Law School, described below, requires separate admission to both schools as well as approval by the appropriate associate dean in each school, and by the director of graduate studies in the student's Graduate School department. Students must apply for admission to a joint program no later than their first year of study in a J.D., Ph.D., or two-year M.A. program, and must matriculate in the joint program no later than the beginning of their second year. Students wishing to pursue a J.D./M.A. in a one-year M.A. program must apply for admission no later than their first year of study in the J.D. program and must matriculate in the M.A. program as a joint-degree candidate.

In the J.D./Ph.D. program, the first year of study is spent principally in the Law School. The second and third years are combined according to the interest of the student. As many as six term courses, designated by the student at the beginning of the term, may be counted toward both degrees. During this time all course work and language requirements for the Ph.D. program are normally completed. The J.D. should be completed by the end of the fourth year. During the fifth year the student is expected to complete all remaining predissertation requirements and be admitted to candidacy. The teaching requirement for the Ph.D. will normally be completed by this time. Any exception to this pattern of study must be approved by the appropriate associate dean.

The minimum residence requirement in the J.D./Ph.D. program is four years. The tuition requirement is two and one-half years in the Law School and three and one-half years in the Graduate School. Financial aid is provided by each school according to its own criteria, typically for two and one-half years in the Law School and three and one-half years in the Graduate School, and is awarded by each school during the terms in which the student pays tuition in that school. Students are not eligible for financial aid from the Graduate School during terms in which they are registered at another school.

In the J.D./M.A. program, the J.D. and M.A. degrees are awarded simultaneously at the end of the fourth year of study in one-year M.A. programs and at the end of four and one-half years of study in two-year M.A. programs. The Graduate School tuition requirement for J.D./M.A. students in one-year M.A. programs is one year of tuition; students in two-year M.A. programs have a one and one-half year tuition requirement in the Graduate School. In all cases students pay three years of tuition in the Law School. Students in J.D./M.A. programs, like other students in M.A. programs, are not ordinarily eligible for University Fellowship aid through the Graduate School. Students usually enroll in the Law School during the first year of study. The pattern of enrollment in subsequent years depends on whether the M.A. program is a one-year or a two-year program.

M.D./PH.D. PROGRAM

This program is sponsored jointly by the Graduate School and the School of Medicine. Applications for admission to the joint program are reviewed by a committee composed of faculty members and deans from both schools. Normally, admission to the program includes simultaneous admission to both schools. However, students may apply to the joint program by October 15 of their second year of study in either the M.D. or Ph.D. program, and they must matriculate in the joint program no later than the beginning of the following year.

Students request affiliation with a particular department or program in the Graduate School by the middle of their third year of study in the joint program, after their course and research interests have been defined. Although students usually pursue their research in one of the biological sciences, those interested in earning the Ph.D. through work in another department may do so under certain circumstances, with the approval of the M.D./Ph.D. committee.

The residence requirement in this program is seven years. The full-tuition requirement is three and one-half years in the School of Medicine and two and one-half years in the Graduate School. To qualify for the M.D. and Ph.D. degrees, students must satisfy all degree requirements of both schools. Normally, a student admitted to this joint program must satisfy the Graduate School Honors requirement by the end of the second year of study and must complete all remaining predissertation requirements within four terms of affiliation with the Ph.D. department. This schedule may be adjusted for students who have been enrolled in either the School of Medicine or the Graduate School before admission to the M.D./Ph.D. program.

PH.D./M.B.A.

The joint degree combines the two-year M.B.A. degree from the School of Management (SOM) with the six-year Ph.D. It would allow its students to complete requirements for both degrees in roughly seven years rather than the eight or more years that would be required if the degrees were pursued separately. Both degrees will be awarded simultaneously once the student has fulfilled the degree requirements of both programs. Like all graduate students, joint-degree students will receive a full financial aid package from the Graduate School during the terms registered there. For students in the humanities and social sciences, this includes four years of tuition, five years of stipend, and health insurance for each term registered. Funding for students in the sciences will mirror standard, departmental packages. Students will pay one and one-half years of tuition for the three terms registered at SOM.

The School of Management and the Graduate School will use independent admissions processes and make independent admissions decisions. Applicants must take both the GRE tests and the GMAT. Prospective students who are currently enrolled neither in the Graduate School nor in SOM may apply to both schools simultaneously. Students already enrolled in the Graduate School normally apply to SOM after taking one course at SOM for matriculation any time after they have passed their Ph.D. qualifying examinations at the Graduate School but prior to beginning the fifth year of study. This pattern, however, is flexible, and students interested in the joint degree should consult the Web pages of their departments or programs for further information. Students registered in

SOM may apply to the Graduate School during the first year of study at SOM. Following admission to both programs, each student must complete a form requesting joint-degree status. The form must be signed by the appropriate associate dean at the Graduate School and at SOM and the student's director of graduate studies.

A student in the Graduate School who wishes to pursue the joint degree will normally be required to take one course in SOM before applying there. The student will need to obtain the permission of the SOM instructor and state his or her intention to apply to the joint-degree program. The Graduate School will waive one course during the term in which the student takes this preliminary course at SOM. For students in some disciplines, this prerequisite to admission will be waived. The student is expected to complete the qualifying exams and prospectus according to the standard schedule set by the Graduate School. The student will normally begin study at SOM after completing the departmental Ph.D. qualifying examinations at the Graduate School, but there are exceptions to this pattern described on the departmental Web sites. Upon admission to SOM, the joint-degree student will register at SOM for the first-year core of courses. Students may not fulfill any Graduate School requirements during this time, nor may they serve as teaching fellows in the Graduate School in any capacity. The student must register for a third term at SOM and complete four additional courses, normally prior to the beginning of the sixth year of study at the Graduate School. Depending on the schedule of individual students, they may or may not complete all four of these remaining courses within a single term at SOM. If they do not, they may complete outstanding courses while registered at the Graduate School, but in all circumstances, students are required to pay a third term of tuition to SOM.

A student who has been admitted to the Graduate School while completing the first-year core at SOM may begin course work in the Graduate School the following year. Once a joint-degree student has matriculated at the Graduate School, it is expected that the student remain registered continuously until completing the qualifying exams. During this time, the student may undertake limited course work at SOM, but may not register there for the third and final term until he or she has passed the departmental exams at the Graduate School. Prospective students who apply simultaneously may start the joint degree at either school and follow the schedules outlined above.

All joint-degree students are subject to the codes of conduct published in the bulletins of their respective programs. Joint-degree students will receive separate transcripts from SOM and the Graduate School. Each transcript will list the courses required for the respective school's portion of the joint degree. Each course taken may be counted toward one degree only. The transcripts will reflect the joint-degree status. If a joint-degree student decides not to complete both degrees, he or she may petition both schools to receive a single degree if the requirements for the single degree, including the two-year tuition requirement at SOM, are met.

Responsible Conduct in Research

Responsible Conduct in Research (RCR) training is intended to establish a basis of understanding among graduate students concerning their rights and obligations as scholars and researchers.

MASTER'S AND PH.D. STUDENTS

All master's and Ph.D. students are required to attend a small-group discussion of professional ethics on Matriculation Day at the start of their first year of study and to complete an approved online training module in professional ethics before they can register for the spring term of their first year.

Additional requirements: (1) Students in the natural sciences must complete a department-based RCR course by the end of their first year of study. Master's students in the natural sciences will not be charged tuition for this course; (2) Students in the humanities and social sciences who receive funding from a U.S. government grant or fellowship are required to complete an online RCR course offered by CITI within one month of the start of the funding.

STUDENTS IN THE DIVISION OF SPECIAL REGISTRATION (DSR)

All DSR students in the natural sciences, and DSR students in the humanities and social sciences who receive funding from a U.S. government grant or fellowship, are required to complete an online RCR course offered by CITI. This requirement must be fulfilled within one month of receiving a Yale NetID and even if RCR training was completed at another university.

Additional requirements: (1) All DSR students registered in the fall term must complete an approved online training module in professional ethics before they can register for the spring term; (2) DSR students in the natural sciences who intend to study at Yale for one year or more are required to complete, at no charge, the department-based RCR course taken by degree-seeking students.

Petitioning for Degrees

Graduate School degrees are awarded twice each year, at Commencement in May and in the fall (normally in December, depending on the schedule of the Yale Corporation). Degrees are not granted automatically. Students must file a petition for each degree by the appropriate date (see Schedule of Academic Dates and Deadlines). Petitions that have received favorable recommendations from the student's department are reviewed by the appropriate degree committee. When the degree committee has given its approval, the petition is forwarded to the faculty of the Graduate School and then to the Yale Corporation. If the petition is successful, the student will be notified in writing by the dean of the Graduate School.

Students enrolled in Ph.D. programs should not petition for M.A./M.S. and M.Phil. degrees until the end of the term in which requirements for the degree are completed (e.g., students completing degree requirements during the spring term should petition for award of the degree the following fall). Students who have not petitioned for or received en route degrees (e.g., M.A., M.S., M.Phil.) will automatically be considered for such degrees in the term following advancement to candidacy. Students in terminal M.A.S./M.A./M.S. programs may petition for their degrees in the term in which they expect to complete them.

Commencement

<http://gsas.yale.edu/academics/commencement>
 GScommencement@yale.edu

There is only one University Commencement ceremony each year, in May. All degrees awarded for both December and May of each academic year are presented at the May ceremony.

ACADEMIC REGULATIONS

Registration

Only registered students may attend classes, receive financial aid, or use the facilities of the University. Students must register every term for the duration of their degree program (normally six years or less for Ph.D. programs and one or two years for students in M.A.S./M.A./M.S. programs). This regulation applies to all students, whether engaged in course work, preparation for qualifying examinations, or dissertation research, and, in the case of students in Ph.D. programs, whether study is in residence or in absentia. Students who do not register for any term for which they have not been granted a leave of absence (see Leaves of Absence, under Registration Status and Leaves of Absence, below) will be considered to have withdrawn from the Graduate School. Privileges associated with registered status (i.e., library privileges, health care coverage, and e-mail accounts) will likewise be withdrawn.

Unless otherwise noted in the letter of admission, students are expected to register on a full-time basis. Part-time employment at the University or elsewhere should not conflict with the obligations of the degree program or interfere with academic progress. Part-time employment beyond an average of ten hours per week requires permission of the director of graduate studies in consultation with the appropriate associate dean. International students must consult the Office of International Students and Scholars (OISS) regarding their eligibility for employment while in the United States.

No student may register for any term unless he or she is making satisfactory progress toward the degree and has been cleared by the Office of Student Financial Services to register. In compliance with Connecticut state law, no student will be allowed to register unless satisfactory evidence of immunity to measles and rubella has been presented to Yale Health (see Health Services under Yale University Resources and Services for more information).

Satisfactory progress means that the student has met all Graduate School and departmental requirements normally expected for each stage of the student's program. For Ph.D. students before admission to candidacy and for M.A.S./M.A./M.S. students, this includes satisfactory completion of courses from the preceding term(s). As indicated in the sections on Course and Honors Requirements and Admission to Candidacy, students in Ph.D. programs must satisfy the Honors requirement before beginning the fifth term of study and must be admitted to candidacy by the appropriate time. In addition to satisfying these general Graduate School requirements, students must meet any additional requirements specified by their departments. Students who fail to make satisfactory progress may be placed on a probationary status pending satisfactory completion

of requirements. Ph.D. students who have been admitted to candidacy must continue to demonstrate satisfactory progress toward the degree in the annual Dissertation Progress Report (DPR). Students who fail to meet departmental or Graduate School requirements by the designated deadlines, and students who have been admitted to candidacy who fail to submit the annual DPR, will be administratively withdrawn.

Students must register each term until the dissertation is submitted or until six years (twelve terms) of study have been completed. Registered students who submit dissertations will remain registered until the end of the term (i.e., through December for those submitting during the fall term, through May for those submitting before the spring degree deadline, and through August for those submitting after the spring degree deadline) and will retain all privileges of registration (e.g., library privileges, health care coverage, and e-mail accounts). Students who complete all Ph.D. requirements within four continuous years of full-time study in the Ph.D. program will be registered and charged full tuition only through the term in which the dissertation is submitted. Students who have registered part-time or taken a leave of absence must complete the four-year, full-tuition obligation, regardless of when they submit the dissertation.

Students are expected to complete the dissertation within six years of study or less. Students who have not submitted the dissertation by the end of the sixth year of study may do so subsequently, at the discretion of the department, without registering or may request a period of extended registration by submitting the petition for extended registration, which includes the standard DPR that is required annually by May 1 of all students admitted to candidacy. Before a seventh year of registration is approved, the student and his or her adviser, as well as the director of graduate studies, must complete a report that specifies the progress the student has already made in writing the dissertation and that also includes a detailed plan for completing the dissertation in the seventh year. Very rarely, students may request an eighth year of registration due to serious circumstances beyond their control that have prevented them from completing the dissertation by the end of the seventh year of study. Students who receive extended registration must register online each term and are normally expected to be in residence.

Alternatively, a doctoral student who has completed six years of study and who was registered as a full-time student during the previous term may request to enroll with the status “Dissertation Completion.” This part-time status enables advanced students to maintain an active NetID in order to access electronic library resources and their Yale e-mail accounts while completing their dissertations under the supervision of a member of the Graduate School faculty. A student may hold this status for a maximum of four consecutive terms and will be charged the Continuous Registration Fee in each term for which it is approved. Once a student enters this status, he or she may not petition to register as a full-time student in a subsequent term.

Noncumulative registration In certain areas of study it may be necessary for a registered student to acquire an academic skill (typically, knowledge of a foreign language) that is essential for a degree requirement or for research in a particular field and for the overall progress of the dissertation but is not an inherent part of the dissertation itself. A student in this situation may request up to one year of “noncumulative registration.” It is important to note that general study in a field related to or parallel with the topic of the dissertation is not appropriate for noncumulative registration.

A student who wishes to have a specific period of study designated as “noncumulative” should discuss the reasons for such a period of study with and secure prior approval from his or her associate dean. If prior authorization has been given by the Graduate School, the period of time spent in acquiring the necessary academic skill will not be counted as part of the student’s six-year period of candidacy. Noncumulative registration does not change the four-year full-tuition obligation. The tuition charge and any University Fellowship aid will be postponed if a student registers noncumulatively before the four-year full-tuition obligation has been satisfied. While registered noncumulatively, students pay the Continuous Registration Fee and doctoral students continue to receive the Health Award from the Graduate School.

Part-time study Students in Ph.D. programs are expected to register for full-time study. In extraordinary circumstances a student may petition the Graduate School for permission to register as a half-time student for a limited period. Students may not register for half-time study for more than three of the first four academic years they are enrolled. Thereafter they must register full-time until the four-year tuition obligation has been satisfied. Any Ph.D. student who registers half-time at any point in his or her graduate program must fulfill the four-year tuition obligation to receive the Ph.D. (see below). Ph.D. students may not register less than half-time.

Students who wish to study part-time should consult with their director of graduate studies and the appropriate associate dean to develop a proposed plan of study, so that both the student and the Graduate School have a common understanding about the time by which the requirements leading to admission to candidacy must be completed. Such a plan of study may be modified with the consent of the director of graduate studies and the associate dean.

Course Enrollment

Any student who wishes to enroll in courses during a term must register through the Online Course Selection (OCS) process. The deadlines for registration each term are listed in the Schedule of Academic Dates and Deadlines. Students who submit course enrollment forms after the appropriate deadline will be assessed a fee.

No student may attend any class unless officially registered in the course. No credit will be given for work done in any course for which a student is not officially registered, even if the student entered the course with the approval of the instructor and the director of graduate studies. Graduate students who wish to register for courses that are offered on both the graduate and undergraduate levels must register with the graduate-level course number (i.e., 500 or higher) in order to receive credit toward their degrees. In rare instances, a graduate student may be granted permission to register for an undergraduate course that will count toward the fulfillment of course requirements for the student’s graduate degree. In such cases, the student must file an approved Graduate Credit Request form (http://gsas.yale.edu/sites/default/files/files-forms/credit_request_form.pdf) with the Registrar’s Office by the end of the registration period. Graduate students may not utilize the “Credit/D/Fail” option within the Yale College grading scale. Students enrolling in courses offered by a Yale professional school are subject to all policies and deadlines of both the professional school and the Graduate School. Graduate

students taking a course through the School of Management and the Law School must also obtain written permission from the respective schools' registrars to be officially enrolled. Permission must be obtained within two weeks of the close of registration at the Graduate School.

A student who wishes to audit a course must receive permission from the instructor (as not all faculty permit auditors in their classes) and register for the course as an auditor. The minimum general requirement for auditing is attendance in two-thirds of the class sessions; instructors may set additional requirements for auditing their classes. Audited courses appear on the student's transcript.

COURSE CHANGES

Once the Online Course Selection (OCS) process has closed for a given term, all subsequent changes must be made using the Course Schedule Change Notification Form, approved by the student's director of graduate studies and then filed with the registrar. If a student is enrolled in a professional school course, all changes in enrollment status must be reported to the registrar of that school as well as to the Graduate School. Forms for reporting changes to the Graduate School are available at the Graduate School Student Information Office (Warner House, 1 Hillhouse Ave.), through the student's department, or online at <http://gsas.yale.edu/forms>.

The dates for changing enrollment in a course from Credit to Audit or Audit to Credit and for withdrawing from a course are listed in the Schedule of Academic Dates and Deadlines. If a student officially withdraws from a course by the stated deadline, the course will be removed from the student's transcript. If a student ceases to participate in a course without officially withdrawing from that course by the stated deadline, it is at the instructor's discretion to assign an appropriate qualitative grade or a grade of "Incomplete."

Grades

The grades assigned in the Graduate School are:

H	Honors
HP	High Pass
P	Pass
F	Fail
TI	Temporary Incomplete
I	Incomplete

A mark of "Y" is assigned as the grade for the first term of a full-year course and will be converted to a standard grade once both terms are completed, depending on the number of credits the course fulfills.

Marks of Satisfactory/Unsatisfactory may be assigned only when the department sponsoring the course has designated such marks. In such cases, the grading mode is the same for all students enrolled in the course.

The Graduate School does not calculate grade-point averages, nor does it assign numerical or letter equivalents to Graduate School grades. Grades assigned according to grading scales other than those described above will be returned to the instructor for conversion.

The Schedule of Academic Dates and Deadlines indicates the dates on which grades are due for the current year. Instructors have the responsibility for assigning dates for submission of course work to meet these grade deadlines. If a student and instructor have agreed that an extension is appropriate, the student must submit to the Registrar's Office a request for the Temporary Incomplete (TI) (available on the Graduate School Web site at <http://gsas.yale.edu/forms>) with the intended completion date, signed by the instructor and the director of graduate studies. Only one TI in a single term is permitted. Temporary Incompletes received in an academic year must be converted to final grades by October 1 of the following academic year. If a grade is not received by the registrar by this date, the TI will be converted to a permanent Incomplete (I) on the student's record.

In certain extraordinary circumstances, such as serious illness or a family emergency, and on the recommendation of the student's department, the associate dean may grant an additional extension. A written request for such an extension must be made by the director of graduate studies on the student's behalf within two weeks of the grade submission deadline. The request should indicate the special circumstances and suggest a date by which the student will complete the work. If the request is approved, the associate dean will inform the student and instructor. If the grade is submitted to the registrar by the new deadline approved by the associate dean, it will replace the Temporary Incomplete. If a grade is not received by the registrar by this date, a Temporary Incomplete (TI) will be converted to a permanent Incomplete (I) on the student's record.

"Provisional" or "temporary" grades (as opposed to Incompletes) are not permitted. Once submitted to the Office of the Registrar, a grade may be changed only in cases of arithmetical or clerical error on the part of the instructor and only with the approval of the appropriate associate dean. If the registrar has not received a given grade from an instructor within two weeks of the stated deadline for the submission of grades, the student will be assigned a grade of "Incomplete" for that course.

Students are reminded that the policies stated above are the Graduate School minimum general requirements. Departments or individual instructors may have more stringent policies, and students should consult their departmental handbooks or directors of graduate studies about such requirements.

Registration Status and Leaves of Absence

REGISTRATION IN RESIDENCE

Students who are studying on campus, attending classes, and using University facilities are considered to be in residence. All M.A.S./M.A./M.S. and nondegree (DSR) students must register in residence each term, as do most students in Ph.D. programs (see also Registration in Absentia and Continuous Registration Fee, below). Students who will be in residence during any term are required to register through the Online Course Selection process during the normal registration period at the beginning of that term (see the Schedule of Academic Dates and Deadlines).

A fee will be charged to students who register in residence after the close of the registration period. Late fees may be waived only if the registrar receives written notification from the student or director of graduate studies before the start of the registration period that the student will register late because of participation in an academic program, such

as a summer language course or professional meeting, that coincides with the registration period. A student who cannot register during the registration period because of a sudden serious illness or family emergency should contact the deputy registrar (246 Church Street) as soon as possible.

REGISTRATION IN ABSENTIA

Ph.D. students whose program of study requires full-time dissertation research, full-time fieldwork, or full-time study at another academic institution outside the New Haven area may request to be registered in absentia. Such registration requires the recommendation of the director of graduate studies and the approval of the appropriate associate dean. Forms for requesting registration in absentia may be obtained at the Graduate School Student Information Office reception desk or online at <http://gsas.yale.edu/forms> and should be filed at least one month before the beginning of the term during which the student expects to be studying away from New Haven. A student who has not completed the three-year residence requirement will be permitted to register in absentia for compelling academic reasons only, and normally only if the student has completed all other predissertation requirements. Registration in absentia does not reduce the four-year full-tuition or three-year residence requirements. For additional information, see Eligibility for Fellowships under Financing Graduate School.

Students who are enrolled in Yale Health and are registering in absentia should consult the staff of the Member Services Department at the Yale Health Center about the policies governing coverage while they are away from New Haven. The Graduate School funds travel insurance for students who have been approved to pursue degree-related activities outside the United States. Such students should register their locations at <http://world.yale.edu/travel> to facilitate communication with the University in cases of an emergency.

CONTINUOUS REGISTRATION FEE

Ph.D. students who have completed the tuition and residence requirements described above must continue to register each term through the sixth year whether in residence or in absentia, or until they submit the dissertation, whichever occurs first. Students who have met the tuition requirement are charged a Continuous Registration Fee (CRF) for each term in which they remain registered. Students who are granted permission to register beyond the sixth year are also charged this fee.

SUMMER REGISTRATION

Ph.D. students receive funding and are expected to continue full-time independent study or research during the summer. Continuing students who were registered during the preceding spring term remain registered through August 31. Ph.D. students who wish to interrupt their studies during the summer (e.g., to accept an internship) must notify their associate dean prior to May 15.

Many M.A./M.S. students continue full- or half-time independent study or research during the summer. Continuing students who were registered during the preceding spring term remain registered through August 31.

Students can obtain verification of summer registration from the Office of the Graduate Registrar.

SUMMER INTERNSHIPS

Normally, students who take time off from their studies to work full-time must take a leave of absence for the term or terms in which they are employed. However, certain summer internship opportunities may be beneficial to a student's academic development and career prospects. Therefore, under certain circumstances students may be permitted to remain registered at Yale while engaged in summer internships. To be eligible, the internship must meet several requirements:

- Continuous registration while participating in an internship requires the permission of the DGS.
- The internship should serve one of two functions: either the student is learning and developing techniques or acquiring data that will be used in the dissertation, or the internship is exposing the student to a potential field of employment following completion of his or her Ph.D.
- The internship must start after the end of the spring term, and be completed before the start of the fall term. If an internship opportunity overlaps with the fall or spring term, students must request a leave of absence.
- Students participating in a summer internship forfeit their summer funding from Yale. The sole exception is if the internship is unpaid and the student is generating data that will be used in the dissertation, or obtaining technical or methodological skills necessary for the dissertation. In this case, the student may request to receive summer support from Yale. In most cases, funding will terminate at the end of May and resume on September 1.
- Students will be limited to two summer internship opportunities. If a student wishes to pursue additional internships, he or she must apply for a leave of absence.
- Students will remain registered full-time and will continue to receive the Health Award and other benefits of registration. Internships do not stop a student's "academic clock."
- Students wishing to pursue internships undertaken primarily for exposure to potential fields of employment are eligible to do so only after they have advanced to candidacy.

To apply for a summer internship:

1. Complete the Request for Summer Internship form. Submit this form with a letter to the DGS describing the nature of the internship and work to be done. Include the name of the employer, location and dates of employment, contact information, and salary or benefits provided by the internship. If the internship restricts the student's rights to use and publish information produced during the experience, a copy of the employer's intellectual property rights agreement or proprietary data agreement should also be submitted. Explain the goals of the internship and how this experience will advance the dissertation research or promote career goals.
2. With the form and letter, students should submit a research plan for the coming year that describes their goals, steps for achieving those goals, and the role of the internship in their plans. Students who have been admitted to candidacy and who have included the internship in their annual Dissertation Progress Report (DPR) may refer to the DPR instead of submitting a new research plan.

3. The student's adviser must include a letter of support explaining how the student will benefit from this internship.
4. The DGS should recommend or disapprove the plan. Recommended plans should be forwarded to the associate dean for final review. The DGS should certify that the type of experience gained is consistent with the educational goals of the department.
5. International students wishing to pursue internships should contact OISS eight to ten weeks prior to the start of the proposed internship, as they will require permission for "practical training" from the U.S. government.

LEAVES OF ABSENCE

Students who wish or need to interrupt their study temporarily may request a leave of absence. There are three types of leave – personal, medical, and parental – all of which are described below. The general policies that apply to all types of leave are:

1. All leaves of absence must be approved by the appropriate associate dean on the recommendation of the department. Medical leaves also require the written recommendation of a Yale Health physician, as described below.
2. Students in Ph.D. programs may be granted a leave for one term or one academic year. A leave extends the eligibility for fellowship aid by a time equal to the duration of the leave, but not for partial terms. The expected last date of registration will be adjusted by one term for each term of the leave.

Students in one-year M.A.S./M.A./M.S. programs may be on leave for a maximum of one term. Students in two-year M.A./M.S. programs may be on leave for a maximum total of one year.

In exceptional circumstances renewal of a one-term or one-year leave, to a cumulative maximum total of two years of personal and medical leave, may be granted for students in Ph.D. programs. Leaves of absence for students in M.A.S./M.A./M.S. programs are not renewable. The duration of a parental leave is one term or one year, renewable for each birth or adoption event.

3. International students who apply for a leave of absence must consult with OISS regarding their visa status.
4. Students on leave may complete outstanding work in courses for which they have been granted approved Incompletes. They may not, however, fulfill any other degree requirements during the time on leave. (Students who intend to work toward the degree while away from the University must request registration in absentia.) Students who in fact make progress toward the degree while on leave will have their registration changed retroactively to in absentia for the period of the leave.
5. A leave of absence does not exempt the student from meeting the tuition requirement (payment of eight terms of full tuition in Ph.D. programs, or the appropriate established tuition charge in M.A.S./M.A./M.S. programs) or from paying the Continuous Registration Fee (if appropriate), but merely postpones the required charges.
6. A student on leave of absence is not eligible for financial aid, including loans; and in most cases, student loans are not deferred during periods of nonenrollment.
7. A student on leave of absence is not eligible for the use of any University facilities normally available to enrolled students.

8. A student on leave of absence may continue to be enrolled in Yale Health by purchasing coverage through the Student Affiliate Coverage plan. In order to secure continuous coverage from Yale Health, enrollment in this plan must be requested prior to the beginning of the term in which the student will be on leave or, if the leave commences during the term, within thirty days of the date when the leave is approved. Coverage is not automatic; enrollment forms are available from the Member Services Department of Yale Health, 203.432.0246.
9. Students living in University housing units are encouraged to review their housing contract and the related policies of the Graduate Housing Office before applying to the Graduate School for a leave of absence.
10. Students on leave of absence do not have to file a formal application for readmission. However, they must notify the registrar in writing of their intention to return. Such notification should be given at least eight weeks prior to the end of the approved leave.
11. Students who fail to register for the term following the end of the approved leave will be administratively withdrawn from the Graduate School.

Personal leave of absence A student who wishes or needs to interrupt study temporarily because of personal exigencies may request a personal leave of absence. The general policies governing all leaves of absence are described above. A student who is current with his or her degree requirements is eligible for a personal leave after satisfactory completion of at least one term of study. Normally, students in Ph.D. programs are not eligible for personal leaves after the fourth year of study. In certain exceptional cases, however, personal leaves may be granted to students beyond the fourth year of study. Personal leaves cannot be granted retroactively and normally will not be approved after the tenth day of a term.

To request a personal leave of absence, the student must complete the appropriate form (available online at <http://gsas.yale.edu/forms>) before the beginning of the term for which the leave is requested, explaining the reasons for the proposed leave and stating both the proposed start and end dates of the leave and the address at which the student can be reached during the period of the leave. If the dean finds the student to be eligible and the department approves, the leave will be granted. In any case, the student will be informed in writing of the action taken. Students who do not apply for a personal leave of absence, or whose application for a personal leave is denied, and who do not register for any term, will be administratively withdrawn from the Graduate School.

Medical leave of absence A student who must interrupt study temporarily because of illness or injury may be granted a medical leave of absence with the approval of the appropriate associate dean, on the written recommendation of a physician on the staff of Yale Health. A student who wishes to take a medical leave of absence may request it from a physician at Yale Health or from his or her associate dean. The general policies governing all leaves of absence are described above. A student who is making satisfactory progress toward his or her degree requirements is eligible for a medical leave any time after matriculation. The final decision concerning a request for a medical leave of absence will be communicated in writing by the appropriate associate dean.

The Graduate School reserves the right to require a student to take a leave for medical reasons when, on recommendation of the director of Yale Health or the chief of the Mental Health and Counseling department, an associate dean of the Graduate School

determines that the student is a danger to self or others because of a serious medical problem, or that the student has refused to cooperate with efforts deemed necessary by Yale Health to determine if the student is such a danger. An appeal of such a leave must be made in writing to the dean of the Graduate School no later than seven days from the date of withdrawal.

A student who is placed on medical leave during any term will have his or her tuition adjusted according to the same schedule used for withdrawals (see Schedule of Academic Dates and Deadlines). Before re-registering, a student on medical leave must secure written permission to return from a Yale Health physician. Advanced Ph.D. students may return at any time during the term with the permission of Yale Health.

Eligible Ph.D. students will receive a Health Award from the Graduate School to cover the cost of the Student Affiliate Coverage plan for the remainder of the coverage period in which the medical leave is started, if they apply for this coverage through Yale Health within thirty days of the start of their leave.

Leave of absence for parental responsibilities A student who wishes or needs to interrupt study temporarily for reasons of pregnancy, maternity care, or paternity care may be granted a leave of absence for parental responsibilities. The general policies governing all leaves of absence are described above. A student who is making satisfactory progress toward his or her degree requirements is eligible for parental leave any time after matriculation.

Any student planning to have or care for a child is encouraged to meet with his or her director of graduate studies and appropriate associate dean to discuss leaves and other short-term arrangements. For many students, short-term arrangements rather than a leave of absence are possible.

Eligible Ph.D. students will receive a Health Award from the Graduate School to cover the cost of the Student Affiliate Coverage plan for the remainder of the coverage period in which the parental leave is started, if they apply for this coverage through Yale Health within thirty days of the start of their leave.

Students granted a parental leave may continue to reside in University housing to the end of the academic term for which the leave was first granted, but no longer.

PARENTAL SUPPORT AND RELIEF

Registered Ph.D. students who wish to modify their academic responsibilities because of the birth or adoption of a child may request parental support and relief during or following the term in which the birth or adoption occurs. For the whole of the term in which the support and relief are requested, the student's academic clock stops, effectively adding an additional term to the total time to degree. During this period, students remain registered, receive the full financial aid package as specified in their letter of admission, and receive modified departmental academic expectations that best suit the specific situation. The precise nature of the academic responsibilities undertaken or suspended during this period should be a matter of consultation among the adviser, the student, and the Graduate School, with the understanding that students are entitled to full relief for at least an eight-week period. Students who take only eight weeks of relief during the term in which, or just after, a birth or adoption occurs may receive an additional eight weeks of stipend

funded by the Graduate School in a later term. Parental relief may not be combined with other funding. To arrange for parental relief, a student should contact the appropriate associate dean four months prior to the birth or adoption. This benefit is limited to two birth or adoption events. If both parents are graduate students at Yale, only one student may receive this benefit per birth or adoption event, though the second student may consult with the associate dean regarding a modification of academic responsibilities.

Graduate students in terminal M.A.S./M.A./M.S. programs may modify their academic responsibilities because of the birth or adoption of a child. They should contact their associate dean the term before the planned modifications would occur.

WITHDRAWAL AND READMISSION

A student may withdraw from his or her program voluntarily or may be withdrawn for cause. A student who wishes to terminate his or her program of study should confer with the director of graduate studies and the appropriate associate dean regarding withdrawal; their signatures on an official withdrawal form (available on the Graduate School Web site at <http://gsas.yale.edu/forms>) are required for withdrawal in good standing. The associate dean will determine the effective date of the withdrawal, upon consultation with the department. The University identification card must be submitted with the approved withdrawal form in order for withdrawal in good standing to be recorded.

Students who are not in good academic standing will be withdrawn for cause, unless an extension or exception has been granted by the appropriate dean or degree committee. Such withdrawals will be noted on the student's transcript.

Students who do not register for any fall or spring term, and for whom a leave of absence has not been approved by the appropriate associate dean, will be administratively withdrawn from the Graduate School.

A student who discontinues his or her program of study during the academic year without submitting an approved withdrawal form and the University identification card will be liable for the tuition charge (or Continuous Registration Fee) for the term in which the withdrawal occurs. Tuition charges for students who withdraw in good standing will be adjusted as described in the Schedule of Academic Dates and Deadlines. The Continuous Registration Fee for the term is not canceled if a student withdraws after the fourteenth day of the term. Health service policies related to withdrawal and readmission are described under Health Services, below.

Only students who have withdrawn from the Graduate School in good standing may apply for readmission. Normally, students seeking readmission must do so within three years of the original withdrawal. Neither readmission nor financial aid is guaranteed to students who withdraw. The deadline for making application for readmission is January 2 of the year in which the student wishes to return to the Graduate School. The student's application will be considered by the department, which will make a recommendation for review by the appropriate associate dean. The student's remaining tuition obligation will be determined at the time of readmission. Students may seek readmission no more than once. If subsequent to a readmission they must again withdraw, they are ineligible for readmission.

U.S. MILITARY LEAVE READMISSIONS POLICY

Students who wish or need to interrupt their studies to perform U.S. military service are subject to a separate U.S. military leave readmissions policy. In the event a student withdraws or takes a leave of absence from the Graduate School to serve in the U.S. military, the student will be entitled to guaranteed readmission under the following conditions:

1. The student must have served in the U.S. Armed Forces for a period of more than thirty consecutive days.
2. The student must give advance written or oral notice of such service to the appropriate dean. In providing the advance notice the student does not need to indicate whether he or she intends to return. This advance notice need not come directly from the student, but rather, can be made by an appropriate officer of the U.S. Armed Forces or official of the U.S. Department of Defense. Notice is not required if precluded by military necessity. In all cases, this notice requirement can be fulfilled at the time the student seeks readmission, by submitting an attestation that the student performed the service.
3. The student must not be away from the Graduate School to perform U.S. military service for a period exceeding five years (this includes all previous absences to perform U.S. military service but does not include any initial period of obligated service). If a student's time away from the Graduate School to perform U.S. military service exceeds five years because the student is unable to obtain release orders through no fault of the student or the student was ordered to or retained on active duty, the student should contact the appropriate dean to determine if the student remains eligible for guaranteed readmission.
4. The student must notify the Graduate School within three years of the end of the U.S. military service of his or her intention to return. However, a student who is hospitalized or recovering from an illness or injury incurred in or aggravated during the U.S. military service has up until two years after recovering from the illness or injury to notify the Graduate School of his or her intent to return.
5. The student cannot have received a dishonorable or bad conduct discharge or have been sentenced in a court-martial.

A student who meets all of these conditions will be readmitted for the next term, unless the student requests a later date of readmission. Any student who fails to meet one of these requirements may still be readmitted under the general readmission policy but is not guaranteed readmission.

Upon returning to the Graduate School, the student will resume his or her education without repeating completed course work for courses interrupted by U.S. military service. The student will have the same enrolled status last held and with the same academic standing. For the first academic year in which the student returns, the student will be charged the tuition and fees that would have been assessed for the academic year in which the student left the institution. Yale may charge up to the amount of tuition and fees other students are assessed, however, if veteran's education benefits will cover the difference between the amounts currently charged other students and the amount charged for the academic year in which the student left.

In the case of a student who is not prepared to resume his or her studies with the same academic status at the same point at which the student left or who will not be able to complete the program of study, the Graduate School will undertake reasonable efforts to help the student become prepared. If after reasonable efforts, the Graduate School determines that the student remains unprepared or will be unable to complete the program, or after the Graduate School determines that there are no reasonable efforts it can take, the Graduate School may deny the student readmission.

Personal Conduct

Yale University is an academic community dedicated to the advancement of learning. Its members freely associate themselves with the University and in doing so affirm their commitment to a philosophy of tolerance and respect for all members of the community. They pledge to help sustain the intellectual integrity of the University and to uphold its standards of honesty, free expression, and inquiry. They are expected to abide by the regulations of the University. They are also expected to obey local, state, and federal laws, and violations of these may be cause for discipline by the Graduate School. Students are required to report misdemeanor and felony charges to their associate dean.

The Graduate School specifically prohibits the following forms of behavior by graduate students:

1. Cheating on examinations, problem sets, and any other form of test; also, falsification and/or fabrication of data.
2. Plagiarism, that is, the failure in a dissertation, essay, or other written exercise to acknowledge ideas, research, or language taken from others.
3. Multiple submission of the same work without obtaining explicit written permission from both instructors before the material is submitted.
4. Misuse of the materials or facilities of the University library.
5. Unauthorized use of University services, equipment, or facilities, such as telephones and photocopying equipment.
6. Violation of University rules for using information technology services and facilities, including computers, the University network, and electronic mail. (See Policies for Use of Information Technology Services Facilities.)
7. Assault on, or coercion, harassment, or intimidation of, any member of the University community, including harassment on the basis of race, religion, gender, ethnicity, or sexual orientation; sexual harassment; or the use of a teaching position to harass or intimidate another student.
8. Engaging in a relationship with a student while serving as the student's teaching fellow or in any other direct supervisory role over the student (as outlined in the University's policy prohibiting "Teacher-Student Consensual Relationships").
9. Disruption of a legitimate function or activity of the University community, including disrupting classes and meetings, blocking entrances and exits to University buildings, unauthorized occupation of any space on the Yale campus, or preventing the free expression or dissemination of ideas. (See Freedom of Expression, below.)
10. Refusal to comply with the direction of a University police officer or other University official, including a member of the faculty, acting in the performance of her or his duties.

11. Misuse, alteration, or fabrication of University credentials or documents, such as an identification card or a transcript or grade list, including grade lists submitted by teaching fellows.
12. Misrepresentation or lying during a formal inquiry by University officials.
13. Misrepresentation in applying for admission or financial aid.
14. Theft, misuse of funds, or willful damage of University property. Off-campus misconduct may result in disciplinary action if such conduct imperils the integrity and values of the University community. Off-campus violations committed in the course of a Yale-sponsored program anywhere in the world could also be subject to disciplinary charges.
15. Trespassing on University property to which access is prohibited.
16. Possession or use of explosives, incendiary devices, or weapons on or about the campus.
17. Interference with the proper operation of safety or security devices, including fire alarms, electronic gates, and sprinkler systems.
18. Unlawful manufacture, possession, use, or distribution of illicit drugs or alcohol on University property or as part of any University activity.

Violations of any of the above regulations will be referred to the Graduate School Committee on Regulations and Discipline, composed of three graduate students, three faculty members, normally one from each division, and an associate dean. Violations of regulations pertaining to sexual misconduct or the University's Consensual Relations Policy will be referred to the University-Wide Committee on Sexual Misconduct. Students found guilty of such violations will be subject to one or more of the following disciplinary penalties:

- Reprimand
- Probation
- Suspension
- Dismissal
- Fines
- Restitution
- Restriction

Penalties of suspension or dismissal will be noted on the student's transcript. Pending disciplinary charges will be noted on a student's transcript if he or she withdraws from the Graduate School after being formally charged but before such charges have been resolved. A student who has petitioned for a degree will not receive the degree while charges are pending or while serving a suspension. A student who has been dismissed for a disciplinary violation may petition for a degree, to be awarded at the discretion of the Degree Committee, based on work completed before the infraction occurred. A student dismissed for academic misconduct will not receive a degree from the Graduate School regardless of requirements fulfilled before the infraction occurred. The Graduate School reserves the right to impose fines as appropriate, in addition to requiring payment for costs resulting from or associated with the offenses. In addition to imposing these penalties for offenses subject to disciplinary action, the University may refer students for prosecution, and students found guilty of unlawful possession, use, or distribution of

illicit drugs or alcohol on University property or as part of any University activity may be required to complete an appropriate rehabilitation program.

Copies of the procedures of the Committee on Regulations and Discipline may be obtained from the office of each of the associate deans of the Graduate School or via the Graduate School Web site (<http://gsas.yale.edu/policies>). The deans may be consulted for further information and advice. A copy of the procedures is sent automatically to any student who is charged with a violation of the Graduate School's regulations.

Grievance Procedures

To address complaints and grievances of various kinds, the Graduate School maintains a set of procedures. Copies of the grievance procedures of the Graduate School may be obtained from the office of each of the associate deans of the Graduate School or via the Graduate School Web site: <http://gsas.yale.edu/academic-professional-development/professional-ethics-regulations/student-grievances>. The deans may be consulted for further information and advice.

THE GRADUATE SCHOOL PROCEDURE FOR STUDENT COMPLAINTS

This procedure governs most student complaints, including, but not limited to, complaints of discrimination on the basis of race, sex, color, religion, national or ethnic origin, disability, or sexual orientation, against a member of the faculty or administration of the Graduate School. Complaints that involve a misapplication of Graduate School policy are also appropriate for consideration by the Dean's Advisory Committee on Student Grievances. Complaints that require an emendation of policy will be referred to the Graduate School Executive Committee. Complaints of sexual misconduct, which includes sexual harassment and sexual assault, may be brought to a Title IX Coordinator or to the University-Wide Committee on Sexual Misconduct (UWC). For more information on the University's Title IX Coordinators or the UWC, please see Resources on Sexual Misconduct under Yale University Resources and Services.

PROVOST'S PROCEDURE

The Provost's Procedure governs most student complaints, including, but not limited to, complaints of discrimination on the basis of race, sex, color, religion, national or ethnic origin, disability, or sexual orientation, against a faculty member who is not a member of the Faculty of Arts and Sciences, or against an employee who is not an administrator in the Graduate School or who is not subject to discipline by the student's dean. This procedure is available at www.yale.edu/equalopportunity/grievance. Complaints of sexual misconduct, which includes sexual harassment and sexual assault, may be brought to a Title IX Coordinator or to the University-Wide Committee on Sexual Misconduct (UWC). For more information on the University's Title IX Coordinators or the UWC, please see Resources on Sexual Misconduct under Yale University Resources and Services.

Freedom of Expression

The Yale faculty has formally endorsed as an official policy of Yale University the following statement from the Report of the Committee on Freedom of Expression at Yale, published in January 1975.

The primary function of a university is to discover and disseminate knowledge by means of research and teaching. To fulfill this function a free interchange of ideas is necessary not only within its walls but with the world beyond as well. It follows that the university must do everything possible to ensure within it the fullest degree of intellectual freedom. The history of intellectual growth and discovery clearly demonstrates the need for unfettered freedom, the right to think the unthinkable, discuss the unmentionable, and challenge the unchallengeable. To curtail free expression strikes twice at intellectual freedom, for whoever deprives another of the right to state unpopular views necessarily also deprives others of the right to listen to those views.

We take a chance, as the First Amendment takes a chance, when we commit ourselves to the idea that the results of free expression are to the general benefit in the long run, however unpleasant they may appear at the time. The validity of such a belief cannot be demonstrated conclusively. It is a belief of recent historical development, even within universities, one embodied in American constitutional doctrine but not widely shared outside the academic world, and denied in theory and in practice by much of the world most of the time.

Because few other institutions in our society have the same central function, few assign such high priority to freedom of expression. Few are expected to. Because no other kind of institution combines the discovery and dissemination of basic knowledge with teaching, none confronts quite the same problems as a university.

For if a university is a place for knowledge, it is also a special kind of small society. Yet it is not primarily a fellowship, a club, a circle of friends, a replica of the civil society outside it. Without sacrificing its central purpose, it cannot make its primary and dominant value the fostering of friendship, solidarity, harmony, civility, or mutual respect. To be sure, these are important values; other institutions may properly assign them the highest, and not merely a subordinate, priority; and a good university will seek and may in some significant measure attain these ends. But it will never let these values, important as they are, override its central purpose. We value freedom of expression precisely because it provides a forum for the new, the provocative, the disturbing, and the unorthodox. Free speech is a barrier to the tyranny of authoritarian or even majority opinion as to the rightness or wrongness of particular doctrines or thoughts.

If the priority assigned to free expression by the nature of a university is to be maintained in practice, clearly the responsibility for maintaining that priority rests with its members. By voluntarily taking up membership in a university and thereby asserting a claim to its rights and privileges, members also acknowledge the existence of certain obligations upon themselves and their fellows. Above all, every member of the university has an obligation to permit free expression in the university. No member has a right to prevent such expression. Every official of the university, moreover, has a special obligation to foster free expression and to ensure that it is not obstructed.

The strength of these obligations, and the willingness to respect and comply with them, probably depend less on the expectation of punishment for violation than they do on the presence of a widely shared belief in the primacy of free expression. Nonetheless, we believe that the positive obligation to protect and respect free expression shared by all members of the university should be enforced by appropriate formal

sanctions, because obstruction of such expression threatens the central function of the university. We further believe that such sanctions should be made explicit, so that potential violators will be aware of the consequences of their intended acts.

In addition to the university's primary obligation to protect free expression there are also ethical responsibilities assumed by each member of the university community, along with the right to enjoy free expression. Though these are much more difficult to state clearly, they are of great importance. If freedom of expression is to serve its purpose and thus the purpose of the university, it should seek to enhance understanding. Shock, hurt, and anger are not consequences to be weighed lightly. No member of the community with a decent respect for others should use, or encourage others to use, slurs and epithets intended to discredit another's race, ethnic group, religion, or sex. It may sometimes be necessary in a university for civility and mutual respect to be superseded by the need to guarantee free expression. The values superseded are nevertheless important, and every member of the university community should consider them in exercising the fundamental right to free expression.

We have considered the opposing argument that behavior which violates these social and ethical considerations should be made subject to formal sanctions, and the argument that such behavior entitles others to prevent speech they might regard as offensive. Our conviction that the central purpose of the university is to foster the free access of knowledge compels us to reject both of these arguments. They assert a right to prevent free expression. They rest upon the assumption that speech can be suppressed by anyone who deems it false or offensive. They deny what Justice Holmes termed "freedom for the thought that we hate." They make the majority, or any willful minority, the arbiters of truth for all. If expression may be prevented, censored, or punished, because of its content or because of the motives attributed to those who promote it, then it is no longer free. It will be subordinated to other values that we believe to be of lower priority in a university.

The conclusions we draw, then, are these: even when some members of the university community fail to meet their social and ethical responsibilities, the paramount obligation of the university is to protect their right to free expression. This obligation can and should be enforced by appropriate formal sanctions. If the university's overriding commitment to free expression is to be sustained, secondary social and ethical responsibilities must be left to the informal processes of suasion, example, and argument.

Financing Graduate School

TUITION AND FEES, 2015–2016

Tuition^{*}

Full-time study, per term	\$19,350
Full-time study in IDE, per term	19,850
Half-time study, per term	9,675
Master's programs, less than half-time per term	
One-quarter time study, per term	4,837.50
Division of Special Registration (DSR, nondegree study)	
Course work, per course, per term (including audited courses)	4,837.50
Visiting Affiliated Research Graduate Students, per term	19,350
Visiting Assistants in Research, per month	425

Fees[†]

Continuous Registration Fee (CRF), per term [‡]	\$540
Special in absentia registration, per term [‡]	540
Yale Health Hospitalization/Specialty Coverage, twelve months [§]	2,176

^{*}It is anticipated that tuition will be increased in subsequent years.

[†]It is anticipated that the Continuous Registration Fee will be increased in subsequent years.

Other fees are subject to change without notice. For fees relating to registration and course enrollment, see Course Enrollment, under Academic Regulations.

[‡]See Registration Status and Leaves of Absence, under Academic Regulations.

[§]Hospitalization fees are for single students. Rates are higher for students needing dependent coverage. Hospitalization/Specialty Coverage includes prescription coverage.

Appointment to a University post does not exempt a student from registration and payment of other fees. Full-time (and certain part-time) Yale managerial and professional employees and their spouses, postdoctoral appointees and their spouses, as well as the spouses of Yale faculty, are eligible for a tuition reduction in the DSR and master's programs. They should consult Human Resources for details. Postdoctoral appointees (whose appointment is at least half-time) may only receive tuition benefits if the classes taken are consistent with their educational training. With the permission of the instructor, full-time faculty members and their spouses, emeritus faculty and their spouses, postdoctoral appointees and their spouses, and University employees may audit courses without charge. The audited courses are not recorded on Graduate School transcripts. Classes audited by postdoctoral appointees should be consistent with the appointees' training objectives, and appointees should discuss their plans with their mentors to ensure that the course work does not interfere with research activities.

Candidates for degrees in the Graduate School, nondegree students paying full tuition, and spouses of full-time candidates for degrees in the Graduate School may audit courses without charge provided that they have received the approval of the course instructor.

STUDENT ACCOUNTS AND BILLS

Student accounts, billing, and related services are administered through the Office of Student Financial Services, which is located at 246 Church Street. The telephone number is 203.432.2700, or visit www.yale.edu/sfs/contactus.

Bills

Yale University's official means of communicating monthly financial account statements is through the University's Internet-based system for electronic billing and payment, Yale University eBill-ePay. Yale does not mail paper bills.

Student account statements are prepared and made available twelve times a year at the beginning of each month. Payment is due in full by 4 p.m. Eastern Time on the first business day of the following month. E-mail notifications that the account statement is available on the University eBill-ePay Web site (www.yale.edu/sis/ebep) are sent to all students at their official Yale e-mail addresses and to all student-designated authorized payers. From the eBill-ePay Web site, students can designate up to three authorized payers to access the eBill-ePay system in order to view the monthly student account statements and make online payments.

Bills for tuition, room, and board are available during the first week of July, due and payable by August 1 for the fall term; and during the first week of November, due and payable by December 1 for the spring term. The Office of Student Financial Services will impose late fees of \$125 per month (up to a total of \$375 per term) if any part of the term bill, less Yale-administered loans and scholarships that have been applied for on a timely basis, is not paid when due. Nonpayment of bills and failure to complete and submit financial aid application packages on a timely basis may result in the student's involuntary withdrawal from the University.

No degrees will be conferred and no transcripts will be furnished until all bills due the University are paid in full. In addition, transcripts will not be furnished to any student or former student who is in default on the payment of a student loan.

The University may withhold registration and certain University privileges from students who have not paid their term bills or made satisfactory payment arrangements by the day of registration. To avoid delay at registration, students must ensure that payments reach Student Financial Services by the due dates.

Payments

There are a variety of options offered for making payments. Yale University eBill-ePay (www.yale.edu/sis/ebep) is the *preferred* means for payment of your monthly student account bill. The ePayments are immediately posted to the student account. There is no charge to use this service. Bank information is password-protected and secure, and a printable confirmation receipt is available. On bill due dates, payments using the eBill-ePay system can be made up to 4 p.m. Eastern Time in order to avoid late fees.

For those who choose to pay the student account bill by check, remittance advice with mailing instructions is available on the eBill-ePay Web site. All bills must be paid in U.S. currency. Checks must be payable in U.S. dollars drawn on a U.S. bank. Payments can

also be made via wire transfer. Instructions for wire transfer are available on the eBill-ePay Web site.

Yale does *not* accept credit card payments.

A processing charge of \$25 will be assessed for payments rejected for any reason by the bank on which they were drawn. In addition, the following penalties may apply if a payment is rejected:

1. If the payment was for a term bill, a \$125 late fee will be charged for the period the bill was unpaid.
2. If the payment was for a term bill to permit registration, the student's registration may be revoked.
3. If the payment was given to settle an unpaid balance in order to receive a diploma, the University may refer the account to an attorney for collection.

Yale Payment Plan

The Yale Payment Plan (YPP) is a payment service that allows students and their families to pay tuition, room, and board in ten equal monthly installments throughout the year based on individual family budget requirements. It is administered by the University's Office of Student Financial Services. The cost to enroll in the YPP is \$100 per contract. The deadline for enrollment is June 25. For additional information, please contact Student Financial Services at 203.432.2700 and select "Press 1" from the Main Menu. Details concerning the Yale Payment Plan are available at www.fc.campusoncall.com/yp/intro.asp.

TRANSCRIPTS

Transcripts may be ordered online at www.yale.edu/sis or in writing from the Office of the Registrar for the Faculty of Arts and Sciences (246 Church Street, third floor). For each transcript order, the charge for the first transcript is \$7, with a charge of \$3 for each additional transcript ordered at the same time for the same address. Normally a transcript order is processed within forty-eight hours after receipt. There are additional charges for overnight delivery. www.yale.edu/sfas/registrar

FINANCIAL AID

Financial assistance is provided in the form of Yale University Fellowships, tuition fellowships, teaching fellowships, traineeships, and research assistantships. The nature of the assistance varies among the divisions and departments. In most departments and programs, doctoral students are guaranteed five years of twelve-month stipend and tuition support. Applicants for admission to Ph.D. programs will automatically be considered for all Yale fellowships, traineeships, research assistantships, and teaching fellowships for which they are eligible. These awards of financial aid are announced in letters of admission, which are usually mailed during the month of March. Applicants for admission to nondegree and terminal master's programs are required to complete the financial statement contained in the application brochure. Students are strongly encouraged to seek financial support from external sources (see External Fellowships and Combined Award Policy, below).

In addition to grants and fellowships for tuition and living costs, Yale Health Basic Coverage is provided at no cost to students enrolled at least half-time in M.A., M.S., and Ph.D. programs. Eligible Ph.D. students also receive a Health Award, which covers the full cost of single-student Yale Health Hospitalization/Specialty Coverage (includes coverage for prescriptions), half the cost of two-person coverage, and the full cost for family coverage. Students who do not participate in Yale Health Hospitalization/Specialty Coverage will not be provided with Health Awards. The graduate dental and vision plans are options that eligible students may choose to purchase for themselves and their dependents and are not covered by the Health Award. (For further information regarding health care options through Yale Health, see Health Services under Yale University Resources and Services.)

University Fellowships

The Graduate School provides all Ph.D. students with a minimum level of support for five years upon admission. Fellowships are awarded at admission to entering students on the basis of merit and recommendations made by individual departments. In most departments the source of stipend support will change after the first or second year of study to a teaching fellowship or research assistantship. Students who teach when such teaching is not part of the standard departmental pattern defer their University Fellowships to a later year and do not receive more than the standard departmental stipend while teaching.

Students awarded a University Fellowship may not accept any other award without the permission of the appropriate associate dean. The Graduate School is the final authority on University Fellowships and any combination of University funding with other sources of financial aid (see External Fellowships and Combined Award Policy, below).

Dissertation Fellowships

The Graduate School offers University Dissertation Fellowships (UDF) as part of its financial aid package to eligible advanced graduate students in the humanities and social sciences once they have advanced to doctoral candidacy. Students receive the UDF when engaged in full-time research and writing, normally in the fifth year of study. The UDF is usually taken in consecutive terms (beginning in either the fall or spring term) and must be completed by the end of the sixth year of study. It may never be held concurrently with a teaching fellowship of any kind. Students who accept a teaching position in the fall or spring of the year of final eligibility will forfeit that term's dissertation fellowship amount. Students receiving external funding for dissertation research or writing may be eligible for a combined award and should consult the External Fellowships and Combined Award policy.

Teaching Fellowships

TEACHING AND ADMISSION OFFERS

Because the Graduate School considers teaching experience to be an integral part of graduate education, doctoral students receive financial aid packages that include teaching fellowships. In many programs there are specific years when students are expected to

teach. For example, most humanities and social science students will teach in their third and fourth years. In the natural sciences, the timing of teaching is earlier or is flexible across several years. When requested by the student for compelling academic reasons, these patterns may be adjusted with the permission of the director of graduate studies contingent on the student's satisfactory academic progress and on sufficient course enrollment.

If the associate dean and director of graduate studies determine that no suitable teaching is available in a term in which a student is expected to teach, the student will continue to receive his or her standard departmental stipend that term. Stipend support will be withheld if a student elects not to teach as outlined in the student's offer of admission.

In the humanities and social sciences, students may be guaranteed teaching in the sixth year of study if the director of graduate study certifies that the student will submit the dissertation by August 31 of the sixth year of study.

ACCESS TO TEACHING FELLOWSHIPS

When departments are considering applications for teaching fellowships, priority is given to qualified graduate students who are expected to teach as indicated in their letter of admission or who are eligible for a guaranteed sixth year teaching position. Students in years two through six who have completed their required teaching may teach if enrollments permit and as long as they have been admitted to candidacy and do not concurrently hold a dissertation fellowship. Students who are permitted to register beyond the sixth year of study may be appointed as TFs or PTAIs, but only if there is no other qualified candidate available in the first six years of study in any department or program of the Graduate School. In cases where an appointing department must choose between two or more graduate students who are each well qualified to teach a particular course, the student or students who have not yet had a chance to teach or who have taught the least will be given preference.

LIMITS ON TEACHING

Except when specified in their letters of admission, first-year doctoral students may be appointed as teaching fellows only in exceptional cases, and only after prior approval by their director of graduate studies and the associate dean. In any year of study, the maximum amount of teaching a student in years one through six may do is two Level 10 assignments (up to ten hours per week) or one PTAI per term. Seventh-year students may teach up to three Level 20 assignments (up to twenty hours per week) per year. Students may not serve as faculty members while registered in the Graduate School.

Students seeking TF appointments outside of their departments should discuss their plans with their director of graduate studies well in advance of the start of a term.

Students with outside fellowships are eligible to serve as TFs according to the policies of the Graduate School and the conditions of their outside awards.

APPOINTMENT LETTERS

Letters of appointment are sent to graduate students via the online Teaching Fellow System (TFS) indicating the course in which a graduate student is expected to teach and the level of the assignment. An appointment is not official until the electronic appointment letter has been transmitted via the online TFS.

TEACHING FELLOW LEVELS

All teaching fellows teach at one of two effort levels. Level 10 TFs are expected to teach for 6–10 hours per week. Level 20 TFs are expected to teach for 15–20 hours per week. Science students engaged in required teaching and doctoral students in the humanities and social sciences who teach in years one through six receive the standard departmental stipend irrespective of assignment. All students, including master's and professional school students, who are teaching outside of a doctoral financial aid package will receive \$4,000 for a Level 10 assignment and \$8,000 for a Level 20 assignment.

Traineeships and Assistantships in Research

Traineeships (National Research Service Awards) from the National Institutes of Health are available in most of the biological sciences and in some other departments. These awards support full-time Ph.D. study by U.S. citizens, noncitizen nationals of the United States, and permanent residents. In combination with University and departmental supplements, they provide payment of tuition, a monthly stipend, and the hospitalization premium. Federal rules require that trainees pursue their research training on a full-time basis. In some instances, there is a federal payback provision, which is ordinarily satisfied by serving in health-related research or teaching at the conclusion of training. Information about this obligation and other matters relating to traineeships is available from the director of graduate studies or the principal investigator of the specific training grant in question.

Research Appointments

Doctoral students in departments where the faculty receive research grants or contracts may be eligible for appointments as assistants in research (AR). In most of the science departments, advanced Ph.D. students are normally supported as ARs by individual faculty research grants. An assistantship in research provides a monthly salary at a rate agreed upon by the department and the Graduate School. It is understood that the work performed not only is part of the faculty principal investigator's research project but also is the student's dissertation research and therefore in satisfaction of a degree requirement. For a standard AR appointment, in addition to the salary, the grant pays half of the tuition or all of the CRF. When the appointee is eligible for a University Fellowship, the other half of tuition is covered by a fellowship.

An appointment as a project assistant (PA) is intended for a student who performs services for a research project that are not a part of the student's degree program. A project assistant may normally work no more than ten hours per week. The rate of compensation is based on the department-approved rate paid to assistants in research. With the permission of the director of graduate studies and the appropriate associate dean, a student may receive a combination of project assistant and assistant in research appointments.

Questions about AR or PA appointments should be directed to the director of graduate studies or the appropriate associate dean in the Graduate School.

EXTERNAL FELLOWSHIPS AND COMBINED AWARD POLICY

To benefit both their current work and their future career prospects, students are strongly encouraged to seek funding from external agencies through grants. These awards, sponsored by both public and private agencies, confer distinction on a student who wins an award in a national competition. They are often more generous than the fellowships the University is able to provide.

Students receiving external awards have two options. They may either (1) hold the outside awards in conjunction with University stipends (including research and teaching fellowships) up to the total of the standard department/program stipend plus \$4,000 or (2) defer financial support awarded in their admission offer for up to one year. Students must report to their associate dean any scholarship/fellowship received from an outside agency or organization. The dean will then assist students in considering the benefits of each option.

Option 1: Supplementation of an External Fellowship

During the twelve-month academic year (September 1–August 31), the Graduate School's stipend award, made at the time of admission, may be used to supplement the sum of all external stipend awards to a maximum stipend equal to the total of the standard department/program stipend plus \$4,000. If the sum of the Graduate School's initial stipend award and all outside awards exceeds this limit, the Graduate School's stipend award will be reduced accordingly. In instances where an external award does not cover the full twelve-month academic year, the combined award will be determined by prorating the combined award over the period when the internal and external awards overlap.

Students who receive external fellowships providing yearly stipends that are more than the total of the standard department/program stipend plus \$4,000 will retain the full external fellowship funding and will receive no university supplement.

Option 2: Deferral of Graduate School Funding

Students receiving external awards in years one through five of study may defer for up to one year the Graduate School's stipend award made at the time of admission. Stipend awards may not be deferred beyond the sixth year of study.

ELIGIBILITY FOR FELLOWSHIPS

Students who hold Yale-administered fellowships are required to be in residence and engaged in full-time study. Permission to hold a fellowship in absentia must be obtained from the appropriate associate dean. A student who leaves New Haven, except for short vacation periods, without having such permission may have the fellowship canceled. No fellowships will be paid for any period when a student is not registered.

Students are not eligible for stipend support from the Graduate School after six years of study, but they remain eligible for private (nongovernmental) student loans as long as they are enrolled at least half-time.

A fellowship will be withdrawn and a stipend withheld if the recipient's activities become prejudicial to the purpose for which the fellowship was granted or if a student becomes ineligible to register for any reason.

OTHER MEANS OF FINANCING GRADUATE EDUCATION

Part-Time Employment

Unless otherwise noted in the letter of admission, students are expected to register on a full-time basis. Part-time employment at the University or elsewhere should not conflict with the obligations of the degree program or interfere with academic progress. International students must consult the Office of International Students and Scholars (OISS) regarding their eligibility for employment while in the United States.

Part-time employment beyond an average of ten hours per week requires permission of the director of graduate studies in consultation with the appropriate associate dean.

Students who hold student loans must report all part-time employment earnings to the Office of Financial Aid. Failure to do so may result in cancellation of the loan(s).

Loans and Work-Study

U.S. citizens may be eligible to borrow through federally subsidized loan programs. Eligibility is based on federal regulations and University policies. Information is available from the Office of Financial Aid, 106 Warner House, 1 Hillhouse Ave.

Eligible students in the Graduate School may be able to borrow from the following federal student loan programs: Federal Direct Loans and Federal Perkins Loans.

The College Work-Study (CWS) program, which is federally funded, enables eligible graduate students to meet a portion of their academic year financial need through part-time employment.

All students applying for any of these federal programs must fill out a Free Application for Federal Student Aid (FAFSA). Information on loan and work-study programs is contained in *Financial Information for Entering Graduate Students*, included with the student's letter of admission. These documents are available from the Office of Financial Aid. Information and FAFSA applications are also available at the Web site of the United States Department of Education (www.fafsa.ed.gov).

Yale currently offers a loan for international students. Features of the Yale International Loan include no requirement for a co-signer and a ten-year repayment period. Students may apply for the Yale International Loan or any other loan of their choice. Students are encouraged to identify a loan that best suits their needs. Information is available from the Office of Financial Aid, 106 Warner House, 1 Hillhouse Ave.

TWO FEDERAL REGULATIONS GOVERNING TITLE IV FINANCIAL AID PROGRAMS

Satisfactory Academic Progress

Federal regulations require that students be making satisfactory academic progress each year in order to be eligible for Title IV funding (i.e., federal loans, Javits Fellowships, and College Work-Study). The standards by which satisfactory academic progress is measured are determined by the Graduate School and by individual departments. See Degree-Granting Departments and Programs in this bulletin for more information.

Department of Education Refund Policy

Students receiving Title IV financial assistance who withdraw during a term and are entitled to a refund of any University charges will have their Title IV assistance adjusted according to a formula specified by the Department of Education. Please consult the Office of Financial Aid, 106 Warner House, 1 Hillhouse Ave.

Yale University Resources and Services

LIVING ACCOMMODATIONS

Graduate Housing—On Campus

<http://gradhousing.yale.edu>

The Yale Housing Office has dormitory and apartment units available for graduate and professional students. Dormitories are single occupancy of varying sizes and prices. They are located across the campus, from Edward S. Harkness Memorial Hall, serving the medical campus, to the Hall of Graduate Studies and Helen Hadley Hall, serving the central/science campus. Unfurnished apartments consisting of efficiencies and one-, two-, and three-bedroom apartments for singles and families are also available. The office's Web site is the venue for graduate housing information and includes procedures, facility descriptions, floor plans, and rates. Applications for the new academic year are available beginning April 1 and can be submitted directly from the Web site. Students are required to submit a copy of their letter of acceptance from Yale with their application.

The Yale Housing Office is located in Helen Hadley Hall (HHH) at 420 Temple Street. It is open from 9 a.m. to 4 p.m., Monday through Friday; 203.432.2167.

Off-Campus Listing Service

<http://offcampusliving.yale.edu>

The Yale Housing Office also manages the Off Campus Living listing service (<http://offcampusliving.yale.edu>; 203.432.9756), which is the exclusive Yale service for providing off-campus rental and sales listings. This secure system allows members of the Yale community to search rental listings, review landlord/property ratings, and search for a roommate. On-campus housing is limited, and members of the community should consider off-campus options. Yale University discourages the use of Craigslist and other nonsecure Web sites for off-campus housing searches.

University Properties

www.yale.edu/properties

University Properties manages Yale University's commercial properties, including retail stores, office spaces, and residential units, in New Haven. The office is committed to enhancing the quality of life at Yale and in New Haven through the development of high quality retail and office environments and the revitalization of surrounding neighborhoods.

University Properties offers a variety of quality, market-rate housing options to the Yale community, including studio apartments, one- to four-bedroom apartments, townhouses, and single-family homes. All units border the Yale campus. A select group are dedicated as housing for graduate students only, and many of these units are recently renovated.

Dining

www.yale.edu/dining/options/Gradmealplan.html

Yale Dining (YD) has tailored its services to meet the particular needs of graduate and professional school students by offering meal plan options that allow flexibility and value. The HGS 150 Plan is a block meal plan that gives graduate and professional school students 150 meals to use anytime during the term. The plan is required for all Hall of Graduate Studies residents as a minimum meal plan; it is one of several optional meal plans available to students who live off-campus. For up-to-date information on all options, costs, and Yale Dining's residential and retail locations, visit www.yale.edu/dining. Inquiries concerning food services should be addressed to Yale Dining, 246 Church Street, PO Box 208261, New Haven CT 06520-8261; email: yale.dining@yale.edu; tel, 203.432.0420.

HEALTH SERVICES

<http://yalehealth.yale.edu>

The Yale Health Center is located on campus at 55 Lock Street. The center is home to Yale Health, a not-for-profit, physician-led health coverage option that offers a wide variety of health care services for students and other members of the Yale community. Services include student medicine, gynecology, mental health, pediatrics, pharmacy, laboratory, radiology, a seventeen-bed inpatient care unit, a round-the-clock acute care clinic, and specialty services such as allergy, dermatology, orthopedics, and a travel clinic. Yale Health coordinates and provides payment for the services provided at the Yale Health Center, as well as for emergency treatment, off-site specialty services, inpatient hospital care, and other ancillary services. Yale Health's services are detailed in the *Yale Health Student Handbook*, available through the Yale Health Member Services Department, 203.432.0246, or online at <http://yalehealth.yale.edu/understand-your-coverage>.

Eligibility for Services

All full-time Yale degree-candidate students who are paying at least half tuition are enrolled automatically for Yale Health Basic Coverage. Yale Health Basic Coverage is offered at no charge and includes preventive health and medical services in the departments of Student Health, Gynecology, Health Education, and Mental Health & Counseling. In addition, treatment for urgent medical problems can be obtained twenty-four hours a day through Acute Care.

Students on leave of absence or on extended study and paying less than half tuition are not eligible for Yale Health Basic Coverage but may enroll in Yale Health Student Affiliate Coverage. Students enrolled in the Division of Special Registration as nondegree special students or visiting scholars are not eligible for Yale Health Basic Coverage but may enroll in the Yale Health Billed Associates Plan and pay a monthly fee. Associates must register for a minimum of one term within the first thirty days of affiliation with the University.

Students not eligible for Yale Health Basic Coverage may also use the services on a fee-for-service basis. Students who wish to be seen fee-for-service must register with the Member Services Department. Enrollment applications for the Yale Health Student

Affiliate Coverage, Billed Associates Plan, or Fee-for-Service Program are available from the Member Services Department.

All students who purchase Yale Health Hospitalization/Specialty Coverage (see below) are welcome to use specialty and ancillary services at Yale Health Center. Upon referral, Yale Health will cover the cost of specialty and ancillary services for these students. Students with an alternate insurance plan should seek specialty services from a provider who accepts their alternate insurance.

Health Coverage Enrollment

The University also requires all students eligible for Yale Health Basic Coverage to have adequate hospital insurance coverage. Students may choose Yale Health Hospitalization/Specialty Coverage or elect to waive the plan if they have other hospitalization coverage, such as coverage through a spouse or parent. The waiver must be renewed annually, and it is the student's responsibility to confirm receipt of the waiver by the University's deadlines noted below.

YALE HEALTH HOSPITALIZATION/SPECIALTY COVERAGE

For a detailed explanation of this plan, which includes coverage for prescriptions, see the *Yale Health Student Handbook*, available online at <http://yalehealth.yale.edu/understand-your-coverage>.

Students are automatically enrolled and charged a fee each term on their Student Financial Services bill for Yale Health Hospitalization/Specialty Coverage. Students with no break in coverage who are enrolled during both the fall and spring terms are billed each term and are covered from August 1 through July 31. For students entering Yale for the first time, readmitted students, and students returning from a leave of absence who have not been covered during their leave, Yale Health Hospitalization/Specialty Coverage begins on the day the dormitories officially open. A student who is enrolled for the fall term only is covered for services through January 31; a student enrolled for the spring term only is covered for services through July 31.

Waiving Yale Health Hospitalization/Specialty Coverage Students are permitted to waive Yale Health Hospitalization/Specialty Coverage by completing an online waiver form at <https://www.yhpstudentwaiver.yale.edu> that demonstrates proof of alternate coverage. It is the student's responsibility to report any changes in alternate insurance coverage to the Member Services Department. Students are encouraged to review their present coverage and compare its benefits to those available under Yale Health. The waiver form must be filed annually and must be received by September 15 for the full year or fall term or by January 31 for the spring term only.

Revoking the waiver Students who waive Yale Health Hospitalization/Specialty Coverage but later wish to be covered must complete and send a form voiding their waiver to the Member Services Department by September 15 for the full year or fall term, or by January 31 for the spring term only. Students who wish to revoke their waiver during the term may do so, provided they show proof of loss of the alternate insurance plan and enroll within thirty days of the loss of this coverage. Yale Health fees will not be prorated.

YALE HEALTH STUDENT TWO-PERSON AND FAMILY PLANS

A student may enroll his or her lawfully married spouse or civil union partner and/or legally dependent child(ren) under the age of twenty-six in one of two student dependent plans: the Two-Person Plan or the Student Family Plan. These plans include services described in both Yale Health Basic Coverage and Yale Health Hospitalization/Specialty Coverage. Coverage is not automatic, and enrollment is by application. Applications are available from the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>) and must be renewed annually. Applications must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

YALE HEALTH STUDENT AFFILIATE COVERAGE

Students on leave of absence or extended study, students paying less than half tuition, or students enrolled in the Eli Whitney Program prior to September 2007 may enroll in Yale Health Student Affiliate Coverage, which includes services described in both Yale Health Basic and Yale Health Hospitalization/Specialty Coverage. Applications are available from the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>) and must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

Eligibility Changes

Withdrawal A student who withdraws from the University during the first ten days of the term will be refunded the fee paid for Yale Health Hospitalization/Specialty Coverage. The student will not be eligible for any Yale Health benefits, and the student's Yale Health membership will be terminated retroactive to the beginning of the term. The medical record will be reviewed, and any services rendered and/or claims paid will be billed to the student on a fee-for-service basis. Assistance with identifying and locating alternative sources of medical care may be available from the Care Management Department at Yale Health. At all other times, a student who withdraws from the University will be covered by Yale Health for thirty days following the date of withdrawal. Fees will not be prorated or refunded. Students who withdraw are not eligible to enroll in Yale Health Student Affiliate Coverage. Regardless of enrollment in Yale Health Hospitalization/Specialty Coverage, students who withdraw will have access to services available under Yale Health Basic Coverage (including Student Health, Athletic Medicine, Mental Health & Counseling, and Care Management) during these thirty days to the extent necessary for a coordinated transition of care.

Leaves of absence Students who are granted a leave of absence are eligible to purchase Yale Health Student Affiliate Coverage during the term(s) of the leave. If the leave occurs during the term, Yale Health Hospitalization/Specialty Coverage will end on the date the leave is granted, and students may enroll in Yale Health Student Affiliate Coverage. Students must enroll in Affiliate Coverage prior to the beginning of the term during which the leave is taken or within thirty days of the start of the leave. Fees paid for Yale Health Hospitalization/Specialty Coverage will be applied toward the cost of Affiliate Coverage. Coverage is not automatic, and enrollment forms are available at the Member Services

Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>). Fees will not be prorated or refunded.

Extended study or reduced tuition Students who are granted extended study status or pay less than half tuition are not eligible for Yale Health Hospitalization/Specialty Coverage. They may purchase Yale Health Student Affiliate Coverage during the term(s) of extended study. This plan includes services described in both Yale Health Basic and Yale Health Hospitalization/Specialty Coverage. Coverage is not automatic, and enrollment forms are available at the Member Services Department or can be downloaded from the Web site (<http://yalehealth.yale.edu>). Students must complete an enrollment application for the plan prior to September 15 for the full year or fall term, or by January 31 for the spring term only.

For a full description of the services and benefits provided by Yale Health, please refer to the *Yale Health Student Handbook*, available from the Member Services Department, 203.432.0246, 55 Lock Street, PO Box 208237, New Haven CT 06520-8237.

Required Immunizations

Measles (rubeola), German measles (rubella), and mumps All students who were born after January 1, 1957, are required to provide proof of immunization against measles (rubeola), German measles (rubella), and mumps. Connecticut state law requires two doses of measles vaccine. The first dose must have been given on or after January 1, 1980, *and* after the student's first birthday; the second dose must have been given at least thirty (30) days after the first dose. Connecticut state law requires proof of two doses of rubella vaccine administered on or after January 1, 1980, *and* after the student's first birthday. Connecticut state law requires proof of two mumps vaccine immunizations administered on or after January 1, 1980, *and* after the student's first birthday; the second dose must have been given at least thirty (30) days after the first dose. The law applies to all students unless they present (a) a certificate from a physician stating that such immunization is contraindicated, (b) a statement that such immunization would be contrary to the student's religious beliefs, or (c) documentation of a positive blood titer for measles, rubella, and mumps.

Meningitis All students living in on-campus housing must be vaccinated against meningitis. The vaccine must have been received after January 1, 2011. Students who are not compliant with this state law will not be permitted to register for classes or move into the dormitories for the fall term, 2015. Please note that the State of Connecticut does not require this vaccine for students who intend to reside off campus.

Varicella (chicken pox) All students are required to provide proof of immunization against varicella. Connecticut state law requires two doses of varicella vaccine. The first dose must have been given on or after the student's first birthday; the second dose must have been given at least twenty-eight (28) days after the first dose. Documentation from a health care provider that the student has had a confirmed case of the disease is also acceptable.

TB screening The University requires tuberculosis screening for all incoming students. Please see the Yale Health Web site (<http://yalehealth.yale.edu/forms>) for more details.

Note: Students who have not met these requirements prior to arrival at Yale University must receive the immunizations from Yale Health and will be charged accordingly.

COMPUTING AND TELECOMMUNICATIONS

<http://its.yale.edu>

Information Technology Services (ITS) is the central computing and communications services organization for the University, providing academic computing, data networking, telephone services, voice and video networking, computer sales, training, printing and copying services, and general user support.

The Student Technology Collaborative (STC) furnishes and supports general purpose computing clusters at many locations on campus (<http://its.yale.edu/services/computer-labs-and-printing>), including the graduate student residences (Helen Hadley Hall, HGS, 254 Prospect, and 276 Prospect), where the computing facility is accessible to residents twenty-four hours a day. Windows and Apple computers and laser printers are available for open use by the Yale community at Bass Library, Dunham Laboratory, the Center for Science and Social Science Information, Sterling Chemistry Laboratory, and Connecticut Hall.

The online purchasing site (www.yale.edu/eportal) sells computers, networking cards, and printers, as well as software and supplies. Apple, Lenovo, and Dell now support direct purchase of computers over the Internet, with systems properly configured for the Yale network. Up-to-date information on pricing and ordering can be found at the ePortal Web site. For more information and recommendations for purchasing computer supplies, see the online buying guide (<http://its.yale.edu/software-technology/buying-guide>).

Graduate students in Arts and Sciences receive free technical support on their personal computers through the STC (<http://its.yale.edu/centers/student-technology-collaborative-stc>). Certified technicians provide warranty support on Dell and Apple computers. Students should bring all of their supporting documentation for their computers with them to campus (especially software CDs and DVDs), to facilitate necessary repairs.

Network Access to Yale Services and Beyond

<http://its.yale.edu/services>

ITS Network Services manages Yale's voice and data network services. These include basic telephone services, long distance, voice mail, operator services, conferencing services, cable TV, Internet and Internet 2 connectivity, and all the related cable and distribution facilities on the Central, Medical, and West Campuses.

Long-distance service for telephones on campus is available through the University's private network, YALENET (<http://its.yale.edu/services/phones-and-cable-tv>).

All on-campus residences, offices, and laboratories are equipped with wired Yale network outlets. Wireless (YaleSecure) network access is available in all of the buildings on campus. Both wired and wireless network access is available in the public areas of HGS, in the Sterling Memorial Library (SML) reading room, and for doctoral students in the SML carrels. Registered users may access network resources through wired or wireless connections.

Students should register their computers to access services on the Yale wired network (<http://its.yale.edu/services/wifi-and-networks>). To enhance support for graduate student research activities, the University provides network-roaming access for laptop computers.

OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS

www.yale.edu/oiss

The Office of International Students and Scholars (OISS) coordinates services and support for Yale's 5,000 international students, faculty, staff, and their dependents. OISS staff offers assistance with issues related to employment, immigration, and personal and cultural adjustment, as well as serves as a source of general information about living at Yale and in New Haven. As Yale University's representative for immigration concerns, OISS provides assistance to students, faculty, and staff on how to obtain and maintain legal nonimmigrant status in the United States. All international students and scholars must register with OISS as soon as they arrive at Yale; see <http://oiss.yale.edu/information-new-yalies>.

OISS programs, like the Community Friends hosting program, daily English conversation groups, U.S. culture workshops and discussions, bus trips, and social events, provide an opportunity to meet members of Yale's international community and become acquainted with the many resources of Yale University and New Haven. Spouses and partners of Yale students and scholars will want to get involved with the International Spouses and Partners at Yale (ISPY), which organizes a variety of programs.

The OISS Web site (<http://oiss.yale.edu>) provides useful information to students and scholars prior to and upon arrival in New Haven, as well as throughout their stay at Yale. International students, scholars, and their families and partners can connect with OISS and the Yale international community virtually through several listservs and Facebook.

OISS is housed in the International Center for Yale Students and Scholars, which serves as a welcoming venue for students and scholars who want to peruse resource materials, check their e-mail, and meet up with a friend or colleague. Open until 9 p.m. on weekdays during the academic year, the center—located at 421 Temple Street, across the street from Helen Hadley Hall—also provides meeting space for student groups and a venue for events organized by both student groups and University departments. For more information about reserving space at the center, send a message to oiss@yale.edu or call 203.432.2305. For information about the center, visit <http://oiss.yale.edu/about/international-center>.

RESOURCE OFFICE ON DISABILITIES

www.yale.edu/rod

The Resource Office on Disabilities facilitates accommodations for undergraduate and graduate and professional school students with disabilities who register with and have appropriate documentation on file in the Resource Office. Early planning is critical. Documentation may be submitted to the Resource Office even though a specific accommodation request is not anticipated at the time of registration. It is recommended that matriculating students in need of disability-related course accommodations at Yale University contact the Resource Office by June 15. Special requests for University housing need to be made in the housing application. Returning students must contact the Resource Office at the beginning of each term to arrange for course and exam accommodations.

The Resource Office also provides assistance to students with temporary disabilities. General informational inquiries are welcome from students and members of the Yale community and from the public. The mailing address is Resource Office on Disabilities, Yale University, PO Box 208305, New Haven CT 06520-8305. The Resource Office is located at 35 Broadway (rear entrance), Room 222. Office hours are Monday through Friday, 8:30 a.m. to 4:30 p.m. Voice callers may reach staff at 203.432.2324; fax at 203.432.8250. The Resource Office may also be reached by e-mail (anthony.kulikowski@yale.edu) or through its Web site (www.yale.edu/rod).

RESOURCES ON SEXUAL MISCONDUCT

Yale University is committed to maintaining and strengthening an educational, employment, and living environment founded on civility and mutual respect. Sexual misconduct is antithetical to the standards and ideals of our community, and it is a violation of Yale policy and the disciplinary regulations of Yale College and the graduate and professional schools.

Sexual misconduct incorporates a range of behaviors including sexual assault, sexual harassment, intimate partner violence, stalking, voyeurism, and any other conduct of a sexual nature that is nonconsensual, or has the purpose or effect of threatening, intimidating, or coercing a person. Sexual activity requires consent, which is defined as voluntary, positive agreement between the participants to engage in specific sexual activity. Violations of Yale's Policy on Teacher-Student Consensual Relations also constitute sexual misconduct.

Yale aims to eradicate sexual misconduct through education, training, clear policies, and serious consequences for violations of these policies. In addition to being subject to University disciplinary action, many forms of sexual misconduct are prohibited by Connecticut and federal law and may lead to civil liability or criminal prosecution. Yale provides a range of services, resources, and mechanisms for victims of sexual misconduct. The options for undergraduate, graduate, and professional school students are described at <http://smr.yale.edu>.

SHARE: Information, Advocacy, and Support

55 Lock Street, Lower Level

Office hours: 9 a.m.–5 p.m., M–F

24/7 hotline: 203.432.2000

<http://sharecenter.yale.edu>

SHARE, the Sexual Harassment and Assault Response and Education Center, has trained counselors available at any time of day or night via its direct hotline, as well as drop-in counseling on weekdays during regular business hours. SHARE is available to members of the Yale community who wish to discuss any experience of sexual misconduct involving themselves or someone they care about. SHARE services are confidential and can be anonymous when desired. SHARE can provide professional help with medical and health issues (including accompanying students to the hospital), as well as advice and assistance with contacting police and/or initiating a formal or informal complaint, and it offers ongoing counseling and support. SHARE works closely with the University-Wide Committee on Sexual Misconduct, the Title IX coordinators, the Yale Police Department, and other campus resources.

If you wish to make use of SHARE's services, you can call the crisis number (203.432.2000) at any time for a phone consultation or to set up an in-person appointment. You may also drop in on weekdays during regular business hours. Some legal and medical options are time-sensitive, so if you have been assaulted, we encourage you to call SHARE and/or the Yale Police as soon as possible. Counselors can talk with you over the telephone or meet you in person at Acute Care in the Yale Health Center or at the Yale-New Haven Emergency Room. If it is not an acute situation and you would like to contact the SHARE staff during regular business hours, you can contact Carole Goldberg, the director of SHARE (203.432.0310, carole.goldberg@yale.edu), Jennifer Czincz, assistant director (203.432.2610, jennifer.czincz@yale.edu), Amy Myers (203.436.8197, amy.myers@yale.edu), or John Criscuolo (203.494.6247, john.criscuolo@yale.edu).

Title IX Coordinators

<http://provost.yale.edu/title-ix>

Title IX of the Education Amendments of 1972 protects people from sex discrimination in educational programs and activities at institutions that receive federal funding. Sex discrimination includes sexual harassment, sexual assault, and other forms of misconduct. The University is committed to providing an environment free from discrimination on the basis of sex.

Each school, including Yale College, has assigned a senior administrator to act as a deputy Title IX coordinator, reporting to Stephanie Spangler, Deputy Provost for Health Affairs and Academic Integrity and the University Title IX Coordinator. Coordinators provide information, track and resolve complaints, and address issues relating to gender-based discrimination and sexual misconduct within their respective schools. Coordinators are knowledgeable about, and will provide information on, all options for complaint resolution, and can initiate institutional action when necessary. Discussions with a Title IX coordinator will be treated confidentially; at times, the coordinator may

need to consult with other administrators or take action in the interest of safety. The coordinators also work closely with the SHARE Center, the University-Wide Committee on Sexual Misconduct, and the Yale Police Department.

University-Wide Committee on Sexual Misconduct

203.432.4449 (business hours)

<http://provost.yale.edu/uwc>

The University-Wide Committee on Sexual Misconduct (UWC) is an internal disciplinary board for complaints of sexual misconduct available to students, faculty, and staff across the University, as described in the committee's procedures. The UWC provides an accessible, representative, and trained body to fairly and expeditiously address formal and informal complaints of sexual misconduct. UWC members can answer informal inquiries about procedures and the University definition of sexual misconduct. Operated from the Provost's Office, the UWC is comprised of faculty, administrative, and student representatives from across the University. In cases where formal resolution is sought, investigations are conducted by professional, independent fact finders.

Yale Police Department

101 Ashmun Street

24/7 hotline: 203.432.4400

<http://publicsafety.yale.edu/police/sensitive-crimes-support>

The Yale Police Department (YPD) operates 24/7 and is comprised of highly trained, professional officers. The YPD can provide information on available victims' assistance services and also has the capacity to perform full criminal investigations. If you wish to speak with Sergeant Marnie Robbins Hoffman, the Sensitive Crimes & Support coordinator, she can be reached at 203.432.9547 during business hours or via e-mail at marnie.robbs@yale.edu. Informational sessions are available with the Sensitive Crimes & Support coordinator to discuss safety planning, available options, etc. The YPD works closely with the New Haven State's Attorney, the SHARE Center, the University's Title IX coordinators, and various other departments within the University. Talking to the YPD does not commit you to submitting evidence or pressing charges; with few exceptions, all decisions about how to proceed are up to you.

The Work of Yale University

The work of Yale University is carried on in the following schools:

Yale College Est. 1701. Courses in humanities, social sciences, natural sciences, mathematical and computer sciences, and engineering. Bachelor of Arts (B.A.), Bachelor of Science (B.S.).

For additional information, please visit <http://admissions.yale.edu>, e-mail student.questions@yale.edu, or call 203.432.9300. Postal correspondence should be directed to Office of Undergraduate Admissions, Yale University, PO Box 208234, New Haven CT 06520-8234.

Graduate School of Arts and Sciences Est. 1847. Courses for college graduates. Master of Advanced Study (M.A.S.), Master of Arts (M.A.), Master of Science (M.S.), Master of Philosophy (M.Phil.), Doctor of Philosophy (Ph.D.).

For additional information, please visit <http://gsas.yale.edu>, e-mail graduate.admissions@yale.edu, or call the Office of Graduate Admissions at 203.432.2771. Postal correspondence should be directed to Office of Graduate Admissions, Yale Graduate School of Arts and Sciences, PO Box 208323, New Haven CT 06520-8323.

School of Medicine Est. 1810. Courses for college graduates and students who have completed requisite training in approved institutions. Doctor of Medicine (M.D.). Post-graduate study in the basic sciences and clinical subjects. Five-year combined program leading to Doctor of Medicine and Master of Health Science (M.D./M.H.S.). Combined program with the Graduate School of Arts and Sciences leading to Doctor of Medicine and Doctor of Philosophy (M.D./Ph.D.). Master of Medical Science (M.M.Sc.) from the Physician Associate Program.

For additional information, please visit <http://medicine.yale.edu/education/admissions>, e-mail medical.admissions@yale.edu, or call the Office of Admissions at 203.785.2643. Postal correspondence should be directed to Office of Admissions, Yale School of Medicine, 367 Cedar Street, New Haven CT 06510.

Divinity School Est. 1822. Courses for college graduates. Master of Divinity (M.Div.), Master of Arts in Religion (M.A.R.). Individuals with an M.Div. degree may apply for the program leading to the degree of Master of Sacred Theology (S.T.M.).

For additional information, please visit <http://divinity.yale.edu>, e-mail divinity.admissions@yale.edu, or call the Admissions Office at 203.432.5360. Postal correspondence should be directed to Admissions Office, Yale Divinity School, 409 Prospect Street, New Haven CT 06511.

Law School Est. 1824. Courses for college graduates. Juris Doctor (J.D.). For additional information, please visit www.law.yale.edu, e-mail admissions.law@yale.edu, or call the Admissions Office at 203.432.4995. Postal correspondence should be directed to Admissions Office, Yale Law School, PO Box 208215, New Haven CT 06520-8215.

Graduate Programs: Master of Laws (LL.M.), Doctor of the Science of Law (J.S.D.), Master of Studies in Law (M.S.L.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. For additional information, please visit www.law.yale.edu, e-mail gradpro.law@yale.edu, or call the Graduate Programs Office at

203.432.1696. Postal correspondence should be directed to Graduate Programs, Yale Law School, PO Box 208215, New Haven CT 06520-8215.

School of Engineering & Applied Science Est. 1852. Courses for college graduates. Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://seas.yale.edu>, e-mail grad.engineering@yale.edu, or call 203.432.4252. Postal correspondence should be directed to Office of Graduate Studies, Yale School of Engineering & Applied Science, PO Box 208267, New Haven CT 06520-8267.

School of Art Est. 1869. Professional courses for college and art school graduates. Master of Fine Arts (M.F.A.).

For additional information, please visit <http://art.yale.edu>, e-mail artschool.info@yale.edu, or call the Office of Academic Affairs at 203.432.2600. Postal correspondence should be directed to Office of Academic Affairs, Yale School of Art, PO Box 208339, New Haven CT 06520-8339.

School of Music Est. 1894. Graduate professional studies in performance, composition, and conducting. Certificate in Performance, Master of Music (M.M.), Master of Musical Arts (M.M.A.), Artist Diploma, Doctor of Musical Arts (D.M.A.).

For additional information, please visit <http://music.yale.edu>, e-mail gradmusic.admissions@yale.edu, or call the Office of Admissions at 203.432.4155. Postal correspondence should be directed to Yale School of Music, PO Box 208246, New Haven CT 06520-8246.

School of Forestry & Environmental Studies Est. 1900. Courses for college graduates. Master of Forestry (M.F.), Master of Forest Science (M.F.S.), Master of Environmental Science (M.E.Sc.), Master of Environmental Management (M.E.M.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://environment.yale.edu>, e-mail fesinfo@yale.edu, or call the Office of Admissions at 800.825.0330. Postal correspondence should be directed to Office of Admissions, Yale School of Forestry & Environmental Studies, 195 Prospect Street, New Haven CT 06511.

School of Public Health Est. 1915. Courses for college graduates. Master of Public Health (M.P.H.). Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://publichealth.yale.edu>, e-mail ysph.admissions@yale.edu, or call the Admissions Office at 203.785.2844.

School of Architecture Est. 1916. Courses for college graduates. Professional degree: Master of Architecture (M.Arch.); nonprofessional degree: Master of Environmental Design (M.E.D.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://architecture.yale.edu>, e-mail gradarch.admissions@yale.edu, or call 203.432.2296. Postal correspondence should be directed to the Yale School of Architecture, PO Box 208242, New Haven CT 06520-8242.

School of Nursing Est. 1923. Courses for college graduates. Master of Science in Nursing (M.S.N.), Post Master's Certificate, Doctor of Nursing Practice (D.N.P.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://nursing.yale.edu> or call 203.785.2389. Postal correspondence should be directed to Yale School of Nursing, Yale University West Campus, PO Box 27399, West Haven CT 06516-7399.

School of Drama Est. 1925. Courses for college graduates and certificate students. Master of Fine Arts (M.F.A.), Certificate in Drama, One-year Technical Internship (Certificate), Doctor of Fine Arts (D.F.A.).

For additional information, please visit <http://drama.yale.edu>, e-mail ysd.admissions@yale.edu, or call the Registrar/Admissions Office at 203.432.1507. Postal correspondence should be directed to Yale School of Drama, PO Box 208325, New Haven CT 06520-8325.

School of Management Est. 1976. Courses for college graduates. Master of Business Administration (M.B.A.), Master of Advanced Management (M.A.M.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please visit <http://som.yale.edu>. Postal correspondence should be directed to Yale School of Management, PO Box 208200, New Haven CT 06520-8200.

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YALE UNIVERSITY CAMPUS SOUTH & YALE MEDICAL CENTER



The University is committed to basing judgments concerning the admission, education, and employment of individuals upon their qualifications and abilities and affirmatively seeks to attract to its faculty, staff, and student body qualified persons of diverse backgrounds. In accordance with this policy and as delineated by federal and Connecticut law, Yale does not discriminate in admissions, educational programs, or employment against any individual on account of that individual's sex, race, color, religion, age, disability, status as a protected veteran, or national or ethnic origin; nor does Yale discriminate on the basis of sexual orientation or gender identity or expression.

University policy is committed to affirmative action under law in employment of women, minority group members, individuals with disabilities, and protected veterans.

Inquiries concerning these policies may be referred to Valarie Stanley, Director of the Office for Equal Opportunity Programs, 221 Whitney Avenue, 3rd Floor, 203.432.0849. For additional information, see www.yale.edu/equalopportunity.

Title IX of the Education Amendments of 1972 protects people from sex discrimination in educational programs and activities at institutions that receive federal financial assistance. Questions regarding Title IX may be referred to the University's Title IX Coordinator, Stephanie Spangler, at 203.432.4446 or at titleix@yale.edu, or to the U.S. Department of Education, Office for Civil Rights, 8th Floor, 5 Post Office Square, Boston MA 02109-3921; tel. 617.289.0111, fax 617.289.0150, TDD 800.877.8339, or ocr.boston@ed.gov.

In accordance with federal and state law, the University maintains information on security policies and procedures and prepares an annual campus security and fire safety report containing three years' worth of campus crime statistics and security policy statements, fire safety information, and a description of where students, faculty, and staff should go to report crimes. The fire safety section of the annual report contains information on current fire safety practices and any fires that occurred within on-campus student housing facilities. Upon request to the Office of the Deputy Vice President for Human Resources and Administration, PO Box 208322, 2 Whitney Avenue, Suite 810, New Haven CT 06520-8322, 203.432.8049, the University will provide this information to any applicant for admission, or prospective students and employees may visit <http://publicsafety.yale.edu>.

In accordance with federal law, the University prepares an annual report on participation rates, financial support, and other information regarding men's and women's intercollegiate athletic programs. Upon request to the Director of Athletics, PO Box 208216, New Haven CT 06520-8216, 203.432.1414, the University will provide its annual report to any student or prospective student. The Equity in Athletics Disclosure Act (EADA) report is also available online at <http://ope.ed.gov/athletics>.

BULLETIN OF YALE UNIVERSITY
New Haven CT 06520-8227

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