Graduate School of Arts and Sciences *Programs and Policies*

2010-2011



BULLETIN OF YALE UNIVERSITY Series 106 Number 5 July 15, 2010 BULLETIN OF YALE UNIVERSITY *Series 106 Number 5 July 15, 2010* (USPS 078-500) is published seventeen times a year (one time in May and October; three times in June and September; four times in July; five times in August) by Yale University, 2 Whitney Avenue, New Haven CT 06510. Periodicals postage paid at New Haven, Connecticut.

Postmaster: Send address changes to Bulletin of Yale University, PO Box 208227, New Haven CT 06520-8227

Managing Editor: Linda Koch Lorimer Editor: Lesley K. Baier PO Box 208230, New Haven CT 06520-8230

The closing date for material in this bulletin was June 15, 2010. The University reserves the right to withdraw or modify the courses of instruction or to change the instructors at any time.

© 2010 by Yale University. All rights reserved. The material in this bulletin may not be reproduced, in whole or in part, in any form, whether in print or electronic media, without written permission from Yale University.

Graduate School Offices

ADMISSIONS 203.432.2771, graduate.admissions@yale.edu ALUMNI RELATIONS 203.432.1942, julia.downs@yale.edu DEAN 203.432.2733, grad.dean@yale.edu FINANCE AND ADMINISTRATION 203.432.2739 FINANCIAL AID 203.432.7980, jennifer.brinley@yale.edu GENERAL INFORMATION OFFICE 203.432.2770 GRADUATE CAREER SERVICES 203.432.7375, mcdougal.careers@yale.edu GRADUATE TEACHING CENTER 203.432.2583; william.rando@yale.edu MCDOUGAL GRADUATE STUDENT CENTER 203.432.2583, mcdougal.center@yale.edu REGISTRAR (DEPUTY) 203.432.2743, stephen.goot@yale.edu TEACHING FELLOW PROGRAM 203.432.2757, judith.hackman@yale.edu

Internet: www.yale.edu/graduateschool

The Graduate School of Arts and Sciences Bulletin is primarily a digital publication, available in both html and pdf versions at www.yale.edu/bulletin. A limited number of copies were printed on 30% postconsumer recycled paper for the Graduate School and the permanent archive of the Bulletin of Yale University. Individual copies may also be purchased on a print-on-demand basis; please contact Joseph Cinquino at Yale Printing and Publishing Services, 203.432.6560 or joseph.cinquino@yale.edu. Graduate School of Arts and Sciences *Programs and Policies*

2010-2011

BULLETIN OF YALE UNIVERSITY Series 106 Number 5 July 15, 2010

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 Diversity and Equal Opportunity 18 McDougal Graduate Student Center 18 Admissions 21 Finance and Administration 21 Financial Aid 21 Registrar's Office 21 Teaching Fellow Program 22 Committees 22 Graduate Student Assembly (GSA) 23 Graduate-Professional Student Senate (GPSS) 23 Degree-Granting Departments and Programs 24 African American Studies 25 African Studies 31 American Studies 38 Anthropology 48 Applied Mathematics 59 Applied Physics 62 Archaeological Studies 67 Architecture 72 Astronomy 75 Biomedical Engineering 79 Cell Biology 80 Cellular and Molecular Physiology 84 Chemical Engineering 89 Chemistry 90 Classics 95 Comparative Literature 104 Computational Biology and Bioinformatics 111 Computer Science 115 East Asian Languages and Literatures 121

East Asian Studies 126 Ecology and Evolutionary Biology 128 Economics 134 Electrical Engineering 145 Engineering and Applied Science 146 English Language and Literature 164 Environmental Engineering 171 Epidemiology and Public Health 172 European and Russian Studies 195 Experimental Pathology 199 Film Studies 204 Forestry & Environmental Studies 210 French 217 Genetics 221 Geology and Geophysics 226 Germanic Languages and Literatures 234 History 238 History of Art 257 History of Science and Medicine 266 Immunobiology 272 International and Development Economics 279 International Relations 281 Investigative Medicine 295 Italian Language and Literature 299 Linguistics 303 Management 313 Mathematics 318 Mechanical Engineering 321 Medieval Studies 322 Microbiology 325 Molecular Biophysics and Biochemistry 329 Molecular, Cellular, and Developmental Biology 336 Music 343 Near Eastern Languages and Civilizations 348 Neurobiology 359 Neuroscience 367 Nursing 373 Pharmacology 378 Philosophy 381 Physics 387 Political Science 393 Psychology 409 Religious Studies 420 Renaissance Studies 430

Slavic Languages and Literatures 433 Sociology 437 Spanish and Portuguese 444 Statistics 448 Urban Education Studies Program 453 Non-Degree-Granting Programs, Councils, and Research Institutes 455 Atmospheric Science 455 Biological and Biomedical Sciences, Combined Program in the 456 The Cowles Foundation 459 The Economic Growth Center 460 Institution for Social and Policy Studies 461 International Security Studies 462 Judaic Studies 463 The MacMillan Center 469 African Studies, Council on 474 East Asian Studies, Council on 476 European Studies Council 477 Jackson Institute for Global Affairs 480 Latin American and Iberian Studies, Council on 483 Middle East Studies, Council on 486 South Asian Studies Council 489 Southeast Asia Studies, Council on 493 Organismal and Integrative Biology 495 Women's, Gender, and Sexuality Studies 496 Yale Center for the Study of Globalization 500 Policies and Regulations 502 Admissions 502 Programs of Study 503 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 507 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 519 Registration Course Enrollment Grades Registration Status and Leaves of Absence Personal Conduct Grievance Procedures Freedom of Expression Financing Graduate School 535 Tuition and Fees, 2010-2011 535 Student Accounts and Bills 535 Transcripts 537 Financial Aid 537 University Fellowships Dissertation Fellowships Teaching Fellowships Traineeships and Assistantships in Research **Research Appointments** External Fellowships and Combined Award Policy 542 Eligibility for Fellowships 543 Other Means of Financing Graduate Education 543 Part-Time Employment Loans and Work-Study Two Federal Regulations Governing Title IV Financial Aid Programs 544 Satisfactory Academic Progress Department of Education Refund Policy University Services and Facilities 545 Living Accommodations 545 Graduate Housing - On Campus Off-Campus Listing Service University Properties Dining Health Services 546 Computing and Telecommunications 550 Office of International Students and Scholars 551 International Center for Yale Students and Scholars 552 International Student Life 552 Resource Office on Disabilities 553 The Work of Yale University 554 Campus Map 558

The President and Fellows of Yale University

President

Richard Charles Levin, B.A., B.Litt., Ph.D.

Fellows

Her Excellency the Governor of Connecticut, ex officio His Honor the Lieutenant Governor of Connecticut, ex officio George Leonard Baker, Jr., B.A., M.B.A., Palo Alto, California Edward Perry Bass, B.S., Fort Worth, Texas Roland Whitney Betts, B.A., J.D., New York, New York Jeffrey Lawrence Bewkes, B.A., M.B.A., New York, New York Francisco Gonzalez Cigarroa, B.S., M.D., Austin, Texas (June 2016) Peter Brendan Dervan, B.S., Ph.D., San Marino, California (June 2014) Donna Lee Dubinsky, B.A., M.B.A., Portola Valley, California Mimi Gardner Gates, B.A., M.A., Ph.D., Seattle, Washington (June 2013) Paul Lewis Joskow, B.A., Ph.D., Locust Valley, New York Neal Leonard Keny-Guyer, B.A., M.P.P.M., Portland, Oregon (June 2015) William Irwin Miller, B.A., M.B.A., Columbus, Indiana (June 2011) Indra Nooyi, B.S., M.B.A., M.P.P.M., Greenwich, Connecticut Barrington Daniels Parker, B.A., LL.B., Stamford, Connecticut Douglas Alexander Warner III, B.A., New York, New York Margaret Garrard Warner, B.A., Washington, D.C. (June 2012) Fareed Zakaria, B.A., Ph.D., New York, New York

The Officers of Yale University

President Richard Charles Levin, B.A., B.Litt., Ph.D.

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

Vice President and Secretary Linda Koch Lorimer, B.A., J.D.

Vice President and General Counsel Dorothy Kathryn Robinson, B.A., J.D.

Vice President for New Haven and State Affairs and Campus Development Bruce Donald Alexander, B.A., J.D.

Vice President for Development Ingeborg Theresia Reichenbach, Staatsexamen

Vice President for Finance and Business Operations Shauna Ryan King, B.S., M.B.A.

Vice President for West Campus Planning and Program Development Michael John Donoghue, B.A., Ph.D.

Vice President for Human Resources and Administration Michael Allan Peel, B.S., M.B.A.

The Administration of the Graduate School

Thomas D. Pollard, M.D., Dean of the Graduate School Pamela Schirmeister, Ph.D., Associate Dean of the Graduate School Richard G. Sleight, Ph.D., Associate Dean of the Graduate School Edward Barnaby, Ph.D., Assistant Dean of the Graduate School Robert Harper-Mangels, Ph.D., Assistant Dean of the Graduate School Michelle Nearon, Ph.D., Assistant Dean and Director, Office for Diversity and Equal Opportunity Victoria A. Blodgett, M.Ed., Assistant Dean and Director, Graduate Career Services, McDougal Graduate Student Center Lisa Brandes, Ph.D., Assistant Dean for Student Affairs and Director, Graduate Student Life, McDougal Graduate Student Center Elena D. Kallestinova, Ph.D., Director, Graduate Writing Center, McDougal Graduate Student Center Jennifer Mendelsohn, M.S., Associate Director, Graduate Student Life, McDougal Graduate Student Center William C. Rando, Ph.D., Assistant Dean and Director, Graduate Teaching Center, McDougal Graduate Student Center Jennifer Frederick, Ph.D., Associate Director, Science Education, Graduate Teaching Center, McDougal Graduate Student Center Robert Colonna, M.B.A., Director of Admissions Lisa Furino, Assistant Director of Admissions Jennifer Brinley, B.S., Associate Director, Finance and Financial Aid Jill Carlton, Ph.D., Registrar, Faculty of Arts and Sciences Stephen Goot, M.A., Deputy Registrar, Faculty of Arts and Sciences Judith Dozier Hackman, Ph.D., Director, Teaching Fellow Program Howard el-Yasin, B.A., Assistant Director, Teaching Fellow Program

Schedule of Academic Dates and Deadlines

FALL TERM 2010

Aug. 23	М	New student orientation week begins
Aug. 25	W	Oral Proficiency Assessment for international students in all GSAS degree programs
Aug. 26	TH	Matriculation ceremony
Aug. 27	F	Fall-term Online Course Selection (OCS) begins
		Orientation in departments for all new students begins
		Oral Performance Assessment for international students in Ph.D. programs
Aug. 30	М	Orientation for all new Teaching Fellows
Sept. 1	W	Fall-term classes begin, 8:20 a.m.
Sept. 3	F	Final day to pick up registration materials from academic departments
Sept. 6	М	Labor Day. Administrative offices closed
Sept. 10	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	W	Fall-term Online Course Selection (OCS) ends. Final day for regis- tration. <i>A fee of \$25 is assessed for course schedules accepted after this date</i>
Sept. 24	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	F	Final date for the faculty to submit grades to replace grades of Tem- porary Incomplete (TI) awarded during the previous academic year
Oct. 4	М	Due date for dissertations to be considered by the Degree Commit- tees for award of the Ph.D. in December
		Final day to file petitions for degrees to be awarded in December

Oct. 22	F	Midterm		
		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 stu- dents who withdraw from the assignment on or before this date		
Oct. 29	F	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		
Nov. 1	М	Readers' Reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in December		
Nov. 5	F	Departmental recommendations are due for candidates for December degrees		
		Final day to withdraw a degree petition for degrees to be awarded in December		
Nov. 11	тн	Oral Proficiency Assessment for international students in all GSAS degree programs		
Nov. 19	F	Fall recess begins, 5:20 p.m.		
Nov. 29	М	Classes resume, 8:20 a.m.		
Dec. 1	W	Final day to submit petitions for extended registration and Dissertation Completion status for the spring term		
Dec. 10	F	Classes end, 5:20 p.m.		
Dec. 18	SA	Fall term ends; winter recess begins		
SPRING TERM 2011				
Ian e	337	Final grades for fall-term courses due		

Jan. 5	W	Final grades for fall-term courses due
Jan. 6	тн	Oral Performance Assessment for international students in Ph.D. programs
Jan. 10	М	Registration and spring ID validation begin
		Spring-term classes begin, 8:20 a.m.
Jan. 14	F	Friday classes do not meet. Monday classes meet instead

Jan. 17	М	Martin Luther King, Jr. Day. Administrative offices closed. Classes do not meet
Jan. 19	W	Final day to apply for a spring-term personal leave of absence
		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
Jan. 21	F	Registration and spring ID validation end. Spring-term Online Course Selection (OCS) ends. Final day for registration. <i>A fee of \$25</i> <i>is assessed for course schedules accepted after this date</i>
Feb. 4	F	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>
Mar. 4	F	Midterm
		Spring recess begins, 5:20 p.m.
		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>
		Teaching appointments will not appear on the transcripts of stu- dents who withdraw from the assignment on or before this date
Mar. 14	М	Due date for dissertations to be considered by the Degree Commit- tees for award of the Ph.D. in May
		Final day to file petitions for degrees to be awarded in May
Mar. 21	М	Classes resume, 8:20 a.m.
Mar. 28	М	Final day to change enrollment in a spring-term course from Credit to Audit or from Audit to Credit
		Final day to withdraw from a spring-term course
Apr. 11	М	Readers' Reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in May
Apr. 14	ТН	Oral Proficiency Assessment for international students in all GSAS degree programs

Apr. 20	W	Departmental recommendations are due for candidates for May degrees
Apr. 22	F	Good Friday. Administrative offices closed
		Final day to withdraw a degree petition for degrees to be awarded in May
Apr. 25	М	Monday classes do not meet. Friday classes meet instead
May 2	М	Classes end, 5:20 p.m.
		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 10	Т	Spring term ends
May 12	тн	Oral Performance Assessment for international students in Ph.D. programs
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	М	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. Through interdisciplinary programs and institutes, as well as the McDougal Graduate Student Center's seminars on teaching, writing, and career education that 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 men and women for truly extraordinary careers across many old, new, and evolving disciplines.

Thomas D. Pollard, M.D. Dean, Graduate School of Arts and Sciences Sterling Professor of Molecular, Cellular, and Developmental Biology and Professor of Molecular Biophysics and Biochemistry and Cell 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, Master of Science, and Master of Engineering. The work of the Graduate School is carried on in the divisions of the Humanities, Social Sciences, and Biological and Physical Sciences. Fifty-four departments and programs offer courses of study leading to the Ph.D. degree. There are twenty-four 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 2,500 graduate students and a faculty of 900 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 550 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

In a speech entitled "The Global University," Yale President Richard C. Levin declared that as Yale enters its fourth century, its goal is to become a truly global university – educating leaders and advancing the frontiers of knowledge not simply for the United States, but for the entire world:

"The globalization of the University is in part an evolutionary development. Yale has drawn students from outside the United States for nearly two centuries, and international issues have been represented in its curriculum for the past hundred years and more. But creating the global university is also a revolutionary development – signaling distinct changes in the substance of teaching and research, the demographic characteristics of students, the scope and breadth of external collaborations, and the engagement of the University with new audiences."

Yale University's goals and strategies for internationalization are described in a report entitled "International Framework: Yale's Agenda for 2009 to 2012," which is available online at www.world.yale.edu/framework/index.html.

International activity is coordinated by several University-wide organizations in addition to the efforts within the individual schools and programs.

Launched in 2003–2004, the Office of International Affairs 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. See www.yale.edu/oia.

The Office of International Students and Scholars is a resource on immigration matters and hosts orientation programs and social activities for the University's international community. See description in this bulletin and www.oiss.yale.edu.

The Whitney and Betty MacMillan Center for International and Area Studies is the University's principal agency for encouraging and coordinating teaching and research on international affairs, societies, and cultures. See description in this bulletin and www. yale.edu/macmillan.

The Yale Center for the Study of Globalization 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. See www.ycsg.yale.edu.

The Yale World Fellows Program 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. See www. yale.edu/worldfellows.

For additional information, the "Yale and the World" Web site offers a compilation of resources for international students, scholars, and other Yale affiliates interested in the University's global initiatives. See www.world.yale.edu.

THE DEAN

Thomas D. Pollard, M.D., 112 HGS, 203.432.2733, 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, its faculty, the quality of its programs, and the welfare of graduate students.

ASSOCIATE AND ASSISTANT DEANS FOR ACADEMIC AFFAIRS

Pamela Schirmeister, Associate Dean, 136 HGS, 203.432.7598,

pamela.schirmeister@yale.edu

Richard G. Sleight, Associate Dean, 132 HGS, 203.432.2744, richard.sleight@yale.edu Edward Barnaby, Assistant Dean, 135 HGS, 203.436.2628, edward.barnaby@yale.edu Robert Harper-Mangels, Assistant Dean, 133 HGS, 203.432.1884,

robert.harper-mangels@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 and Dean Barnaby 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 Studies; French; Germanic Languages and Literatures; History; History of Art; History of Science and Medicine; International and Development Economics; International Relations; Italian Language and Literature; Management; Medieval Studies; Music; Near Eastern Languages and Civilizations; Philosophy; Political Science; Religious Studies; Renaissance Studies; Slavic Languages and Literatures; Sociology; Spanish and Portuguese; and Urban Education Studies.

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

DIVERSITY AND EQUAL OPPORTUNITY

Michelle Nearon, Assistant Dean, Director, 127 HGS, 203.432.0763 www.yale.edu/graduateschool/diversity

The Office for Diversity and Equal Opportunity'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 assistant dean works collaboratively with departments and programs to support the needs of these students as they pursue graduate study. The assistant dean advises prospective and current minority graduate students, directs the Summer Undergraduate Research Fellowship (SURF) Program, oversees Diversity Recruitment Days, 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.

MCDOUGAL GRADUATE STUDENT CENTER

Hall of Graduate Studies, 203.432.BLUE (2583) www.yale.edu/graduateschool/mcdougal

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.

Graduate Career Services

Victoria A. Blodgett, Assistant Dean and Director, 122 HGS, 203.432.7375, mcdougal.careers@yale.edu www.yale.edu/mcdougal/careers

Graduate Career Services (GCS) assists currently enrolled students of the Graduate School and its alumni with career education, decision making, and job search planning. Offerings include individual advising, workshops and programs, guest speakers, employer visits and information sessions, interview practice, print resources, and career-related Web links. The GCS director consults with directors of graduate studies to develop programs that supplement the department's role in the professional development of students pursuing an academic career. For graduate students considering careers beyond the professoriate, the director and Career Services McDougal Fellows initiate programs and develop links with employers who seek graduate students' skills. Students and alumni place requests through Interfolio to transmit their dossiers to employers, agencies, and schools considering them for permanent or short-term positions, and for grants and fellowships. Students are encouraged to begin using the services of the office and attending career and professional development programs and events early in their graduate careers in order to increase their opportunities upon the completion of their degree. Students interested in the activities planned by the GCS should visit the Web site to view the calendar of events and subscribe to the weekly GCS newsletter.

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 www.yale.edu/mcdougal/studentlife

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; 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, ticket sales, and lockers.

The assistant dean for student affairs coordinates general campus services for graduate students, serving as the 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 organizes recruitment activities, new student orientation, and other events for the Graduate School community, including the Graduate School's participation in the University's Commencement exercises.

McDougal Graduate Teaching Center

William C. Rando, Assistant Dean and Director, 120B HGS, 203.432.2583, william.rando@yale.edu, mcdougal.teaching@yale.edu
Jennifer Frederick, Associate Director, Science Education, 120A HGS, 203.432.2583, jennifer.frederick@yale.edu, mcdougal.teaching@yale.edu

www.yale.edu/mcdougal/teaching

The Graduate Teaching Center offers a full range of training, consultation, and development services to teachers and teaching fellows at Yale. The director and staff of fifteen graduate teaching consultants are available throughout the year and in a variety of capacities, providing assistance and training for brand-new teachers as well as experienced members of the faculty. Each year the center offers a comprehensive program of teaching workshops, dealing with topics such as effective discussion leading, classroom management, lecturing, and course design. The center also organizes four- to six-week courses in the fundamentals of teaching in each of four areas: humanities, social sciences, sciences, and foreign languages. Through its Spring Teaching Forum and lecture series, the GTC also provides a venue for members of the Yale community to discuss issues in undergraduate education and to explore the latest in teaching innovation. Anyone teaching at Yale can contact the center for an individual consultation at any time. Classroom visitations and videotaping are also available. The GTC works closely with academic departments to design discipline-specific training for teaching fellows and new faculty. The GTC publishes Becoming Teachers: The Graduate Student Guide to Teaching at Yale as well as Tales from the Classroom, which presents teaching cases from Yale as short, illustrated comics. Graduate students interested in the activities organized by the GTC should visit the Web site listed above and sign up for the GTC listserv, Teaching Notes.

McDougal Graduate Writing Center

Elena D. Kallestinova, Director, 35 Broadway, Rm. 210, 203.432.7725, grad.writing@yale.edu www.yale.edu/graduateschool/writing

The Graduate Writing Center helps graduate students develop as successful academic writers. The center offers support and assistance through a full range of services including individual consultations, academic writing workshops, discussion panels, dissertation support groups, writing groups, and department-specific programs. Five graduate student writing advisers are available throughout the year for individual consultations in which they provide feedback on written course work, grant proposals, fellowship applications, prospectuses, and dissertation chapters. In addition, the center offers a comprehensive program of workshops throughout the year relating to topics such as writing of scientific papers and proposals, choosing dissertation topics, and publishing books and articles. The center also organizes regular peer-review writing groups as well as seven- to eight-week support groups that help students with the process of dissertation writing. For a complete list of the offered programs, please see the Writing Center Web site and the newsletter circulated among graduate students by e-mail.

ADMISSIONS

Robert Colonna, Director, 117B HGS, 203.432.2771, graduate.admissions@yale.edu Lisa Furino, Assistant Director, 117A HGS, 203.432.2771,

graduate.admissions@yale.edu

www.yale.edu/graduateschool/admissions

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.

FINANCE AND ADMINISTRATION

The Office of Finance and Administration 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, Associate Director, 129 HGS, 203.432.7980, jennifer.brinley@yale.edu www.yale.edu/graduateschool/financial

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

Stephen Goot, Deputy Registrar, 246 Church Street, 203.432.2743, stephen.goot@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

Judith Dozier Hackman, Director, 139 HGS, 203.432.2757, judith.hackman@yale.edu Howard el-Yasin, Assistant Director, 139 HGS, 203.432.2757, howard.el-yasin@yale.edu

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.

COMMITTEES

Currently five 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 Grievance Board for Student Complaints of Sexual Harassment Composed of two faculty members, two graduate students, an administrator of the Graduate School, and a person with counseling experience, the board exists to support an atmosphere of mutual tolerance and respect in the Graduate School. It is responsible for addressing complaints of sexual harassment brought by graduate students against administrators, faculty of the Graduate School of Arts and Sciences, other instructors of graduate students, postdoctoral appointees, or other graduate students (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 www.yale.edu/gsa

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 www.yale.edu/gpss

Founded in 1971, the Graduate-Professional Student Senate, Inc. (GPSS) is the official student government group representing all thirteen graduate and professional schools. All graduate and professional students are eligible to become senators via elections held each fall. The GPSS meets on alternating Thursdays throughout the academic year, and meetings are open to the graduate and professional school community. Senators serve on and make appointments to University committees, meet with University administrators, organize social events and orientation activities, provide modest funding to student groups, and assist in community service events. Additionally, the GPSS is housed at and oversees operation of the Graduate-Professional Student Center at Yale (GPSCY), at 204 York Street, which includes office and meeting spaces for student organizations, and the Gryphon's Pub for those twenty-one and over. For more information, please contact gpss@yale.edu or visit www.yale.edu/gpss.

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* are posted in the Faculty of Arts and Sciences Registrar's Office, 246 Church Street, third floor.

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." Yearlong courses have no letter designation or list both "a" and "b." Course numbers followed by a superscript "u" are also open to undergraduates in Yale College. Courses in brackets are not offered during the current academic year.

AFRICAN AMERICAN STUDIES

81 Wall Street, 203.432.1170 www.yale.edu/afamstudies M.A., M.Phil., Ph.D.

Chair Elizabeth Alexander

Director of Graduate Studies

Hazel Carby (81 Wall St., hazel.carby@yale.edu)

Professors Elizabeth Alexander, Elijah Anderson, David Blight, Hazel Carby, M. Kamari Clarke, Glenda Gilmore, Ezra Griffith, Jonathan Holloway, Matthew Jacobson, Gerald Jaynes, Christopher L. Miller, Patricia Pessar, Joseph Roach, Robert Stepto, John Szwed (*Emeritus*), Robert Thompson (*on leave*), Emilie Townes, Michael Veal

Assistant Professors Jafari Allen, GerShun Avilez, Khalilah Brown-Dean, Crystal Feimster, Terri Francis, Paige McGinley, Naomi Pabst, Anthony Reed, Edward Rugemer

Lecturers Kathleen Cleaver, Flemming Norcott, Deborah Thomas

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 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), which is a yearlong requirement of all third-year graduate students in the combined program. 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. 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 contact the prospective department and request a description of all 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 in their third and fourth years.

Master's Degrees

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

M.A. (en route to the joint 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.

Program materials are available upon request to the Director of Graduate Studies, African American Studies, Yale University, PO Box 208212, New Haven CT 06520-8212.

Courses

AFAM 505a/AMST 643a, Theorizing Racial Formations Hazel Carby

A required course for all first-year students in the joint 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. TH 9:25–11:15

AFAM 588b^U/AMST 710b^U/ENGL 948b^U, Autobiography in America Robert Stepto At least a dozen North American autobiographies are studied, mostly from the "American Renaissance" to the present. Discussion of various autobiographical forms and strategies as well as of various experiences of American selfhood and citizenship. Slave narratives, spiritual autobiographies, immigrant narratives, autobiographies of childhood or adolescence, relations between autobiography and class, region, or occupation. M 1:30–3:20

AFAM 596a^U/AMST 641a^U, African American Poets of the Modern Era

Robert Stepto

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic poems, and blues poems. Poets studied include Paul Laurence Dunbar, Langston Hughes, Sterling Brown, Gwendolyn Brooks, Margaret Walker, and Robert Hayden. The classes include sessions at Beinecke Library for the inspection and discussion of original editions, manuscripts, letters, and other archival materials. W 1:30–3:20

AFAM 647b/ANTH 591b/WGSS 689b, Black Feminist Theory and Praxis

Jafari Allen

In this course we analyze black feminisms as both political space and scholarly choice. This framework enables us to examine the continuities between black feminist and womanist theorizing in diverse locations, and to explore how different embodied experiences – including genders, histories, geographies, and genealogies – condition divergent perspectives. Themes explored include slavery, colonialism, diaspora consciousness, multiple genders and sexualities, class difference and inequities of power within black communities; representation in popular culture; state violence; poetics and resistance. We employ a transdisciplinary perspective – including anthropology, history, sociology, literature, and film – and challenge notions of "theory" as the province of the West (and North) and the middle class. T 1:30–3:20

AFAM 693a/AMST 730a/HIST 709a, Black Intellectuals since 1941

Jonathan Holloway

The goal of the course is to develop a general reading knowledge of the traditions, contexts, and trajectories of black intellectual discourse since 1941. Emphasis is placed on foundational texts in the field. M 1:30–3:20

[AFAM 731b^U/WGSS 705b^U, Theories of Black Women and Film]

AFAM 748a/AMST 639a/ENGL 943a, Rethinking the African American Literary Canon Elizabeth Alexander

As we move into the twenty-first century, we now have behind us a serious body of literary criticism and theory on African American literature. This is a moment to consider, discuss, and perhaps revise some of the touchstones of the African American canon. We read works considered canonical along with the critical material surrounding them, studying these books in their historical contexts and finding new methods and contexts for reading them. The course assumes that students may have read many of these works but will reread with fresh eyes, moving toward original research and new propositions about these works as well as questions of tradition, doctrine, the idea of "genius" and "masterpiece," and creative resistance. For a final project, students present a work not on the syllabus and argue for its necessity to African American literary study. Works include Frederick Douglass's *Narrative, Incidents in the Life of a Slave Girl, The Collected Poems* of Paul Laurence Dunbar, *Cane, The Collected Poems* of Langston Hughes, *Their Eyes Were Watching God, The Collected Poems* of Gwendolyn Brooks, *Invisible Man, The Collected Poems* of Robert Hayden, *A Raisin in the Sun,* and *Beloved.* T 1:30–3:20

AFAM 763a/AMST 731a/HIST 780a, 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. F 9:25-11:15

AFAM 773a/SOCY 630a, 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 805a/AFST 949a/CPLT 987a/FREN 949a, Novel, Film, and History in French Africa]

AFAM 814b^U/PLSC 823b, Race and Ethnicity Khalilah Brown-Dean

An introduction to research on race and ethnicity in American politics. Topics include the social construction of race; intersections between race and gender; black, Latino, and Asian American public opinion and political participation; minority representation; the relationship among race, racism, and public policy; immigration and citizenship; state politics; the psychology of racial politics; and the role of race in campaigns. We discuss and debate the empirical contributions of this literature, as well as questions of theory, methodology, and research design. T 9:25–11:15

AFAM 817b/HIST 741b, Readings in Comparative Slavery Edward Rugemer

An introduction to the central themes of the historiography on slavery in the Americas during the eighteenth and nineteenth centuries. Readings include books and articles that have an explicitly comparative focus, as well as single-region studies. Themes include master/slave relations, African American cultures, resistance and rebellion, economic life, and the politics of slavery. T 1:30–3:20

AFAM 821a/REL 642a/RLST 847a, Warrior Chants and Unquiet Spirits

Emilie M. Townes

An exploration of the spiritual autobiographics and social actions of four significant representatives of the Christian protest tradition. Study of public and private documents, and analysis of personal disciplines and basic commitments for social justice, form the framework for exploring the nature of a spirituality that is a social witness. T 8:30–10:20

AFAM 827b, Interdisciplinary Analysis in Race, Class, and Gender Gerald Jaynes Examination of some of the most influential social science texts treating theories of race, class, and gender. The seminar covers various theoretical and methodological paradigms common to social science disciplines. Authors discussed include classical (Marx, Weber) and more contemporary scholars (Giddens, Bourdieu, Butler, Moi, Hill-Collins, Wilson). Emphasis is placed on interdisciplinary analysis and critique of past and contemporary scholarship in African American studies and related fields. W 1:30–3:20

[AFAM 829b/WGSS 715b, American Legal History: Citizenship and Race]

AFAM 842a/MUSI 932a, Topics in Jazz Studies Michael Veal

A survey of the various approaches that academic scholars and other writers have used to explore the phenomenon of jazz throughout its 100-year history. Disciplinary perspectives are taken from musicology, ethnomusicology, jazz studies, "new" jazz studies, journalism, music theory, cultural anthropology, and literary criticism. Critical issues include the role of recordings in jazz history, constructions of the jazz canon, institutionalization of jazz, jazz as "America's indigenous classical music," and the varying equation of West African and Western European musical retentions. W 2:30–4:20

AFAM 846b/AFST 746b/CPLT 725b/FREN 946b, Postcolonial Theory and Its

Literature Christopher L. Miller

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage, créolité*, "minor

literature"), but also gives attention to the literary texts from which they are derived (francophone and anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. TH 1:30–3:20

[AFAM 851b/CPLT 989b/FREN 943b, Creole Identities and Fictions]

AFAM 880a or b, Directed Reading

By arrangement with faculty.

AFAM 895, Dissertation Prospectus Workshop Hazel Carby

A noncredit, yearlong course required of all third-year students. Fall term consists of biweekly work-in-progress talks by Yale faculty, advanced graduate students, and outside speakers. Spring term has biweekly workshops that focus on the dissertation prospectus.

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 M. Kamari Clarke (Anthropology)

Director of Graduate Studies

Michael McGovern (203.432.3686, mike.mcgovern@yale.edu)

Director of Program in African Languages

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

Professors Lea Brilmayer (*Law*), M. Kamari Clarke (*Anthropology*), John Darnell (*Near Eastern Languages & Civilizations*), Owen Fiss (*Law*), William Foltz (*Emeritus, Political Science*), Robert Harms (*History*), Andrew Hill (*Anthropology*), Roderick McIntosh (*Anthropology*), Christopher L. Miller (*French; African American Studies*), Lamin Sanneh (*History; Divinity*), Ian Shapiro (*Political Science*), Robert Thompson (*History of Art; on leave*), Christopher Udry (*Economics*), Michael Veal (*Music*), David Watts (*Anthropology*)

Associate Professor Ann Biersteker (Adjunct; Linguistics)

Assistant Professors Michael McGovern (*Anthropology*), Christopher Blattman (*Political Science*), Ato Onoma (*Political Science*), Jonathan Wyrtzen (*Sociology*)

Lecturers Anne-Marie Foltz (*Epidemiology & Public Health*), David Simon (*Political Science*)

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

Senior Lector Matuku Ngame (French)

Lector Oluseye Adesola (African Languages)

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 501) and Africa and the Disciplines (AFST 764); 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 director of graduate studies and advised by a faculty member with expertise or specialized competence in the chosen topic.

Program in African Languages

The language program offers instruction in three major languages from sub-Saharan Africa: Kiswahili (eastern and central 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, african.studies@yale.edu.

Courses

AFST 501a^U, Research Methods in African Studies Ann Biersteker

The course considers 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. TH 1:30–3:20

AFST 541b^U, Comparative Perspectives on African Literatures Ann Biersteker

Introduction to a wide range of topics in African literature through an examination of English translations of works composed both in African and in European languages. Readings include poetry, novels, plays, essays, nonliterary texts, and autobiographies. Consideration of the symbiotic relationship between printed text and oral performance, between composition and transmission. W 1:30–3:20

AFST 590a^U, African Studies Colloquium Ann Biersteker

Students conduct research for the master's thesis, give presentations on their research, and prepare a bibliography, a prospectus, and a draft chapter of the master's thesis. Discussion of model essays and other examples of writing. W 1:30-3:20

AFST 598a^U, **Introduction to an African Language I** Kiarie Wa'Njogu and staff Beginning instruction in an African language other than those regularly offered. Courses offered depend on availability of instructors. Methodology and materials vary with the language studied. Students may also study an African language through the noncredit Directed Independent Language Study program. Prerequisite: permission of the instructor. MTWTHF 9:25–10:15

AFST 599b^U, **Introduction to an African Language II** Kiarie Wa'Njogu and staff Continuing instruction in an African language other than those regularly offered. Courses offered depend on availability of instructors. Methodology and materials vary with the language studied. Students may also study an African language through the noncredit Directed Independent Language Study program. Prerequisites: AFST 598a and permission of the instructor. 5 HTBA

AFST 618b^u, Communication and Healing Sandra Sanneh

The course deals with practical issues of communication about health and healing in South Africa. It focuses on the Nguni language environment (Zulu/Xhosa/Swati/ Ndebele) but also addresses some issues relating to other South African languages. The course offers an introduction to Zulu language in the context of health, and to social and cultural issues surrounding the origins of suffering, the articulation of symptoms, and the role of the family, traditional healers, and Western medical practitioners. Particular attention is given to HIV/AIDS in the community and to the status and attitudes of young people. HTBA

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 650, Second Year in an African Language

By arrangement with faculty. Prerequisite: AFST 599b.

AFST 660, Third Year in an African Language

By arrangement with faculty. Prerequisite: AFST 650.

AFST 670, Fourth Year in an African Language

By arrangement with faculty. Prerequisite: AFST 660.

AFST 68ob^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 Yorubas. 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 746b/AFAM 846b/CPLT 725b/FREN 946b, Postcolonial Theory and Its

Literature Christopher L. Miller

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage, créolité*, "minor literature"), but also gives attention to the literary texts from which they are derived (francophone and anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. TH 1:30–3:20

[AFST 764b^U/ANTH 622b^U, Africa and the Disciplines]

AFST 766a/INRL 566a^U, Comparative Welfare Policy in Developing Countries

Jeremy Seekings

Examination of public and private welfare systems in the developing world. Analysis of the evolving relationships between kin or community and states and market. Particular attention is paid to the politics of contemporary reforms. W 2:30–4:20
AFST 814a/REL 914a, Christian-Muslim Dialogue and Understanding

Lamin Sanneh

An introductory survey of Islam: its origin, history, law, theology, and religious tradition. An examination of the encounter of the medieval Muslim world with the West, and an assessment of intercultural influences between the two civilizations. The course explores interfaith issues in terms of convergence as well as contrast. HTBA

AFST 839a/HIST 839a, Environmental History of Africa Robert Harms

An examination of the interaction between people and their environment in Africa, and the ways in which this interaction has affected or shaped the course of African history. W 3:30-5:20

AFST 840b/HIST 840b, Colonialism in Africa Robert Harms

Discussion of the theory and practices of colonialism in Africa. Topics include the motives for European expansion, the scramble for Africa, early colonialism, direct and indirect rule, "colonization of the mind," the colonial state, the developmental state, late colonialism, and paths to decolonization. W 3:30–5:20

AFST 900b, Master's Thesis Ann Biersteker 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 949a/AFAM 805a/CPLT 987a/FREN 949a, Novel, Film, and History in French Africa]

AFST 951a or b, Directed Reading and Research Ann Biersteker 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 Kiarie Wa'Njogu

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 Kiarie Wa'Njogu 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 64ob. TTH 11:35–12:50

SWAH 660b^U, Advanced Kiswahili II Ann Biersteker Continuation of SWAH 650a. TTH 11:35–12:50

SWAH 670a^u or b^u, Topics in Kiswahili Literature John Wa'Njogu [F],

Ann Biersteker [Sp]

Advanced readings and discussion with emphasis on literary and historical texts. Reading assignments include materials on Kiswahili poetry, Kiswahili dialects, and the history of Kiswahili. Prerequisite: SWAH 660b. 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

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 www.yale.edu/amstud M.A., M.Phil., Ph.D.

Chair Matthew Jacobson (230 HGS, 203.432.1186)

Director of Graduate Studies

Joanne Meyerowitz (230 HGS, 203.432.1186)

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

Assistant Professors Birgit Brander Rasmussen, Crystal Feimster, Zareena Grewal (*on leave*), Kathryn Lofton, Paige McGinley (*on leave*), Alyssa Mt. Pleasant, Naomi Pabst, Caleb Smith, Kariann Yokota

Lecturers James Berger, Ronald Gregg (on leave), David Musto

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 two of these each year 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 a yearlong prospectus workshop (AMST 902a and b). Open to all students in the program, the workshop serves as a forum for the discussion of selecting a dissertation topic, refining a project's scope, organizing research materials, and evaluating work in progress. 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. The workshop meets once a month.

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 joint 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 STUDIES

The American Studies Program also offers, in conjunction with the Film Studies Program, a joint Ph.D. in American Studies and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to American Studies and to Film 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 six term courses (two grades must be Honors and the other four 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. in Public Humanities is granted upon the completion of all requirements for the en route M.A. Of the six 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 six 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.

For further information, see the American Studies Web site: www.yale.edu/amstud.

Courses

AMST 600a, American Scholars Kathryn Dudley

"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 and 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 is made up of graduate students and faculty from several disciplines. The working group 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 639a/AFAM 748a/ENGL 943a, Rethinking the African American Literary Canon Elizabeth Alexander

As we move into the twenty-first century, we now have behind us a serious body of literary criticism and theory on African American literature. This is a moment to consider, discuss, and perhaps revise some of the touchstones of the African American canon. We read works considered canonical along with the critical material surrounding them, studying these books in their historical contexts and finding new methods and contexts for reading them. The course assumes that students may have read many of these works but will reread with fresh eyes, moving toward original research and new propositions about these works as well as questions of tradition, doctrine, the idea of "genius" and "masterpiece," and creative resistance. For a final project, students present a work not on the syllabus and argue for its necessity to African American literary study. Works include Frederick Douglass's *Narrative, Incidents in the Life of a Slave Girl, The Collected Poems* of Paul Laurence Dunbar, *Cane, The Collected Poems* of Langston Hughes, *Their Eyes Were Watching God, The Collected Poems* of Gwendolyn Brooks, *Invisible Man, The Collected Poems* of Robert Hayden, *A Raisin in the Sun*, and *Beloved*. T 1:30–3:20

AMST 641a^U/AFAM 596a^U, African American Poets of the Modern Era

Robert Stepto

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic poems, and blues poems. Poets studied include Paul Laurence Dunbar, Langston Hughes, Sterling Brown, Gwendolyn Brooks, Margaret Walker, and Robert Hayden. The classes include sessions at Beinecke Library for the inspection and discussion of original editions, manuscripts, letters, and other archival materials. W 1:30–3:20

AMST 643a/AFAM 505a, Theorizing Racial Formations Hazel Carby

A required course for all first-year students in the joint 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. TH 9:25–11:15

AMST 650a/ANTH 510a/HIST 807a, Resistance, Rebellion, and Survival Strategies in Modern Latin America Gilbert Joseph, Patricia Pessar

An interdisciplinary examination of new conceptual and methodological approaches to such phenomena as peasants in revolution, millenarianism, "banditry," refugee movements, and transnational migration. TH 3:30–5:20

AMST 653a, Recording Vernacular Music Michael Denning

An introduction to the cultural study of vernacular musics in the era of sound recording. Topics include the rise of the music industry from sheet music to MP3s; the critical debates over vernacular musics associated with figures like Theodor Adorno, Charles Seeger, Alejo Carpentier, and Amiri Baraka; the rise of ethnographic field recording and the twentieth-century revivals of folk musics; the popular urban music cultures of ports and industrial cities; and the global circulation of commercial vernacular musics from jazz, tango, and hula to salsa and hip hop. TTH 1–2:15

AMST 676a/ENGL 865a/WGSS 778a, Walt Whitman Michael Warner

An intensive reading in Whitman. A central topic is sexuality, including the relations among Whitman's rhetoric of sex, his quasi-religious ambitions, and the rhetoric of critical worldliness. The course also attempts to situate Whitman's diverse writings in the landscape of genres and circulating forms in the transatlantic world of his day. Related topics include mid-nineteenth-century media shift; periodical verse; author cults; New York City literary culture and its emergent bohemian scene; nationalism, race, the state, and ambiguities of antislavery politics; stranger sociability, intimacy, and the pragmatics of "self" in Whitman. Seminar papers dealing with these broader topics are warmly invited, even if Whitman is not their primary focus. T 9:25–11:15

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

Joseph Roach

Taking account of the genealogy of modern drama in eighteenth-century performance, the seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events 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*. M 3:30–5:20

AMST 699b/HIST 749b/RLST 707b, Religion and Modernity Kathryn Lofton Is religion a construction of modernity? Is modernity the construction of religion? The course considers the historical and theoretical problem of modernity through readings that emphasize its interpretive location within the academic study of religions, the industrialization of the West, and the emergence of the social sciences as the epistemic presumption of the twentieth century. Included in our examinations are works that seek to provide for modernity a historical philosophy, a magic, and a gender; likewise, we evaluate critiques of modernity that query its classificatory utility, its imperial suppositions, and its sexual proclivities. Threaded throughout this focus on modernity is its discursive, sociological, and institutional relationship to religion, religions, and religious studies. In addition to more recent monographs, students read from works by Frazer, Freud, Marx, and Weber to develop a critical perspective on descriptions of religion developed through formats of the modern. M 2:30–4:20

AMST 700a/HIST 700a, Introduction to the Historiography of the United States Ned Blackhawk

Readings and discussion of scholarly work on U.S. history from the settlement era to the present. Members of the department faculty visit the class on a rotating basis. T 9:25–11:15

AMST 710b^U/AFAM 588b^U/ENGL 948b^U, Autobiography in America Robert Stepto At least a dozen North American autobiographies are studied, mostly from the "American Renaissance" to the present. Discussion of various autobiographical forms and strategies as well as of various experiences of American selfhood and citizenship. Slave narratives, spiritual autobiographies, immigrant narratives, autobiographies of childhood or adolescence, relations between autobiography and class, region, or occupation. M 1:30–3:20

AMST 728b/ARCG 772b/HSAR 727b, The American Interior Edward Cooke, Jr.

The course historicizes and theorizes the furnishing and cultural function of American domestic space from the colonial period to the present. It charts developments over time with an eye toward themes such as gendered consumption, accumulated possessions, en suite decoration, separation of public and private space, identity formation, interest in domesticating cultural tourism, professionalization of the interior designer or architect, desire to reshape domesticity, rise of interior decorators, and impact of technology. The course also makes use of collections at Yale. W 9:25–11:15

AMST 730a/AFAM 693a/HIST 709a, Black Intellectuals since 1941

Jonathan Holloway

The goal of the course is to develop a general reading knowledge of the traditions, contexts, and trajectories of black intellectual discourse since 1941. Emphasis is placed on foundational texts in the field. M 1:30–3:20

AMST 731a/AFAM 763a/HIST 780a, 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. F 9:25-11:15

AMST 733b/HIST 781b, The History of the Transpacific World Kariann Yokota A seminar introducing students to the emerging interdisciplinary field of Pacific Studies. The assigned readings present a global perspective on the circulation of people, objects, and ideas in the region in their discussion of the politics of material and cultural exchange in the transpacific world. The class focuses on how foreign expansion from the mideighteenth to the mid-nineteenth century influenced the transpacific world and, conversely, how this involvement shaped the development of American society and culture. We look specifically at the study of the objects that circulated throughout the area and were eventually preserved in cabinets of curiosity, universities, and museums in diverse locations such as Honolulu, London, and Salem, Massachusetts. W 1:30–3:20

AMST 740a/HIST 740a, Research in Western and Frontier History

John Mack Faragher, George Miles

Taught with George Miles, curator of Yale's extensive collection of Western Americana at the Beinecke Library. Meets at the Beinecke Library. Emphasis on research methods and the use of primary evidence to construct historical arguments. The goal of the seminar is the research and writing of an original and publishable historical essay. W 9:25–11:15

AMST 745b, American Communities Kathryn Dudley

The course considers the concept of community as a theoretical idea and then examines various kinds of communities – ranging from those defined by social proximity to those defined by a common experience or ideology – that are part and parcel of the American experience. We explore the value Americans place on community itself, and how the pull of individualism exacts a toll on that commitment. Readings are drawn from ethnographic studies of American society and culture, all of which partake of anthropology's fieldwork tradition of participant-observation. W 1:30–3:20

AMST 780a/HIST 776a, Class and Capitalism in Twentieth-Century America

Jennifer Klein

Readings course on class formation, labor, and political economy in the twentiethcentury United States; how regionalism, race, and class power shaped development of American capitalism. Reconsiders relationship between economic structure and American politics and political ideologies; relationship 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 799b/HIST 799b, The American Century, 1941-1961

Jean-Christophe Agnew

The seminar looks at recent work in the intellectual and cultural history of WWII and Cold War America – the years between the New Deal and the New Frontier. Secondary readings highlight current directions in historiography as well as the range of research opportunities available, while class assignments and discussions focus for the most part on the different ways one can teach the period and its documentary sources, including literature, film, music, and painting. The seminar aims to suggest the richness and coherence of this period as a subject for intellectual and cultural historians – especially for those wishing to pursue a research topic in this area – and as an occasion to explore the possibilities for interdisciplinary teaching. W 1:30–3:20

AMST 802a/HIST 702a, Readings in Early National America Joanne Freeman An introduction to the early national period and its scholarship, exploring major themes such as nationalism, national identity, the influence of the frontier, the structure of society, questions of race and gender, the creation of a national politics and culture, and the evolution of political cultures. T 1:30–3:20

AMST 804a/HSAR 733a, The American Civil War: A Visual and Literary History

Alexander Nemerov

A close consideration of paintings, photographs, poems, and stories of the Civil War, made during and after the conflict (up until the 1890s). Figures to be studied include Herman Melville, Julia Ward Howe, Emily Dickinson, Abraham Lincoln, Winslow Homer, Alexander Gardner, Timothy O'Sullivan, Ambrose Bierce, and Stephen Crane. In addition to developing techniques of close analysis of pictures and literature, we consider questions of place, of being on the spot where a historical event happened, and how awareness of these issues might affect the historian's responsibilities and tasks. With that emphasis in mind, the seminar reconvenes at the end of the academic year, in May 2011, for a field trip to Gettysburg, Washington, D.C., and northern Virginia. T 1:30–3:20

AMST 805a/HSAR 720a/REL 966a/WGSS 779a, Sensational Materialities: Sensory Cultures of Religion in History, Theory, and Method Sally Promey

This interdisciplinary seminar explores the process and practice of researching and writing sensory and material histories of religious images, objects, buildings, and performances. While the instructor's training and research concern American things and religions, the course considers broader geographical and categorical parameters in its readings so as to invite intellectual engagement with the most challenging and decisive developments in relevant fields. The goal is to study not only the *visual* cultures of religions but also to investigate possibilities for scholarly examination of a more robust human sensorium of sound, taste, touch, scent, and sight, the points where the senses meet material things (and vice versa) in religious life and practice. Topics for consideration include the cultural construction of the senses and sensory hierarchies; the course invites thinking beyond the "Western" five senses to other locations and historical possibilities for identifying the dynamics of sensing human bodies in (trans)national religious practices, experience, and ideas. Prerequisite: permission of the instructor. T 1:30–3:20

AMST 814a/FILM 603a, Historical Methods in Film Study Charles Musser Engages a range of historiographical issues in film studies including the roles of technology, exhibition, and spectatorship as well as topics such as intermediality and intertextuality. A range of methodological approaches is considered. Particular attention is given to the interaction between scholars and archives. T 1:30–3:20, screenings M 7–10

AMST 823b/FILM 734b, Digital Documentary and the Internet Charles Musser In the last fifteen years, new media technologies have transformed the moving image documentary. Modes of production, distribution, exhibition, promotion, and spectatorship have all undergone fundamental changes. The course explores this new world of documentary by looking at the ways established filmmakers such as Errol Morris, television stations – particularly PBS – activist groups such as Witness, and semiprofessional/amateur videomakers have made use of today's rapidly changing media formation. M 3:30–5:20, screenings SU 7

AMST 850a/ENGL 898a, American Literary Coteries Amy Hungerford

The work and workings of two literary coteries based in San Francisco, the Beats and the McSweeney's group. Focus on major and minor figures; contact between literature and other arts; formal ambitions; class and social dynamics; race, gender, and sexuality in the groups' constitution and reception; and the groups' relation to the city and American culture. The comparative aspect highlights questions of genre, historical context, literary value, and the history of the book; supplemental readings in the sociology of literature and affect theory. Students pursue collaborative research and may choose other literary coteries from the period under study, such as the Black Arts movement, the NOON group, the n+1 group, or the L=A=N=G=U=A=G=E poets. TH 9:25–11:15

AMST 859a/ARCH 4217a, Suburbs Dolores Hayden

In 2000, more Americans lived in suburbs than in rural areas and inner cities. This seminar explores the shifting meanings of city, suburb, and countryside in the American landscape since 1920. Definitions of sprawl include both the expansion of metropolitan peripheries and the decay of city centers, examined through readings from history, geography, architecture, and literature. Students present papers. Limited enrollment. M 9:25–11:15

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

George Chauncey, Joanne Meyerowitz

Selected topics in the history of sexuality. Emphasis on key theoretical works and recent historical literature. M 2:30-4:20

AMST 878a/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, cultural, and intellectual history of medicine, focusing on the United States. Reading and discussion of the recent scholarly literature on medical cultures, public health, and illness experiences from the early national period through the present. Topics include the role of gender, class, ethnicity, race, religion, and region in the experience of health care and sickness and in the construction of medical knowledge; the interplay between lay and professional understandings of the body; the role of the marketplace in shaping professional identities and patient expectations; citizenship, nationalism, and imperialism; and the visual culture of medicine. M 1:30–3:20

AMST 879a^U/HIST 914a^U/HSHM 634a^U, Media and Medicine in Modern America

John Harley Warner, Gretchen Berland

An exploration of the relationships among medicine, health, and the media in the United States from 1870 through the present. Focus on newspapers, magazines, professional journals, advertising, exhibitions, radio, film, television, and the Internet; and on interactions among researchers, health professions, medical and public health institutions, journalists, advocacy organizations, the state, industry, and the public. Topics include the changing role of the media in shaping conceptions of the body; creating new diseases; influencing health and health policy; crafting the image of the medical profession; informing expectations of medicine and constructions of citizenship; and the medicalization of American life. TTH 10:30–11:20

AMST 900, Independent Research

AMST 901, Directed Reading

AMST 902a and b, Prospectus Workshop Joanne Meyerowitz

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, Public Humanities Laura Wexler

How do ideas circulate between academic expertise, on the one hand, and public or nonprofessionalized ways of knowing, on the other? What kinds of exchange are happening now, and what may be possible in the future? The seminar provides an introduction to various institutional relations and to the modes of inquiry, interpretation, and presentation by which practitioners in the humanities seek to invigorate the flow of information and ideas among a public more broadly conceived than the academy, its classrooms, and its exclusive readership of specialists. Topics may include public history, museum studies, oral and community history, public art, documentary film and photography, public writing and educational outreach, and the socially conscious performing arts. In addition to core readings and discussions, the seminar includes presentations by several practitioners who are currently engaged in different aspects of the Public Humanities. A highly flexible term project - including possibilities for an internship with a regional museum, archive, gallery, or media outlet - allows students to explore the substantive and logistical challenges of public intellectual work in the genre or form that most interests them. Participants also collaborate in developing and beginning to organize a Public Humanities program of installations and events to be held during the following academic year. Required for the Master's Degree in Public Humanities. M 3:30-5:20

AMST 904, Practicum in Public Humanities

AMST 905, Master's Project in Public Humanities

ANTHROPOLOGY

10 Sachem Street, 203.432.3670 www.yale.edu/anthropology M.A., M.Phil., Ph.D.

Chair Richard Bribiescas

Director of Graduate Studies Anne Underhill

Professors Richard Bribiescas, Richard Burger, M. Kamari Clarke, Michael Dove (*Forestry & Environmental Studies*), Kathryn Dudley (*American Studies*), J. Joseph Errington, Andrew Hill, Marcia Inhorn (*Middle East Studies*), William Kelly, Enrique Mayer, Roderick McIntosh, Catherine Panter-Brick, Patricia Pessar (*Adjunct; American Studies*), Eric Sargis, James Scott (*Political Science*), Helen Siu, Kalyanakrishnan Sivaramakrishnan, Anne Underhill, David Watts, Harvey Weiss (*Near Eastern Languages & Civilizations*)

Associate Professors J. Bernard Bate, Nora Groce (*Adjunct; Epidemiology & Public Health*)

Assistant Professors Jafari Allen (African American Studies), Brenda Bradley, Sean Brotherton, Narges Erami (Middle East Studies), Erik Harms (Southeast Asia Studies), Karen Hébert (Forestry & Environmental Studies), William Honeychurch, Michael McGovern, Karen Nakamura, Douglas Rogers

Lecturers Osmund Bopearachchi (South Asian Studies), Carol Carpenter (Forestry & Environmental Studies), Graeme Reid (Women's, Gender & Sexuality Studies)

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

Although there are a few required courses or seminars for each subfield, more than three-fourths of a student's program consists of electives, including course work in other departments. Admission to 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. Qualifying examinations, normally taken at the end of the second year, consist of eight hours written (four hours on one of the subfields, four hours on the student's special interest), and two hours oral. Dissertations are normally based on field or laboratory research.

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. This degree is granted 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, www.yale.edu/anthro.

Courses

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

Michael McGovern

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. W 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. M 9:25–11:15

ANTH 501a, Anthropology and Classical Social Theory Douglas Rogers

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. TH 9:25–11:15

ANTH 501b, Anthropology and Contemporary Social Theory Bernard Bate

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 502b, Research in Sociocultural Anthropology: Design and Methods

Marcia Inhorn

The course offers critical evaluation of the nature of ethnographic research. Research design includes the rethinking of site, voice, and ethnographic authority. HTBA

ANTH 503a, Research in Sociocultural Anthropology: Ethnographic Writing and Representation Karen Nakamura

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. W 1:30-3:20

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. T 1:30-3:20

ANTH 510a/AMST 650a/HIST 807a, Resistance, Rebellion, and Survival Strategies in Modern Latin America Gilbert Joseph, Patricia Pessar

An interdisciplinary examination of new conceptual and methodological approaches to such phenomena as peasants in revolution, millenarianism, "banditry," refugee movements, and transnational migration. TH 3:30–5:20

ANTH 527b^U, Socialisms and Postsocialisms Douglas Rogers

An exploration of anthropologists' writings on socialist societies and trajectories out of socialism. Although primary emphasis is on Eastern Europe and the former Soviet Union, the course also takes up both socialisms and postsocialisms as transnational phenomena, ripe for global-scale analyses and contextualized comparisons. Topics may include the workings of socialist political economy; national, cultural, ethnic, and other identities; notions of personhood and subjectivity; gender regimes; property relationships; exchange and consumption; language ideologies; politics and the state; and critiques of "transition studies" in Western political science and economics. W 1:30–3:20

ANTH 537a, Politics/Aesthetics Michael McGovern

The course explores the complex relations between expressive culture and the exercise of power. Starting with the works of the Frankfurt School and such authors as Lukács, Debord, Raymond Williams, and Rancière, the course proceeds through a series of thematic steps, examining case studies. We look at Zairean popular music and painting as political critique; the politics of museum and other exhibitionary displays; the question of visibility both as it relates to talk about transparency and conspiracy and as it relates to urban planning. The course ends with several full-length monographs on the performance of secularism in contemporary Turkey, the attribution of agency to architecture in Jerusalem, and the "theater state" in Bali. The course attempts to analyze the politics of artistic creation and the aesthetic elements of political rhetoric and practice as two moments in a dialectical – indeed, dialogical – relation. T 9:25–11:15

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

Elisabeth Wood

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. TH 1:30–5:20

ANTH 561a/F&ES 877a, 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 11:30–2:20

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. Topics covered include the academic literature on the social dimension of natural disasters, illustrated with a case study of volcanic hazard; the discursive dimensions of environmental degradation, focusing on deforestation and other case studies; climate change, including discursive dimensions at the global level; the current debate about the relationship between resource wealth and political conflict, focusing on the "green war" thesis, and the case of tropical forest commodities; and alternative perspectives on sustainable environmental relations, based on interdisciplinary work and work in the humanities. Prerequisite: ANTH 581a, 582b, or 597a. Three-hour lecture/seminar. Enrollment limited to twenty. TH 2:30–5:20

ANTH 575b^U, Urban Anthropology and Global History 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. W 1:30–3:20

ANTH 579a, Advanced Readings in Economic Anthropology Enrique Mayer

A research seminar that surveys a selection of recent trends in economic anthropology. The emphasis is on reading new books, to critique them and to fit them into a context. Students are encouraged to bring to the seminar their own topics, concerns, and interests. The seminar is a follow-up of ANTH 569b, Economic Anthropology, and is intended for students who are interested in further reading and detailed examination of a particular set of authors or subject matter; familiarity with the subject matter of that course is suggested but not required. Intended for graduate students in anthropology, history, other social sciences, and F&ES. Open to qualified upper-level undergraduates who can demonstrate interest and have the necessary background. Prerequisite: permission of the instructor. W 3:30–5:20

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. It is designed to be the first course for students who will be specializing in social science approaches as well as the last/only course for students who take only one course in this area. The approach taken in the course is inductive, problem-oriented, and case-study-based. 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 the myth of slash-and-burn cultivation, livestock and the development discourse, and indigenous knowledge and its transformation. Section V presents lessons learned. No prerequisites. The course is a prerequisite for advanced seminars in social ecology in F&ES. Three-hour lecture/seminar. Enrollment limited to thirty. TH 2:30–5:20

[ANTH 582b/F&ES 882b, Households, Communities, Gender (for Development and Conservation)]

ANTH 591b/AFAM 647b/WGSS 689b, Black Feminist Theory and Praxis Jafari Allen

In this course we analyze black feminisms as both political space and scholarly choice. This framework enables us to examine the continuities between black feminist and womanist theorizing in diverse locations, and to explore how different embodied experiences – including genders, histories, geographies, and genealogies – condition divergent perspectives. Themes explored include slavery, colonialism, diaspora consciousness, multiple genders and sexualities, class difference and inequities of power within black communities; representation in popular culture; state violence; poetics and resistance. We employ a transdisciplinary perspective – including anthropology, history, sociology, literature, and film – and challenge notions of "theory" as the province of the West (and North) and the middle class. T 1:30–3:20

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

Carol Carpenter

The course provides a fundamental understanding of the social aspects involved in implementing sustainable development and conservation projects. 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. Second, social science tackles the analysis of the knowledge systems that implicitly shape development and conservation policy and impinge on practice. The goal of the course is to stimulate students to apply informed and critical thinking to whatever roles they play in sustainable development and conservation, in order to move toward more environmentally and socially sustainable projects and policies. A prerequisite for F&ES 80153a and ANTH 598b. Three hours lecture/seminar. T 10:30–1:20

ANTH 598b/F&ES 84ob, Advanced Readings: Social Science of Development and Conservation Carol Carpenter

An advanced seminar on the social science theory of sustainable development and conservation, intended for students interested in research design and policy planning in this field. It traces the conceptual history of the ideas of progress and development from the colonial period through the present and examines how these ideas are used by the parties who fund, design, and manage development projects. Topics discussed vary from year to year in response to current debates and events, but in the past have included the idea of poverty, the politics of mapping, microcredit and the entrepreneurial subject, imagemaking in development and conservation, changing ideas of nature, and governmentality in development and conservation. Students are expected to use the course to develop, and present in class, their own research and writing. Prerequisite: ANTH 581a or 597a. Three-hour lecture/seminar. Enrollment limited to twelve. TH 11:30–2:20

ANTH 608a^U, **Politics and Culture in Contemporary Indonesia** J. Joseph Errington The course develops local ethnographic perspectives on social dynamics before and after the fall of Indonesia's New Order regime. Topics include religion and politics, gender and social change, modernization and identity. W 1:30–3:20

ANTH 619a^U/**WGSS 685a**^U, **Language and the Public Sphere** J. Bernard Bate Explores the relationship between language and the public sphere through consideration of theoretical perspectives of Jürgen Habermas and Benedict Anderson, along with ethnographic and historical examination of eighteenth- and nineteenth-century America and Europe, nineteenth- and twentieth-century Arabia, and India from the third to the twentieth century. T 1:30–3:20

[ANTH 622b^U/AFST 764b^U, Africa and the Disciplines]

ANTH 638a^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. T 1:30-3:20

ANTH 674b^U, Anthropologies of Insurgency Michael McGovern

The course explores the interlinked categories of rebel, bandit, and freedom fighter to understand insurgency from an anthropological viewpoint. Privileging sociological and micropolitical analysis, the course approaches specific instances of illegal use of force in their sociocultural and historic settings, and builds toward a consideration of insurgency from "the actors' points of view." T 9:25–11:15

ANTH 684a^u/WGSS 660a^u, Men, Manhood, and Masculinity Graeme Reid Cultural and historic constructions of masculinity through an investigation of male bodies, sexualities, and social interactions. Examination of multiple masculinities and exploration of the relationships among hegemonic, non-hegemonic, and subordinate masculinities.

ANTH 705Lb^U/ARCG 705Lb^U, Archaeology Laboratory II Roderick McIntosh

Practical experience in preparation, analysis, and interpretation of artifacts and nonartificial archaeological data. Students undertake term projects. W 2-5

ANTH 714a/ARCG 714a, The 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. TTH 1–2:15

ANTH 729b^U/ARCG 729b^U, Visualization beneath the Earth William Honeychurch An upper-level undergraduate and graduate-level course that focuses on teaching the techniques of data collection and analysis for subsurface remote sensing including ground-penetrating radar, resistivity, and magnetometry. Applications draw on uses of these techniques in archaeology, geology, and urban planning. W 2:30–4:20

ANTH 732a^U and 733La^U/ARCG 732a^U and 733La^U, Archaeological Field Techniques and Archaeology Lab Roderick McIntosh

An introduction to the practice and techniques of modern archaeology including methods of excavation, recording, mapping, dating, and ecological analysis. The lab offers instruction in the field at an archaeological site in Connecticut in stratigraphy, mapping, artifact recovery, and excavation strategy. The courses must be taken concurrently and are counted together as 1 credit. MW 4-5:15, lab SA 8:30-5

ANTH 743a/ARCG 743a, Archaeological Research and Proposal Development

William Honeychurch

Proposal development is important in archaeology because an effective proposal requires close consideration of all steps of research design, from statement of the problem to data analysis. The course is designed to provide an introduction to the principles by which archaeological research projects are devised and proposed. Students receive intensive training in the preparation of a research proposal with the expectation that the final proposal will be submitted to national and international granting agencies for consideration. The course is structured around the creation of research questions; hypothesis development and statement of expectations; and the explicit linking of expectations to material patterning, field methods, and data analysis. Students review and critique examples of funded and nonfunded research proposals and also comment extensively on each others' proposals. In addition to developing one's own research, learning to constructively critique the work of colleagues is imperative for becoming a responsible anthropological archaeologist. W 2:30–4:20

ANTH 756a/ARCG 756a, Regional Exchange Systems Anne Underhill

The course considers archaeological examination of exchange systems from a broad perspective. The first part involves examination of ethnographic and historic information about variation in types of exchange, as well as theoretical approaches that have been used to understand early exchange systems. Then the class discusses archaeological methods to determine evidence for exchange of goods at the local and regional levels on the basis of settlement data and information from compositional analysis. Archaeological case studies from more than one world area are examined. Open to advanced undergraduates. W 9:25–11:15

[ANTH 763b^U/ARCG 763b^U/NELC 589b^U, Archaeologies of Empire]

ANTH 767b/ARCG 767b, Archaeology of Consumption Anne Underhill

The course considers methods for investigating the consumption of goods in antiquity – the social, political, and ideological uses of craft objects, foods, and drinks. It begins with discussion of the utility of various theoretical approaches for archaeological investigation of consumption patterns in social groups of varying sizes. The class then examines methods for identifying evidence for consumption, such as functional analysis of objects and food residues in pottery vessels. The class evaluates archaeological case studies from more than one area. Open to advanced undergraduates. W 9:25–11:15

ANTH 771a/ARCG 771a, Early Complex Societies Richard Burger,

Roderick McIntosh

A consideration of theories and methods developed by archaeologists to recognize and understand complex societies in prehistory. Topics include the nature of social differentiation and stratification as applied in archaeological interpretation; emergence of complex societies in human history; case studies of societies known ethnographically and archaeologically. T 9:25–11:15

ANTH 773b^U/ARCG 773b^U/NELC 588b^U, Civilizations and 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 politico-economic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, "barbarian" incursions, or class conflict. TH 2:30–4:20

ANTH 775**a**^U/**ARCG** 775**a**^U, **Anthropology of Mobile Societies** William Honeychurch The social and cultural significance of the ways that hunter-gatherers, pastoral nomads, maritime traders, and members of our own society traverse space. The impact of mobility and transport technologies on subsistence, trade, interaction, and warfare from the first horse riders of five thousand years ago to jet-propulsion tourists of today. T 1:30–3:20

ANTH 776b^U/ARCG 776b^U, GIS and Spatial Analysis for Archaeology

William Honeychurch

Introduction to the practice of Geographical Information Systems in anthropology with attention to archaeological applications. The growing use of GIS among anthropologists has transformed the way we carry out research and conceive of space. The course draws on research examples from a range of theoretical, analytical, and geographical contexts and introduces students to current software. Emphasis is placed on understanding how anthropological archaeologists have employed GIS as part of generating evidence to assess their hypotheses. T 1:30–3:20

ANTH 782b^U/**ARCG 782b**^U, **Advanced Archaeological Theory** Roderick McIntosh Review of the intellectual history of archaeology with original readings of the central texts from the Enlightenment to the present. The course deals particularly with the tension between the use of science and mysticism/nationalism in the interpretation of prehistoric processes. W 7–8:50

ANTH 803b, Reproductive Ecology of Humans and Nonhuman Primates Richard Bribiescas

Survey of the current understanding of the physiology of reproductive function within the control of evolutionary and life history theory. Emphasis on population variation in female and male reproductive endocrinology as well as the sources of that variation. T 1:30-3:20

ANTH 822b/ARCG 822b, 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. W 1:30–3:20

ANTH 829b^u, Primate Evolution Eric Sargis

Exploration of the evolutionary history of primates from their origin to extant species. Focus on controversies in taxonomy, phylogeny, and functional morphology of fossil and living primates. Recommended preparation: ANTH 116a or an introductory biology course. TTH 2:30–3:45

ANTH 830a, Topics in Human Life History Evolution Richard Bribiescas

The seminar focuses on questions related to the evolution of the timing of key life history events, energetic and temporal trade-offs, and basic demography in humans and comparative contexts. Topics include the evolution of patterns of growth, maintenance, sexual maturation, offspring investment, fertility, mortality, and senescence. T 1:30–3:20

ANTH 851a, Topics and Issues in Evolutionary Theory Andrew Hill, Eric Sargis Focus on current literature in theoretical evolutionary biology, intended to give new graduate students intensive training in critical analysis of theoretical models and in scientific writing. W 1:30–3:20

ANTH 856a/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. TH 1:30–3:20

ANTH 864a^U/ARCG 864a^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 875a^U, Primate Behavioral Ecology David Watts

Includes kinship and dominance as organizing principles of primate social groups; feeding competition and risk of predation as determinants of group size; mating strategies and sexual dimorphism; dispersal, transfer, and the permeability of social boundaries; the structure of primate communities; the role of primates in ecological community function. TH 2:30-4:20

ANTH 941a and b, Research Seminar in Japan Anthropology Karen Nakamura

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. HTBA

ANTH 942b, Research Seminar in South Asia Anthropology

Kalyanakrishnan Sivaramakrishnan

The 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 by permission of the instructor. T 1:30-3:20

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

A. K. Watson Hall, 203.432.1278 www.cs.yale.edu/appliedmath2 M.S., M.Phil., Ph.D.

Professors Andrew Barron (Statistics), Donald Brown (Economics), Joseph Chang (Statistics), Ronald Coifman (Mathematics; Computer Science), Gustave Davis (Pathology), Eric Denardo (Operations Research), Stanley Eisenstat (Computer Science), Michael Fischer (Computer Science), Roger Howe (Mathematics), Peter Jones (Mathematics), Steven Orszag (Mathematics), David Pollard (Statistics), Nicholas Read (Physics; Applied Physics), Vladimir Rokhlin (Computer Science; Mathematics; Physics), Herbert Scarf (Economics), Martin Schultz (Computer Science), Mitchell Smooke (Mechanical Engineering; Applied Physics), Daniel Spielman (Computer Science), Günter Wagner (Ecology & Evolutionary Biology), John Wettlaufer (Geology & Geophysics; Physics), Steven Zucker (Computer Science; Biomedical Engineering)

Associate Professors John Emerson (Statistics), Josephine Hoh (Epidemiology & Public Health; Ophthalmology), Sekhar Tatikonda (Electrical Engineering; Statistics), Huibin Zhou (Statistics)

Assistant Professors Lisha Chen (Statistics), Thierry Emonet (Molecular, Cellular & Developmental Biology; Physics), Dan Kushnir, Adam Marcus, Mokshay Madiman (Statistics), Neta Rabin, Andrew Wells

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, 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 an approved course on responsible conduct in research. 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.

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.

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 eight graduate-level courses. Courses taken as part of the M.S. program must be pre-approved by the director of graduate studies to ensure that a suitable distribution of topics is covered.

Honors Requirement

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

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 561a, Spectral Graph Theory]

AMTH 562a, Graphs and Networks Daniel Spielman

A mathematical examination of graphs and their applications in the sciences. Families of graphs include social networks, small-world graphs, Internet graphs, planar graphs, well-shaped meshes, power-law graphs, and classic random graphs. Phenomena include connectivity, clustering, communication, ranking, and iterative processes.

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

[AMTH 664a^U, Topics in Computational Biology]

AMTH 665b^U/MCDB 561b^U/PHYS 529b, Systems Modeling in Biology

Thierry Emonet, Steven Kleinstein, Simon Mochrie, Xiao-Jing Wang, Steven Zucker

An introduction to the techniques of integrating knowledge from mathematics, physics, and engineering into the analysis of complex living systems. Use of these techniques to address key questions about the design principles of biological systems. Discussion of experiments and corresponding mathematical models. Reading of research papers from the literature. Students build their own models using MATLAB. TTH 2:30–3:45

AMTH 666a/ASTR 666a/G&G 666a, Statistical Thermodynamics for Astrophysics and Geophysics John Wettlaufer

Classical thermodynamics is derived from statistical thermodynamics. Using the multiparticle 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. HTBA

AMTH 667a, Advanced Computational Vision Steven Zucker

An advanced course in computational vision, with emphasis on object recognition, shape analysis, learning, and perceptual organization. A background in computer vision, biological vision, or equivalent is necessary. Prerequisite: CPSC 575b or equivalent, or permission of the instructor.

APPLIED PHYSICS

Becton Center, 203.432.9654 www.yale.edu/appliedphysics M.S., M.Phil., Ph.D.

Chair A. Douglas Stone

Director of Graduate Studies Robert Grober (415 BCT, 203.432.9653, robert.grober@yale.edu)

Professors Charles Ahn, Sean Barrett, Hui Cao, Richard Chang (*Emeritus*), Michel Devoret, Paul Fleury, Steven Girvin, Leonid Glazman, Robert Grober, Victor Henrich, Arvid Herzenberg (*Emeritus*), 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 Jack Harris, Sohrab Ismail-Beigi, Karyn Le Hur

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 (IGPPEB)

The Yale IGPPEB program brings together faculty drawn mainly from five member areas (MB&B, MCDB, Physics, Applied Physics, and Engineering). All faculty involved recognize the importance of interdisciplinary research at the interface of the biological and physical sciences, and have recently developed interdisciplinary research collaborations among IGPPEB colleagues. Core courses for Applied Physics students in this Ph.D. program are listed below.

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, and they are to be completed in the first two years. 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.

Students in the IGPPEB program must also take Methods and Logic in Interdisciplinary Research (ENAS 517a), Biological Physics (ENAS 541a), Biology Boot Camp (MB&B 520a1), Integrated Workshop (ENAS 991b), and Systems Modeling in Biology (MCDB 561b).

Well-prepared students may be able to place out of up to two of the seven required core courses after demonstrating equivalent training and competence by passing a written exam in the relevant subject. Success in such an exam will reduce the total course requirement by one for each exam passed.

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.

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, www. yale.edu/appliedphysics.

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 Charles Ahn

Vector analysis in three dimensions (2 weeks), linear algebra (4 weeks), functions of a complex variable (4 weeks), topics at the discretion of the instructor (3 weeks), e.g., (1) specific examples to reinforce the material already presented and (2) new topics (to choose among: Fourier series in one and more dimensions, Laplace transformations, Fourier integrals in one and more dimensions, optimization, elements of ODE). TTH 2:30–3:45

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. TTH 2:30–3:45

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

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. HTBA

APHY 548a^u and 549b^u/ENAS 850a^u and 851b^u/PHYS 548a^u and 549b^u, Solid State Physics I and II Paul Fleury, Daniel Prober

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonon, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. Fall: TTH 1–2:15; Spring: TTH 2:30–3:45

APHY 610b/PHYS 610b, Quantum Many-Body Theory Leonid Glazman

Second quantization, quantum statistical mechanics, Hartree-Fock approximation, linear response theory, random phase approximation, perturbation theory and Feynman diagrams, Landau theory of Fermi liquids, BCS theory, Hartree-Fock-Bogoliubov method. Applications to solids and finite-size systems such as quantum dots, nuclei, and nanoparticles. TTH 11:35–12:50

[APHY 633b/PHYS 633b, Introduction to Superconductivity]

[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/PHYS 675a, 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, and nanostructure physics. Topics include propagation of light, reflection and refraction, guiding light, polarization, interference, diffraction, scattering, and Fourier optics and optical coherence. TTH 11:35–12:50

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 679a/PHYS 679a, Non-linear Optics and Lasers]

APHY 816b, Techniques of Microwave Measurements and RF Design

Robert Schoelkopf

An advanced course covering the concepts and techniques of radio-frequency design, and their application in making microwave measurements. The course begins with a review of lumped element and transmission line circuits, network analysis, and design of passive elements, including filters and impedance transformers. We continue with a treatment of passive and active components such as couplers, circulators, amplifiers, and modulators. Finally, we employ this understanding for the design of microwave measurement systems and techniques for modulation and signal recovery, to analyze the performance of heterodyne/homodyne receivers and radiometers. MW 10:30-11:20

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*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Leo Hickey (*Geology & Geophysics*), Andrew Hill (*Anthropology*), Diana Kleiner (*Classics; History of Art*), Roderick McIntosh (*Anthropology*), Mary Miller (*History of Art*), Eric Sargis (*Anthropology*), Ronald Smith (*Geology & Geophysics*), Karl Turekian (*Geology & Geophysics*), Anne Underhill (*Anthropology*), Harvey Weiss (*Near Eastern Languages & Civilizations*)

Associate Professor Lillian Tseng (History of Art)

Assistant Professors Milette Gaifman (History of Art; Classics), William Honeychurch (Anthropology), Colleen Manassa (Near Eastern Languages & Civilizations), Tamara Sears (History of Art)

Lecturer Karen Foster (Near Eastern Languages & Civilizations)

The aims of the program are to give students the academic background needed for careers in the conservation of archaeological resources, to prepare students to teach in community colleges and secondary schools, and to provide the opportunity for teachers, curators, and administrators to refresh themselves on recent developments in archaeology. The program is administered by Yale's Council on Archaeological Studies, with faculty from the departments of Anthropology, Classics, Geology & Geophysics, History of Art, and Near Eastern Languages & Civilizations.

Special Admissions Requirements

The GRE General Test; applicants need not have an archaeology background, but a strong grounding in the social sciences or history is recommended.

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 Field Techniques; at least one laboratory course; a course related to archaeology in each of the following three groups: (1) Anthropology; (2) Classics, History of Art, or Near Eastern Languages & Civilizations; (3) Ecology & Evolutionary Biology, Forestry & Environmental Studies, or Geology & Geophysics; and three electives. 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 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, archaeology@yale.edu.

Courses

ARCG 705Lb^U/ANTH 705Lb^U, Archaeology Laboratory II Roderick McIntosh

Practical experience in preparation, analysis, and interpretation of artifacts and nonartificial archaeological data. Students undertake term projects. W 2-5

ARCG 714a/ANTH 714a, The 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. TTH 1–2:15

ARCG 729b^U/ANTH 729b^U, Visualization beneath the Earth William Honeychurch An upper-level undergraduate and graduate-level course that focuses on teaching the techniques of data collection and analysis for subsurface remote sensing including ground-penetrating radar, resistivity, and magnetometry. Applications draw on uses of these techniques in archaeology, geology, and urban planning. W 2:30–4:20

ARCG 732a^U and 733La^U/ANTH 732a^U and 733La^U, Archaeological Field Techniques and Archaeology Lab Roderick McIntosh

An introduction to the practice and techniques of modern archaeology including methods of excavation, recording, mapping, dating, and ecological analysis. The lab offers instruction in the field at an archaeological site in Connecticut in stratigraphy, mapping, artifact recovery, and excavation strategy. The courses must be taken concurrently and are counted together as one credit. MW 4-5:15, lab SA 8:30-5

ARCG 743a/ANTH 743a, Archaeological Research and Proposal Development William Honeychurch

Proposal development is important in archaeology because an effective proposal requires close consideration of all steps of research design, from statement of the problem to data analysis. The course is designed to provide an introduction to the principles by which archaeological research projects are devised and proposed. Students receive intensive training in the preparation of a research proposal with the expectation that the final proposal will be submitted to national and international granting agencies for consideration. The course is structured around the creation of research questions; hypothesis

development and statement of expectations; and the explicit linking of expectations to material patterning, field methods, and data analysis. Students review and critique examples of funded and nonfunded research proposals and also comment extensively on each others' proposals. In addition to developing one's own research, learning to constructively critique the work of colleagues is imperative for becoming a responsible anthropological archaeologist. W 2:30–4:20

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

Karen Foster

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. TTH 1–2:15

ARCG 756a/ANTH 756a, Regional Exchange Systems Anne Underhill

The course considers archaeological examination of exchange systems from a broad perspective. The first part involves examination of ethnographic and historic information about variation in types of exchange, as well as theoretical approaches that have been used to understand early exchange systems. Then the class discusses archaeological methods to determine evidence for exchange of goods at the local and regional levels on the basis of settlement data and information from compositional analysis. Archaeological case studies from more than one world area are examined. Open to advanced undergraduates. W 9:25–11:15

[ARCG 762a^U/EMD 548a/F&ES 726a/G&G 562a^U, Remote Sensing: Observing the Earth from Space]

[ARCG 763b^U/ANTH 763b^U/NELC 589b^U, Archaeologies of Empire]

ARCG 767b/ANTH 767b, Archaeology of Consumption Anne Underhill The course considers methods for investigating the consumption of goods in antiquity the social, political, and ideological uses of craft objects, foods, and drinks. It begins with discussion of the utility of various theoretical approaches for archaeological investigation of consumption patterns in social groups of varying sizes. The class then examines methods for identifying evidence for consumption, such as functional analysis of objects and food residues in pottery vessels. The class evaluates archaeological case studies from more than one area. Open to advanced undergraduates. W 9:25–11:15

ARCG 771a/ANTH 771a, Early Complex Societies Richard Burger,

Roderick McIntosh

A consideration of theories and methods developed by archaeologists to recognize and understand complex societies in prehistory. Topics include the nature of social differentiation and stratification as applied in archaeological interpretation; emergence of complex societies in human history; case studies of societies known ethnographically and archaeologically. T 9:25–11:15 **ARCG** 772b/AMST 728b/HSAR 727b, The American Interior Edward Cooke, Jr. The course historicizes and theorizes the furnishing and cultural function of American domestic space from the colonial period to the present. It charts developments over time with an eye toward themes such as gendered consumption, accumulated possessions, en suite decoration, separation of public and private space, identity formation, interest in domesticating cultural tourism, professionalization of the interior designer or architect, desire to reshape domesticity, rise of interior decorators, and impact of technology. The course also makes use of collections at Yale. W 9:25–11:15

ARCG 773**b**^U/**ANTH** 773**b**^U/**NELC** 588**b**^U, **Civilizations and 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 politico-economic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, "barbarian" incursions, or class conflict. TH 2:30–4:20

ARCG 77**5a**^U/**ANTH** 77**5a**^U, **Anthropology of Mobile Societies** William Honeychurch The social and cultural significance of the ways that hunter-gatherers, pastoral nomads, maritime traders, and members of our own society traverse space. The impact of mobility and transport technologies on subsistence, trade, interaction, and warfare from the first horse riders of five thousand years ago to jet-propulsion tourists of today. T 1:30–3:20

ARCG 776b^U/ANTH 776b^U, GIS and Spatial Analysis for Archaeology

William Honeychurch

Introduction to the practice of Geographical Information Systems in anthropology with attention to archaeological applications. The growing use of GIS among anthropologists has transformed the way we carry out research and conceive of space. The course draws on research examples from a range of theoretical, analytical, and geographical contexts and introduces students to current software. Emphasis is placed on understanding how anthropological archaeologists have employed GIS as part of generating evidence to assess their hypotheses. T 1:30–3:20

ARCG 782b^U/ANTH 782b^U, Advanced Archaeological Theory Roderick McIntosh Review of the intellectual history of archaeology with original readings of the central texts from the Enlightenment to the present. The course deals particularly with the tension between the use of science and mysticism/nationalism in the interpretation of prehistoric processes. W 7–8:50

ARCG 822b/ANTH 822b, 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. W 1:30–3:20

ARCG 856a^U/ANTH 856a, 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. TH 1:30–3:20

ARCG 864a^U/ANTH 864a^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.

Related Courses

ARCG 001/NELC 001, Egypt and Northeast Africa Colleen Manassa

- ARCG 100b/ANTH 150b/HUMS 376b/NELC 100b, Genesis and Collapse of Old World Civilizations Harvey Weiss
- ARCG 170/HSAR 250/CLCV 170, Roman Art: Empire, Identity, Society Diana Kleiner
- ARCG 172b/ANTH 172b, Great Hoaxes and Fantasies in Archaeology Harvey Weiss
- ARCG 212/HSAR 351, Art and Archaeology in China Lillian Tseng

ARCG 226/EVST 226, Global Environmental History Harvey Weiss

ARCG 230a/G&G 230a, Stratigraphy Leo Hickey

ARCG 232b/ANTH 232b, Ancient Civilizations of the Andes Richard Burger

ARCG 237/HSAR 237/NELC 108, Ancient Painting and Mosaics Karen Foster

- ARCG 239/HSAR 239/HUMS 104/NELC 104, Art of Ancient Near East & Aegean Karen Foster
- ARCG 243b/CLCV 16ob/HSAR 243b, Greek Art and Architecture Milette Gaifman
- ARCG 252a/CLCV 175a/HSAR 252a, Roman Architecture Diana Kleiner
- ARCG 272b/ANTH 272b, African Prehistory Roderick McIntosh

ARCG 424/HSAR 424/CLCV 230, eClavdia: Women in Ancient Rome Diana Kleiner

ARCHITECTURE

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

Dean Robert A. M. Stern

Director of Doctoral Studies

Kurt W. Forster (316 Rudolph, 203.432.0692, kurt.forster@yale.edu)

Professors Michelle Addington, Peggy Deamer, Keller Easterling, Peter Eisenman, Kurt W. Forster, Dolores Hayden, Alan Plattus, Robert A. M. Stern

Associate Professors Mark Foster Gage, Keith Krumwiede, Eeva-Liisa Pelkonen, Emmanuel Petit, Hilary Sample

Assistant Professor Kyoung Sun Moon

Adjunct Faculty Thomas Beeby, Deborah Berke, Kent Bloomer, Turner Brooks, Alexander Garvin, Steven Harris, John Jacobson, Fred Koetter, 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 its critical issues.

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 shall have appropriate academic credentials (a master's degree or equivalent in Architecture, Engineering, Environmental Design, or, exceptionally, in a related field) and at least two years of work experience in an appropriate professional setting. 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 will have received a baccalaureate degree, or its international equivalent, prior to matriculation at Yale, 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 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.

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.

All students must spend their first two years in residence at Yale enrolled as full-time students in the School of Architecture. During the first two years of study, students will normally take at least eight courses, consisting of graduate seminars. During each of the four terms in residence, a student must take a Ph.D. seminar taught by a member of the Ph.D. committee, which will introduce the student to various methodologies and areas of study. Some seminars will encourage primary research on a narrow topic or focus on producing a collective body of work, such as an exhibition. Others offer a broader survey of historiographies. Another will focus on the close reading of a body of texts. These four required seminars form the methodological core of the program.

Students will be encouraged to take courses outside the School of Architecture but related to their specific areas of interest. 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 four 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.

Students will also be expected to demonstrate competence in at least one foreign language relevant to their field of study, not later than the end of their second year. Language competence is more than a formality and requires some acquaintance with the literature in the chosen language. Competency may be determined by either a grade of B or better in a yearlong intermediate-level language course or through examination.

Ideally, the student's field of interest will be defined after the first year. At this point, the student will be assigned an adviser by the director of doctoral studies. At the end of the second year the student will be assigned an additional three faculty members, who will constitute his or her dissertation committee. One of these additional faculty members should be from outside the School of Architecture, with selection based on the student's area of interest, and in consultation with the Ph.D. adviser and the director of doctoral studies.

Upon completion of all course requirements and the language requirement, normally during the fall of the third year, students will take a qualifying exam, which requires an approximately 8,000-word research paper and an oral examination during which members of his/her dissertation committee will question the candidate in three fields of study. During the spring term of the third year, candidates will present and defend a preliminary proposal for a dissertation topic, consisting of a topic statement, program of research and study, and annotated bibliography.

By the end of the third year, students will begin a period of dissertation research and writing. A student is asked to submit a draft of the dissertation half a year before the final

defense. After successful completion of the defense, students are given three months to complete the final submission.

Graduate Research Assistant and Teaching Fellow Experience

The program in Architecture considers teaching to be an important part of graduate training. Therefore, before completing the Ph.D., all candidates will be required to have at least two terms of teaching experience in their area of study at the School of Architecture or elsewhere in the University. At least one of these should be a history and theory survey course requiring direction of a discussion session. Students will also be encouraged to assist in studio teaching. Students in the Ph.D. program normally serve as teaching fellows for four terms.

Master's Degree

M.Phil. The M.Phil. degree is awarded en route to the Ph.D. The minimum requirements for this degree are that a student shall have completed all requirements for the Ph.D. except the teaching fellow experience, the prospectus, and the dissertation.

For information on the master's degrees offered by the Yale School of Architecture (the Master of Architecture and the Master of Environmental Design), visit the School's Web site, www.architecture.yale.edu, or contact Office of Admissions, Yale School of Architecture, PO Box 208242, New Haven CT 06520-8242.

Courses

For courses and their descriptions, see the School of Architecture bulletin, online in both html and pdf versions at www.yale.edu/bulletin.

ASTRONOMY

J. W. Gibbs Laboratories, 203.432.3000 www.astro.yale.edu M.S., M.Phil., Ph.D.

Chair Jeffrey Kenney

Director of Graduate Studies

Priyamvada Natarajan (203.436.4833, priyamvada.natarajan@yale.edu)

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

Associate Professor Richard Easther (Physics)

Assistant Professors Héctor Arce, Marla Geha

Fields of Study

Fields include observational and theoretical galactic astronomy, solar and stellar astrophysics, astrometry, 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 prerequisite 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:

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 observational 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 five 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. Note that ASTR 710 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 will serve as teaching fellows and complete a total of nine TF units. 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 six TF units. The additional three TF units will normally be carried out after the fourth term of study.

In addition to all other requirements, all graduate students must successfully complete the seminar course ASTR 720a, Ethics and Responsible Conduct in Research, prior to the end of their first 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.

Master's Degrees

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

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 satisfactorily completed the first year of the program leading to the Ph.D. degree. Satisfactory is defined as having taken at least four courses (not including ASTR 710) and one research project. The student should

have a grade average of High Pass in the courses taken 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 510b^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.

[ASTR 518b, Stellar Dynamics]

ASTR 520a/G&G 538a, Computational Methods in Astrophysics and Geophysics Paolo Coppi

The analytic and numerical/computational tools necessary for effective research in astronomy, geophysics, and related disciplines. Topics include numerical solutions to differential equations, spectral methods, and Monte Carlo simulations. Applications are made to common astrophysical and geophysical problems including fluids and N-body simulations.

ASTR 530a^U, Galaxies Frank van den Bosch

The formation and evolution of galaxies. Topics include the morphology and structure of galaxies, stellar populations, central black holes, galaxy mergers, and galaxy properties as a function of environment.

ASTR 540a^U/G&G 501a^U, Radiative Processes in Astrophysics/Stellar Atmospheres Debra Fischer

Theory of radiation fields and their propagation through media. Applications to stellar and planetary atmospheres and the interstellar medium including planetary energy balance and climate, terrestrial optical phenomena, solar physics, high-energy phenomena, and remote sensing. HTBA

ASTR 550a^U, Stellar Astrophysics Sarbani Basu

An introduction to the physics of stellar atmospheres and interiors. The basic equations of stellar structure, nuclear processes, stellar evolution, white dwarfs, and neutron stars. MW 9-10:15

ASTR 555a^U, Observational Astronomy Pieter van Dokkum

The design and use of optical telescopes, cameras, spectrographs, and detectors to make astronomical observations. The reduction and analysis of photometric and spectroscopic observations.

[ASTR 560b, Interstellar Matter and Star Formation]

[ASTR 565b, The Evolving Universe]

[ASTR 570a/PHYS 570a, High-Energy Astrophysics]

ASTR 580a or b, Research By arrangement with faculty.

[ASTR 585a, Radio Astronomy]

[ASTR 590b^U, Solar Physics]

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

ASTR 666a/AMTH 666a/G&G 666a, Statistical Thermodynamics for Astrophysics and Geophysics John Wettlaufer

Classical thermodynamics is derived from statistical thermodynamics. Using the multiparticle 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. HTBA

[ASTR 705, Research Seminar in Stellar Populations]

ASTR 710a and b, Professional Seminar Charles Bailyn, Richard Larson A weekly seminar covering science and professional issues in astronomy.

ASTR 715a/G&G 744a, Research Seminar on Planet Formation Debra Fischer, Shun-ichiro Karato

ASTR 720a, Ethics and Responsible Conduct in Research Faculty

A seminar that discusses ethics and responsible conduct in scientific research. This fulfills the requirement stipulated by the National Science Foundation for all students, and for postdoctoral researchers funded by NSF. In the fall, the Ethics seminar forms part of the weekly Professional Seminar series that covers science and professional issues in astronomy.

BIOMEDICAL ENGINEERING

Dunham Laboratory, 203.432.4250 M.S., M.Phil., Ph.D.

Chair Mark Saltzman

Director of Graduate Studies Richard Carson (richard.e.carson@yale.edu)

Professors Richard Carson, Todd Constable, James Duncan, Jay Humphrey, Laura Niklason, Douglas Rothman, Mark Saltzman, Fred Sigworth, Steven Zucker (*Computer Science*)

Associate Professors Robin de Graaf, Tarek Fahmy, Fahmeed Hyder, Themis Kyriakides, Evan Morris, Xenophon Papademetris, Lawrence Staib, Hemant Tagare

Assistant Professors Rong Fan, Anjelica Gonzalez, Michael Levene, Kathryn Miller-Jensen, Smita Sampath, Erik Shapiro

Fields of Study

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

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

CELL BIOLOGY

C-207 Sterling Hall of Medicine, 203.737.5603 www.cellbiology.yale.edu M.S., M.Phil., Ph.D.

Chair James Rothman

Director of Graduate Studies

Carl Hashimoto (C-215 SHM, 203.737.2746, carl.hashimoto@yale.edu)

Professors 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), Thomas Pollard (Molecular, Cellular & Developmental Biology), James Rothman, Michael Simons (Internal Medicine/Cardiovascular Medicine), Elisabetta Ullu (Internal Medicine/Infectious Diseases), Sandra Wolin

Associate Professors Karin Reinisch, Elke Stein (Molecular, Cellular & Developmental Biology), Derek Toomre, Agnes Vignery (Orthopaedics)

Assistant Professors Joerg Bewersdorf, Jonathan Bogan (*Internal Medicine/Endo-crinology*), Daniel Colón-Ramos, Eric Dufresne (*Mechanical Engineering*), Shawn Ferguson, Megan King, Patrick Lusk, Thomas Melia, Peter Takizawa, Tobias Walter, Yongli Zhang

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), axon guidance, 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, cell biology of the cytoskeleton and of the nucleus, cellular signaling and motility, cytokinesis. Approaches to these topics include biochemistry, molecular biology, and biophysics; 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.

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 and Cellular Basis of Human Disease (CBIO 601), and a seminar course that involves the reading and class discussion of research papers. The two 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 pass at least five graduate-level term courses at Yale, including CBIO 602, Molecular Cell Biology, and a seminar course as recommended above, with at least one grade of Honors or three of High Pass.

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 502a/b, Molecules to Systems James Jamieson, Thomas Lentz, Fred Gorelick, Peter Takizawa, and staff

This full-year 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 in the first term include replication and transcription of the genome; regulation of the cell cycle and mitosis; protein biosynthesis and membrane targeting; cell motility and the cytoskeleton; signal transduction; nerve and muscle function. The second term covers cell and tissue organization of organ systems including respiratory, renal, gastrointestinal, endocrine, and reproductive 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 from September to mid-May and is equivalent to three graduate credits.

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

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 three graduate credits. M 4–5:30

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

Thomas Melia, Thomas Pollard, Michael Caplan, Craig Crews, Pietro De Camilli, Haifan Lin, Joseph Madri, Mark Mooseker, James Rothman

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 Sandra Wolin,

Thomas Melia, Thomas Pollard, Michael Caplan, Craig Crews, Pietro De Camilli, Joseph Madri, Mark Mooseker, James Rothman

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 or previous 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 Karin Reinisch and faculty

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. Special emphasis is given to application of state-of-the-art imaging techniques to topical areas covering a wide range of contemporary cell biology. T 4:15-6

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 multi-photon microscopes.

CBIO 900a/GENE 900a/MCDB 900a, First-Year Introduction to Research and

Rotations Frank Slack and faculty

Lab rotations and grant writing 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 Valerie Horsley

Lab rotations and ethics for Molecular Cell Biology, Genetics, and Development track students. TH 4–5:30

CELLULAR AND MOLECULAR PHYSIOLOGY

B147 Sterling Hall of Medicine, 203.785.4041 www.physiology.yale.edu M.Phil., Ph.D.

Chair Michael Caplan

Director of Graduate Studies

Emile Boulpaep (SHM B142, 203.785.4055, emile.boulpaep@yale.edu)

Professors Peter Aronson (Internal Medicine/Nephrology), Emile Boulpaep, Thomas Brown (Psychology), Cecilia Canessa, Lloyd Cantley (Internal Medicine/Nephrology), Michael Caplan, Lawrence Cohen, Barbara Ehrlich (Pharmacology), Biff Forbush III, John Geibel (Surgery), Leonard Kaczmarek (Pharmacology), 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, Fred Wright (Internal Medicine/Nephrology), Lawrence Young (Internal Medicine/Cardiology), Z. Jimmy Zhou (Ophthalmology)

Associate Professors Angelique Bordey (*Neurosurgery*), Marie Egan (*Pediatrics*), Michael Nitabach, Vincent Pieribone, Susumu Tomita, David Zenisek

Assistant Professors Richard Kibbey (Internal Medicine/Endocrinology), Satinder Singh, Jesse Rinehart, Xiaoyong Yang (Comparative Medicine)

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 Physiology and Integrative Medical Biology 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 520a, C&MP 550a, and C&MP 560b. 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 least at the level of Teaching Fellow 2. Students are not expected to teach during their first year.

In addition to all other requirements, students must successfully complete MB&B 676b, Responsible Conduct of Research, prior to the end of their first year of study.

After satisfying the departmental predissertation requirements, passing the qualifying examination, submitting a satisfactory thesis prospectus, and having fulfilled the teaching requirement, 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.

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 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 520a, Current Perspectives in Physiology Susumu Tomita

The seminar explores a diverse range of current topics in physiology, emphasizing readings and discussions of recent primary literature. A variety of expert physiologists present topics such as structural biology, membrane transport, signal transduction, sensory systems, and neurophysiology. Instructors guide the discussion regarding the background, the experiments, the methods, and most importantly the impact of relevant research papers. The aim of the course is to understand how physiological approaches integrate the study of organismal function from genes, to systems, to behavior and disease. TTH 2:30–3:45

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

C&MP 560b^U/ENAS 570b^U/MCDB 560b^U/PHAR 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

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

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

Two-term course taught in groups of 10–12 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. HTBA

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

C&MP 750/PSYC 750, Research Topics in the Neurobiology of Learning and Memory Thomas Brown

Discussion and analysis of current work on the neurobiological foundations of learning and memory systems in mammals. Informal weekly discussions span several levels of analysis, including molecular and biophysical studies, cellular and systems neurophysiology and neuro-anatomy, and contemporary behavioral neuroscience. HTBA

CHEMICAL ENGINEERING

Dunham Laboratory, 203.432.4250 M.S., M.Phil., Ph.D.

Chair Menachem Elimelech

Director of Graduate Studies Michael Loewenberg (michael.loewenberg@yale.edu)

Professors Eric Altman, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Michael Loewenberg, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, Mark Saltzman, T. Kyle Vanderlick, Paul Van Tassel, Kurt Zilm

Associate Professors Tarek Fahmy, Yehia Khalil (*Adjunct*), William Mitch, Jordan Peccia

Assistant Professors Eric Dufresne, Chinedum Osuji, Andre Taylor, Corey Wilson, Julie Zimmerman

Fields of Study

Fields include separation processes, catalysis, combustion, statistical mechanics of adsorption, high-temperature chemical reaction engineering, colloids and complex fluids, nanotechnology, convective heat and mass transfer, biomolecular engineering, biotechnology, molecular beams, aerosol science and technology, materials processing, surface science, and environmental engineering.

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

J. Patrick Loria (1 SCL, 203.432.3913, chemistry.dgs@yale.edu)

Professors Sidney Altman (Molecular, Cellular & Developmental Biology), Victor Batista, Jerome Berson (Emeritus), Gary Brudvig, Robert Crabtree, Craig Crews (Molecular, Cellular & Developmental Biology), R. James Cross, Jr., Donald Crothers (Emeritus), John Faller, Gary Haller (Engineering & Applied Science), Francesco Iachello (Physics), Mark Johnson, William Jorgensen, J. Patrick Loria, J. Michael McBride, Scott Miller, Peter Moore, Lynne Regan (Molecular Biophysics & Biochemistry), James Rothman (Cell Biology), Martin Saunders, Alanna Schepartz, Charles Schmuttenmaer, Dieter Söll (Molecular Biophysics & Biochemistry), John Tully, Patrick Vaccaro, Harry Wasserman (Emeritus), Kenneth Wiberg (Emeritus), Frederick Ziegler (Emeritus), Kurt Zilm

Associate Professor Ann Valentine

Assistant Professors Nilay Hazari, Seth Herzon, David Spiegel, Elsa Yan

Fields of Study

Fields include bio-inorganic chemistry, bio-organic chemistry, biophysical chemistry, chemical physics, inorganic chemistry, organic chemistry, physical 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 and the Subject Test in Chemistry are required. Students whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE) if the TOEFL Internet-based test is not taken.

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 either three cumulative examinations and 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 eight cumulative examinations (organic 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 level of Teaching Fellow 3 or higher.

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 Robert Crabtree, Gary Brudvig,

Charles Schmuttenmaer, Victor Batista

Team-taught. Design principles for molecular components of alternative energy devices. Light energy conversion, energy transfer and charge separation in photosynthesis. Dioxygen evolution in photosystem II. Biofuels. Bioethanol, biodiesel, hydrogenase. Interaction of light with semiconductors. Fast spectroscopy to probe interfacial electron transfer. Computational design and characterization. Solar cells for electricity, photocatalysis, biomimetic water oxidation. Hydrogen economy. No final exam – paper instead. TTH 10:30–11:45

CHEM 518a^U, Advanced Organic Chemistry William Jorgensen

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

CHEM 519b, Advanced Organic Chemistry II Scott Miller

Continuation of CHEM 518a. Concise overview of structure, properties, thermodynamics, kinetics, reactions, and intermolecular interactions for organic molecular systems. Particular emphasis on stereochemical aspects of chemical reactions of interest to synthetic settings as well as in biomolecules. MW 11:35–12:50

CHEM 521b^U, Chemical Biology Alanna Schepartz

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. TTH 9–10:15

CHEM 523a^U, Synthetic Methods in Organic Chemistry Seth Herzon

A discussion of modern methods. Functional group manipulation, synthesis and functionalization of stereodefined double bonds, carbonyl addition chemistry, and synthetic designs. Normally taken only by students with a special interest in organic synthesis; for others, CHEM 518a is more appropriate. MWF 10:30–11:20

CHEM 524b, Advanced Synthetic Methods in Chemistry Seth Herzon

Selected topics in organic synthesis. Strategies for the synthesis of complex, biologically active molecules, including retrosynthetic analysis. Considerable emphasis is placed on strategy-level reactions, asymmetric catalysis, and applications to targets. Reaction mechanisms are emphasized throughout the course. MWF 8:20–9:10

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

[CHEM 526b^U, Computational Chemistry and Biochemistry]

[CHEM 528a, Natural Product Synthesis]

CHEM 530b^U, Statistical Methods and Thermodynamics Victor Batista

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 535a, Chemical Dynamics]

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 Charles Schmuttenmaer

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 Gary Brudvig

A quantum mechanical treatment of magnetic resonance aimed at providing an understanding of the fundamentals of EPR spectroscopy. Topics include solutions and solidstate measurements of radicals and spin labels, triplet states, transition metals, pulsed and double-resonance methods, and applications to biological systems. MWF 10:30–11:20

[CHEM 548b, Nuclear Magnetic Resonance in Liquids]

[CHEM 549b^U, Biophysical Chemistry]

CHEM 550b^U, Theoretical and Inorganic Chemistry Nilay Hazari

Elementary group theory, molecular orbitals, states arising from molecular orbitals containing several electrons, ligand field theory, and electronic structure of metal complexes. Introduction to physical methods used in the determination of molecular structure and the bonding of polyatomic molecules. TTH 9–10:15

CHEM 552a^U, Organometallic Chemistry Nilay Hazari

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

CHEM 554b, Bio-Inorganic Chemistry Ann Valentine

An advanced introduction to biological inorganic chemistry. Important topics in metalloprotein 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. MWF 8:20–9:10

[CHEM 555b, Inorganic Mechanisms]

CHEM 556a, 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. MWF 9:25–10:15

CHEM 557a^U, Modern Coordination Chemistry John Faller

The principles of modern inorganic chemistry. Main group and transition element chemistry: reactions, bonding, structure, and spectra. TTH 11:35–12:50

[CHEM 558b, Biophysical Spectroscopy]

CHEM 560La, Advanced Physical Methods in Molecular Science I Patrick Vaccaro 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. F 3–4

CHEM 56oLb, Advanced Physical Methods in Molecular Science II

R. James Cross, Jr.

A laboratory course introducing physical chemistry tools used in the experimental and theoretical investigation of large and small molecules. Modules include machining materials, magnetic resonance, optical spectroscopy and lasers, and computational tools. F $_3-_4$

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 metalworking 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 570a^U, Introductory Quantum Chemistry Victor Batista

The elements of quantum mechanics developed and illustrated with applications to chemical problems. Suitable for first-year graduate students in chemistry who have had some exposure to quantum mechanics as part of an undergraduate chemistry course. TTH 9–10:15

CHEM 572a, Advanced Quantum Mechanics John Tully

Topics in quantum mechanics that are essential for understanding modern chemistry, physics, and biophysics. Topics include the interaction of radiation with matter and using quantized radiation fields, and may include time-dependent quantum theory, scattering, semiclassical methods, angular momentum, density matrices, and electronic structure methods. Prerequisite: CHEM 570a or equivalent. TTH 9–10:15

CHEM 590a,b, 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, will be discussed, using as examples recent cases of misconduct by scientists. Enrollment is restricted to graduate students in chemistry. HTBA

CHEM 600-670, Research Seminars Faculty

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 Gary Brudvig, Craig Crews

CHEM 720, Current Topics in Organic Chemistry Faculty

A seminar series based on invited speakers in the general area of organic chemistry.

CHEM 730, Molecular Science Seminar Faculty

A seminar series based on invited speakers in the areas of physical, inorganic, and biological chemistry.

CHEM 990, Research Faculty

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 Christina S. Kraus

Director of Graduate Studies J. G. Manning (311 Phelps, 203.432.0989)

Professors Egbert Bakker, Victor Bers, Kirk Freudenburg, Verity Harte (*Classics; Philosophy*), J. G. Manning (*Classics; History*), Donald Kagan (*Classics; History; on leave* [Sp]), Diana Kleiner (*Classics; History of Art*), Christina S. Kraus, John Matthews (*Classics; History; on leave* [F]), William Metcalf (*Adjunct; Curator of Coins & Medals, Art Gallery*)

Associate Professor Emily Greenwood

Assistant Professors Milette Gaifman (*Classics; History of Art*), Jay Fisher, Pauline LeVen (*on leave*), Irene Peirano

Lecturers Veronika Grimm, Joseph Solodow

Affiliated Faculty Susanne Bobzien (Philosophy), Dimitri Gutas (Near Eastern Languages & Civilizations), Bentley Layton (Religious Studies), Dale Martin (Religious Studies), Susan Matheson (Curator of Ancient Art, Art Gallery), David Quint (Comparative Literature), Barbara Sattler (Philosophy), Barbara Shailor (Deputy Provost; Paleography)

The degree program in Classical Philology seeks 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.

Requirements for the Ph.D. Degree in Classics

- 1. Proficiency sight translation examinations in Greek and Latin (these are taken before the beginning of the first term and must have been passed at the latest by the end of the second term in residence).
- 2. A proseminar, in the first term, 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) 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, at least eight of which must be seminars (including four courses in the history of Greek and Latin literature, two literary seminars in one language, and one in the other); one course in historical or comparative linguistics; one course in ancient history (either an 800-level seminar or a 600-level materials course); and one course in classical art and archaeology.
- 5. Greek and Latin composition (this requirement may but need not be satisfied by courses taken under [4] above).
- 6. Translation examinations in Greek and Latin, based on the Classics Ph.D. reading list, by the beginning of the fifth term in residence.
- 7. Oral examinations in Greek and Latin literature, based on the Classics Ph.D. reading list, by the end of the fifth term in residence.

Starting with the class of students in the Classical Philology track entering in 2010, this requirement is as follows: Oral examinations in Greek and Latin literature, based on the Classics Ph.D. reading list, as well as in Greek and Roman history, by the beginning of the sixth term in residence.

8. Special fields oral examinations by the end of the sixth term, consisting of two areas of special concentration in each ancient language (four topics in total) selected by the candidate in consultation with the director of graduate studies (DGS). One of the special fields is normally related to the student's chosen dissertation topic.

Starting with the class of students entering in 2008, this requirement is as follows: Special fields oral examinations by the end of the sixth term, consisting of three areas of special concentration selected by the candidate in consultation with the DGS. One of the special fields is normally related to the student's chosen dissertation topic; the two other fields are in each of the two ancient languages.

- 9. A dissertation prospectus by the end of the seventh term in residence.
- 10. A dissertation.

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 predissertation 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.

Combined Programs

CLASSICS AND ANCIENT HISTORY

Admission requirements Students may apply to either the Department of Classics or the Department of History. In the former case, the requirements are the same as for Classical Philology; in addition, at least two term courses in Greek or Roman history are required for admission to the program.

Requirements for the Ph.D. degree in Classics and Ancient History

1. Proficiency sight translation examinations in Greek and Latin (these are taken before the beginning of the first term and must have been passed at the latest by the end of the second term in residence).

- 2. A proseminar, in the first term, 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) 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, including two courses in the history of Greek or Latin literature; one seminar in Greek or Latin literature; six courses in Greek and Roman history (three of these must be either seminars or materials courses, two in one language, one in the other); and two courses in another period of history.
- 5. A translation examination in Greek and Latin, based on the Ancient History Ph.D. reading list, by the beginning of the fifth term in residence.
- 6. An oral examination in Greek and Latin literature, based on the Ancient History Ph.D. reading list, by the end of the fifth term in residence.
- 7. Oral examinations in Greek and Roman history on four topics (two for each language) approved by the DGS, by the end of the sixth term in residence. One of the topics studied is normally related to the student's dissertation topic.
- 8. A dissertation prospectus by the end of the seventh term in residence.
- 9. A dissertation.

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.

Requirements for the Ph.D. degree in Classical Art and Archaeology

- 1. Proficiency sight translation examinations in Greek and Latin (these are taken before the beginning of the first term and must have been passed at the latest by the end of the second term in residence).
- 2. A proseminar, in the first term, offering an introduction to the discipline and its various subdisciplines.
- 3. Departmental reading examinations in Italian (or French) and German. To be passed by the beginning of the second year in residence.
- 4. A minimum of fourteen term courses, including a minimum of six courses in Greek and/or Roman art and/or archaeology (at least four must be seminars); a minimum of two courses in a related field of the history of art, for example Medieval or Renaissance; a minimum of two courses in Greek or Roman history, numismatics, or papyrology. Of the remaining four courses, at least two should be seminars in Greek or Latin literature.
- 5. Competence in Greek and Latin, usually demonstrated by passing at least one 400/700-level course in each language.
- 6. A written examination in classical art and archaeology (identifications of works of art and architecture, essays, and twenty-four-hour research paper), followed by an oral examination in four areas of concentration, guided by the following topics set in

advance by consultation with the faculty adviser and approved by the DGS: period (for example, the fourth century B.C.), genre (for example, Roman painting), site or geographical area (for example, Mycenae or Roman Africa), and free topic, normally by the end of the sixth term in residence.

- 7. A dissertation prospectus, normally by the end of the seventh term in residence.
- 9. A dissertation.

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 joint program, normally during the first term of residence; the directors of graduate studies of both departments should be consulted before application to the joint program is made.

Requirements for the Ph.D. degree in Classics and Comparative Literature

- 1. Proficiency sight translation examinations in Greek and Latin (these are taken before the beginning of the first term and must have been passed at the latest by the beginning of the second term in residence).
- 2. A proseminar, in the first term, offering an introduction to the discipline and its various subdisciplines.
- 3. Fourteen term courses including at least seven in Classics, including two courses in the history of Greek or Latin literature and two seminars; and at least six courses in Comparative Literature, including at least four courses on postclassical European literature and two courses on literary theory or methodology.
- 4. Literary proficiency in German and one other modern language, to be demonstrated during the first two years.
- 5. Translation examinations in Greek and Latin, based on the Classics Ph.D. reading list, by the beginning of the fifth term in residence.
- 6. Oral examinations in Greek and Latin literature, based on the Classics Ph.D. reading list, by the end 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, by the end of the sixth term.
- 8. A dissertation prospectus by the end of the seventh term in residence.
- 9. A dissertation.

CLASSICS AND PHILOSOPHY JOINT-PH.D. PROGRAM

The Classics and Philosophy Program is a joint 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 or through the Philosophy department for the Philosophy track.

Applicants for the Classics track of the joint program must satisfy the general requirements for admission to the Classics graduate program, in addition to the requirements of the Classics track of the joint program. Details of the Classics track of the program may be found online at www.yale.edu/classics/research_philosophy_program.html.

Applicants for the Philosophy track of the joint program must satisfy the general requirements for admission to the Philosophy graduate program, in addition to the requirements of the Philosophy track of the joint program. Details of the Philosophy track of the program may be found online at www.yale.edu/philos/grad_classics.html.

The Classics and Philosophy Program is overseen by an Interdepartmental Committee currently consisting of Professors Susanne Bobzien, Verity Harte, and Barbara Sattler, together with the DGS in Classics and the DGS in Philosophy.

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. Proficiency sight translation examinations in Greek and Latin (these are taken before the beginning of the first term and must have been passed at the latest by the end of the second term in residence).
- 2. A proseminar, in the first term, offering an introduction to the discipline and its various subdisciplines.
- 3. Sixteen term courses, eight of which will be courses in Classics and will include at least four courses in Greek and Latin literature, a course in historical or comparative linguistics, and at least three seminars; the eight remaining courses making up the Renaissance Studies portion of the degree will be broken down 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 meet the normal Classics requirements of a course in classical art or archaeology.
- 4. Literary proficiency in Italian, as examined by Renaissance Studies, and a second language, normally German or French.
- 5. Translation examinations in Greek and Latin, based on the Classics Ph.D. reading list, by the end of the fifth term in residence.
- 6. Oral examinations on six topics appropriate to both disciplines, selected in consultation with the directors of graduate studies in both disciplines, by the end of the sixth term in residence.
- 7. Oral examinations in Greek and Latin literature, based on the Classics Ph.D. reading list, by the end of the seventh term in residence.
- 8. A dissertation prospectus, by the end of the seventh term in residence.
- 9. A dissertation.

For information about the Ph.D. program in Graeco-Arabic Studies, please contact Professor Gutas, Department of Near Eastern Languages and Civilizations.

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 completion of seven 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 703a^U, Comparative Greek Grammar Jay Fisher

A historical and comparative study of the Greek language. Emphasis on the earliest records of Greek, the development of Greek grammar and vocabulary from Proto-Indo-European, and a comparison of this development with the grammar and vocabulary of Latin, English, and other Indo-European languages, including Sanskrit. MW 1–2:15

GREK 731a/PHIL 600a^U, Plato's Sophist Verity Harte, Barbara Sattler

A reading of the Greek text of Plato's *Sophist*, a work central to Plato's later philosophy and his engagement with Parmenides. Philosophical issues including the nature of sophistry; of being and not being; of language; and the possibility of falsehood in thought and speech. W 3:30–5:20

GREK 743b^U, Homer's Iliad Egbert Bakker

Readings 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. MW 4–5:15

GREK 751a^U, Herodotus J. G. Manning

An intensive reading of selections from the *Histories* of Herodotus. Study of the work's aims and methods in the historical and intellectual context of its time. TTH 1-2:15

GREK 771b^U, Plutarch's *Lives* Emily Greenwood

Plutarch is one of the most important authors for the study of biography in the Greco-Roman tradition and, as such, is integral to the intellectual curriculum that we offer our graduate students in Classics. In addition, Plutarch's Greek lives are important sources for the study of key periods of early Greek history and the relationship between historiography and other genres. The material covered in this course equips graduate students for future teaching and research in Greek literature, Greek history of the so-called classical period, and ancient biography. TH 1:30–3:20

GREK 790a^U, Syntax and Stylistics Victor Bers

Stylistic analysis and extended prose composition in imitation of particular genres and "subgenres," concentrating on classical Attic prose. Students enrolled in GREK 790a 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, 10:30–11:20

LATN 733a^U, Sallust Irene Peirano

An introduction to the works, style, and thought of Sallust through in-depth discussion of his two monographs: the *Bellum Catilinae* and *Bellum Jugurthinum*. MW 2:30–3:45

LATN 737a^U, Roman Comedy Jay Fisher

A close reading of the *Pseudolus* of Plautus and the *Adelphoe* of Terence, with attention to the literary, social, and historical contexts of both plays. MW 4-5:15

LATN 762b^U, The Histories of Tacitus William Metcalf

Close reading of Tacitus's *Histories* and parallel passages from his other works, with attention to his syntax and style. The influence of Tacitus's background and experience on his narrative is focal throughout. TTH 1-2:15

LATN 775b^U, Horace: Satires and Epistles Kirk Freudenburg

The primary goal of the course is to read through the hexameter works of Horace, the *Satires* and *Epistles*, attending to the basic demands of close reading in the original Latin, as well as to larger matters of genre, style, and cultural context. The course requirements include selected readings from related works of Latin poetry and prose, as well as works of modern scholarship. TTH 11:35–12:50

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 9-10:15

CLSS 805b/HSAR 561b, The Aesthetics of the Divine Image in Greek Antiquity

Milette Gaifman

An exploration of the complex and problematic relationship between imagined divinities and visual representations in Greek antiquity, an area that has received much scholarly attention in recent years. Topics include the range of visual strategies for the demarcation of divine presence from aniconism to naturalism, the nature of Greek anthropomorphism, the variety of functions of images of gods both inside and outside the cultic sphere, and the relationship between artistic representations and epiphanic experience. In addition to the analysis of ancient monuments and primary texts (e.g., Herodotos, Plato) the course treats modern theoretical discussions on the role of art in bridging the gap between human and divine by rendering the invisible gods into visible entities. W 3:30-5:20

CLSS 808b/PHIL 601b^U, Theories of Emotion in Greco-Roman Antiquity

Verity Harte

Theories of emotion from Greco-Roman antiquity, particularly those of Plato, Aristotle, and the Stoics, considered with a view to exploring the nature of emotions and their role in human life and psychology. T 3:30–5:20

CLSS 849a, Ancient Greek Masculinities Emily Greenwood

The course examines different discourses of Greek masculinity in a range of texts from Homeric epic to Plutarch's writings on Sparta. We study these ancient Greek textual representations of masculinity in the broader context of Greek art and material culture, as well as contemporary gender theory. Topics to be studied include heroism and manliness in early Greek epic, the performativity of masculinity in Athenian drama, constructions of sex and gender in the Hippocratic corpus, the gendering of empire in Greek historiography, rhetorics of masculinity in the Athenian law courts, and masculinity and the athletic body in Athens and Sparta. T 3:30–5:20

CLSS 852b/HIST 513b, The Origins of Roman Writers John Matthews

The course studies, in detail and in their original languages, a selection of Roman writers, in both Greek and Latin, who came from different origins and cultural environments. We explore the effect this has on their choices of subject matter and the manner of their writing and on their interpretation. T 3:30-5:20

CLSS 855b, Attic Tragedy and Politics Victor Bers

The seminar considers the relation of the Athenian tragic theater to the city's political life in the fifth and fourth centuries B.C., examining both the dramatic presentations themselves and the civic apparatus that financed and supervised the performances. Euripides's *Suppliants* is the first specimen the seminar inspects in some detail. T 1:30–3:20

CLSS 857a, Vergil's Aeneid Christina S. Kraus, David Quint

A close reading of selected books of the epic, concentrating on Vergilian poetics. Particular themes include intertextuality; figures of speech and thought; narrative structure and meaning; repetition; *ekphrasis* and simile; the relationship between poetics and politics. Weekly readings include key secondary material that has shaped the interpretation of the poem. Students should read the whole poem in Latin before the seminar begins. TH 3:30–5:20

CLSS 870b, Greek Texts from Egypt J.G. Manning

A survey of the variety and the range of Greek texts from Egypt including papyri, inscriptions, and ostraca. A focus on vocabulary and semantics as well as historical and cultural context. M 2:30–4:20

CLSS 871b, Poetic Careers from Homer to Ovid Irene Peirano

A study of the representations of the lives and careers of poets in biographical sources as well as in the poets' own writings. The seminar focuses primarily on the scholarly genre of poets' *bioi/vitae* starting from the *Lives of Homer* and ending with Donatus's *Life of Virgil*. Other texts include the *Contest of Hesiod and Homer*, Hermesianax's *Leontion*, Horace's autobiographical *Satires*, and Ovid's *Tristia* 4.10. TH 3:30–5:20

CLSS 890a/HSAR 581a, Roman Painting: Achievement and Legacy Diana Kleiner Roman mural painting in all its aspects and innovations. Individual scenes and complete ensembles in palaces, villas, and houses in Rome and Pompeii are explored, along with their rediscovery and revival in the Renaissance and Neoclassical periods. Special attention is paid to the four architectural styles; history and mythological painting; the impact of the theater; the part played by landscape, genre, and still life; the accidental survival of painted portraiture; and the discovery and rejection of trompe l'oeil illusionism and linear perspective. T 1:30–3:20

CLSS 896a, History of Greek Literature I Egbert Bakker

A comprehensive treatment of Greek literature from Homer to the imperial period, with an emphasis on archaic and Hellenistic poetry. The course prepares for the comprehensive oral qualifying examinations. The student is expected to read extensively in the original language, working toward familiarity with the range and variety of the literature. MW 9-10:15

CLSS 897b, History of Greek Literature II Victor Bers Continuation of CLSS 896a. TTH 9–10:15

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 www.yale.edu/complit M.A., M.Phil., Ph.D.

Chair Dudley Andrew

Director of Graduate Studies

Pericles Lewis [F] (angelika.schriever@yale.edu) David Quint [Sp] (angelika.schriever@yale.edu)

Professors Dudley Andrew, Katerina Clark, Roberto González Echevarría, Carol Jacobs, Pericles Lewis, Rainer Nägele, David Quint, Haun Saussy, Katie Trumpener

Associate Professors Ala Alryyes, Moira Fradinger, Barry McCrea

Assistant Professor David Gabriel

Senior Lecturer Richard Maxwell

Faculty Affiliates Rolena Adorno, Howard Bloch, Rüdiger Campe, Michael Denning, Wai Chee Dimock, Paul Fry, Beatrice Gruendler, Karsten Harries, Tina Lu, John MacKay, Giuseppe Mazzotta, Christopher L. Miller, Joseph Roach, Henry Sussman, Christopher Wood, Ruth Yeazell

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 at least seven 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) course work dealing with texts from three literatures, one of which may be English or American. 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 seven 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).

The Ph.D. dissertation, supervised by a dissertation director (or directors) and approved by the departmental faculty, 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

The Department of Comparative Literature also offers, in conjunction with the Department of Classical Languages and Literatures, a combined Ph.D. in Comparative Literature and Classics. For further details, see Classics.

COMPARATIVE LITERATURE AND FILM STUDIES

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

COMPARATIVE LITERATURE AND RENAISSANCE STUDIES

The Department of Comparative Literature also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in Comparative 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 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.

Courses

CPLT 511b^U, Introduction to Theory of Literature Haun Saussy

An examination of concepts and assumptions active in contemporary views of literature, with their history. Shifting definitions of "literary theory"; accounts of meaning, interpretation, and representation; examinations of historicist, formalist, psychoanalytic, Marxist, structuralist, post-structuralist, feminist, and media-centered approaches to theory and literature. TTH 11:35–12:25

CPLT 521A/FILM 609a, Issues in World Literature and Cinema Dudley Andrew Can there be a disciplinary "area" entitled World Literature or World Cinema, or does the adjective "world" defy perimeters? Undergraduate courses and textbooks with "world" in their title have proliferated this century, but what are they aiming to define, organize, and explore? What topics, principles, methods, and conundrums do they address? This seminar aims to quickly survey the history of the "world quest" of literary studies from Goethe to Moretti, and to see if the more recent shift from International to World Cinema marks a parallel quest or something entirely different. All participants debate key texts and essays by literary scholars (Damrosch, Casanova, Pendergast, B. Anderson, et al.) and by film scholars (see *World Cinema/Transnational Perspectives*). We formulate one common seminar project to try out the kind of collaborative research often required by the scale of this "area." And each participant pursues an essay on one problem lurking today in literary or film history as these fields are pushed to a geographical limit. Questions could concern corpus, system, distribution, influence, translation, mediation, genre, and so on. TH 9:25–11:15

CPLT 527b/FILM 828b/RUSS 746b, Art and Ideology Katerina Clark

Examination of texts identified as ideological art, focusing on the relationship between the conventions they use and the ideology they seek to advance. Theoretical readings include works by Benjamin, Jameson, Lukács, Bakhtin, Marx, Althusser, and Judith Butler; literary works by Balzac, Brecht, Tretiakov, Ostrovsky, Orwell, Koestler, and others; films by Eisenstein, Leni Riefenstahl, and others. W 1:30–3:20
CPLT 539b/ENGL 846b, American Literature: Regional, National, Global Wai Chee Dimock

How does the choice of scale affect our understanding of American literature: its histories, its webs of relations, the varieties of genres that make up its landscape? Through three interlocking prisms – regional, national, and global – we explore multiple permutations of locality and distance; the size of events; lengths and widths of causal connection; and the expanding or contracting spheres of race and gender. Authors include Anne Bradstreet, Nathaniel Hawthorne, Henry James, Sarah Orne Jewett, Ernest Hemingway, Gertrude Stein, Ezra Pound, Paul Bowles, Langston Hughes, Robert Lowell, Monique Truong, Edwidge Danticat. w 1:30–3:20

CPLT 573a, Symbolisme and the Technologies of Mimesis Haun Saussy

The nineteenth century saw the emergence of new media – photography, lithography, phonography, color reproduction, the cinema – that altered the basis of perception and creation that had conditioned the arts for centuries. Through readings in biology, psychology, anatomy, physiology, ethnography, and linguistics, we attempt to reconstruct the share of technological change in the *Symboliste* movement centered around Stéphane Mallarmé. W 2:30–4:20

CPLT 578a/MDVL 558a/SPAN 526a, Love in the Western World

María Rosa Menocal

Readings in the formative period of the vernacular lyric in Europe, with special emphasis on the development of the poetic ideology long known as "courtly love." We read selections from the great variety of lyric languages involved at this turning point in European literary history: from the eleventh- and twelfth-century Occitan troubadours and their contemporaries writing in the Arabic and Hebrew of the Taifas of Islamic Spain and Norman Sicily, to the range of other medieval literary forms and languages that refined poetic expression and philosophies of love simultaneously (including, among others, the Anglo-Norman Tristan, the *scuola siciliana* and the *dolce stil nuovo*, the Galician-Portuguese *cantigas*). We also explore the central role that the study of these new poetic languages and ideologies played in the rise of the new philologies of the nineteenth century, the immediate ancestors of our own fields of national language and comparative literary studies. TH 1:30–3:20

CPLT 632b/FILM 861b, World War II Narratives: Home Fronts Katie Trumpener Taking a pan-European perspective, the course examines quotidian, civilian experiences of war during a conflict of unusual scope and duration. Considering key works of wartime and postwar fiction alongside diaries, memoirs, and films, we explore the kinds of literary reflection war occasioned, how civilians experienced the relationship between history and everyday life (both during and after the war), children's experience of war, and the ways that home front, occupation, and concentration camp memories shaped postwar avant-garde aesthetics. Novels and autobiographical fiction by Elio Vittorini, Anna Seghers, Irène Némirovsky, Elizabeth Taylor, Elizabeth Bowen, Tadeusz Borowski, Georges Simenon, Harry Mulisch, Jiří Weil, Jorge Semprún, Miron Białoszewski, and Christa Wolf. Diaries and memoirs by Victor Klemperer, Anne Frank, and Sarah Kofman. Films by Humphrey Jennings, Andrzej Munk, Theo Angelopoulos, Péter Forgács. M 9:25–11:15, screenings SU 6–10

CPLT 633a^U/FILM 757a^U/FREN 755a^U, French New Wave Dudley Andrew

This lecture course lays out "the idea of cinema" that developed in the wake of World War II as French critics inaugurated the New Wave school around 1960. The intellectual development of directors such as Truffaut, Godard, and Rohmer is seen via texts by Bazin, Rivette, Robbe-Grillet, and Barthes. Postwar cultural life led to a new film aesthetic from Bresson and Cocteau through the masterworks of the New Wave, affecting the 1968 generation right up to Assayas and Desplechin today. Graduate discussion section. Knowledge of French required. MWF 11:30–12:20, screenings M 6:30–10

CPLT 646b/ENGL 723b, The Rise of the European Novel Katie Trumpener

Over the eighteenth century, the novel became a key literary form in many parts of Europe. Yet now-standard narratives of its "rise" often offer a view that is temporally and linguistically foreshortened. The course examines key early modern novels in a range of European languages and tackles some of the major literary-historical accounts explaining novelistic form, audiences, timing, and social function. It centers on key eighteenth-century British and French novels by Montesquieu, Defoe, Swift, Sterne, Diderot, Laclos, Edgeworth, and Austen. Yet we begin by considering earlier picaresque novels and secret histories such as *Lazarillo de Tormes*, Grimmelshausen's *Courage*, and Madame de Lafay-ette's *The Princess of Cleves*, and end with novellas by Goethe, Kleist, and Pushkin. All texts available in translation, although students are strongly encouraged, if possible, to read in the original. M 1:30–3:20

CPLT 702a/PHIL 701a, Schopenhauer, The World as Will and Representation

Karsten Harries

A careful reading, with special emphasis on the reception of Schopenhauer's ideas. W 1:30–3:20

CPLT 703b/GMAN 651b/PHIL 654b^U/PLSC 583b^U, Contemporary Critical Theory: Habermas and Beyond Seyla Benhabib

Critical theory after Jürgen Habermas's "theory of communicative action" faces the challenges of a postnational society; the rise of a global worldwide net; increasing multiculturalism; the end of secularism; and a worldwide economic crisis. The course examines Habermas's response as well as that of the third generation of critical theorists to these issues. Limited to three Comparative Literature students. W 1:30–3:20

CPLT 725b/AFAM 846b/AFST 746b/FREN 946b, Postcolonial Theory and Its

Literature Christopher L. Miller

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage, créolité*, "minor literature"), but also gives attention to the literary texts from which they are derived (francophone and anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. Conducted in English. TH 1:30–3:20

CPLT 803b/GMAN 661b^U, Hölderlin, Kafka, Benjamin Rainer Nägele

The seminar addresses the question of the relationship of (auto-)biography and literature based on texts by Hölderlin and his undermining of the romantic concept of literature as subjective expression; Kafka's notebooks, in which literary texts and diary entries are curiously intertwined; and finally Benjamin's autobiographical texts (*Berliner Kindheit*) as well as his essays on Kafka and Proust. Discussion in English; reading knowledge of German is strongly encouraged. W 1:30–3:20

CPLT 805a/ENGL 773a^U, Readings in Romantic Poetry: Function, Medium, Affect Geoffrey Hartman

A seminar on the place of romantic poetry in literary history, and how it projects its own historical perspectives. We also try to understand the rise of a more theoretical criticism. But we do not neglect generic qualities this poetry shares with major poems in other periods. Our discussions should come to terms with attempts to theorize affects that have been described as peculiarly poetic or aesthetic, and with questions concerning art's function, in the sense of cognitive qualities, cultural utility, or some definable end like Schiller's "aesthetic education." If there is time, the instructor welcomes a discussion of what is – or remains of – poetry's role as a medium in the context of new media and technologies of communication. Intensive readings of individual poems or passages, accompanied by critical or theoretical texts. Blake, Wordsworth, Coleridge, Keats, and Shelley play the major roles. Students have an opportunity to raise issues about poetry in languages/traditions other than English. Questions about "noncanonical" authors are welcome. One short paper and one significantly longer term paper. Enrollment limited to ten; this number may include two or three auditors or advanced undergraduates with permission of the director of undergraduate studies. T 3:30–5:45

CPLT 862a/GMAN 663a^U, Brecht, Artaud, Müller, and the Modern Theater

Rainer Nägele

The seminar concentrates on the theatrical experimentations of Brecht and Artaud and the transformations of these experiments in Heiner Müller's plays. Reading knowledge of German and French is desirable. W 1:30–3:20

CPLT 897b/FREN 899b, Modernity Maurice Samuels

The seminar studies literature and art from nineteenth-century France alongside theoretical and historical reflections to explore the significance of modernity. How did historical forces shape cultural trends? How did literature and art define what it means to be modern? Writers to be studied include Balzac, Baudelaire, Flaubert, Maupassant, and Zola. Theorists include Benjamin, Durkheim, Foucault, Marx, Simmel, and Weber. We also examine the painting of Manet and his followers. TH 9:25–11:15

CPLT 900a, Directed Reading Faculty

CPLT 900b, Directed Reading Faculty

CPLT 901a, Individual Research Faculty

CPLT 901b, Individual Research Faculty

CPLT 903a/FILM 625a^U/HSAR 726a, Media and the Logic of Repetition Francesco Casetti

By its very name, "media" seldom connotes originality, yet cultures grow in new ways through media. New stories or topics most often are variations on original texts or ideas. This seminar confronts this conundrum by analyzing a set of textual practices that are all defined by the presence of a repetition: a text retakes, borrows, copies, or extends a previous text. Repetition functions in parallel with other media practices: technical reproduction (which eliminates the idea of "original"); the extension of narrative (which blurs the boundary of a text); the emphasis given genre and formula (which strengthens the role of text-type); or intermediality itself (which dismantles the idea of a homogeneous discursive field). The course focuses on how repetition works in media, where it is rooted, and what concepts it is connected to. Repetition is analyzed from the point of view of semiotics, cultural history, and philosophy (with reference to scholars such as Barthes, Eco, Benjamin, Deleuze, but also to debates on film and adaptation, film genres, etc.). TH 1:30–3:20

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

Joseph Roach

Taking account of the genealogy of modern drama in eighteenth-century performance, the seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events 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*. M 3:30–5:20

CPLT 958b/SPAN 941b, Severo Sarduy and Tel Quel Roberto González Echevarría A study of Severo Sarduy's work in relation to the major figures of the *Tel Quel* group (Barthes, Derrida, Lacan) and his impact on leading Latin American writers, particularly Octavio Paz. Among the topics to be considered: Sarduy's relations with the Boom novelists (Fuentes, García Márquez, Cortázar, Vargas Llosa), his readings of Lezama Lima and Carpentier, and his contacts with the Cuban Revolution, the Orient, the Baroque, and transvestism. In Spanish. W 3:30–5:20

[CPLT 987a/AFAM 805a/AFST 949a/FREN 949a, Novel, Film, and History in French Africa]

[CPLT 989b/AFAM 851b/FREN 943b, Creole Identities and Fictions]

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) Perry Miller (300 George St., Suite 501, 203.737.2903, perry.miller@yale.edu)

Professors James Aspnes (Computer Science), Joseph Chang (Statistics), Ronald Coifman (Mathematics; Computer Science), Xing Wang Deng (Molecular, Cellular & Developmental Biology), Donald Engelman (Molecular Biophysics & Biochemistry), Mark Gerstein (Biomedical Informatics; Molecular Biophysics & Biochemistry; Computer Science), William Jorgensen (Chemistry), Douglas Kankel (Molecular, Cellular & Developmental Biology), Kenneth Kidd (Genetics; Ecology & Evolutionary Biology), Paul Lizardi (Pathology), Elias Lolis (Pharmacology), Perry Miller (Anesthesiology; Medical Informatics; Molecular, Cellular & Developmental Biology), Willard Miranker (Computer Science), Anna Pyle (Molecular Biophysics & Biochemistry), Martin Schultz (Computer Science), Gordon Shepherd (Neuroscience), Abraham Silberschatz (Computer Science), Michael Snyder (Molecular, Cellular & Developmental Biology; Molecular Biophysics & Biochemistry), Dieter Söll (Molecular Biophysics & Biochemistry; Chemistry), Günter Wagner (Ecology & Evolutionary Biology), Xiao-Jing Wang (Neurobiology), Heping Zhang (Epidemiology & Public Health; Statistics), Hongyu Zhao (Epidemiology & Public Health; Genetics), Steven Zucker (Computer Science; Electrical Engineering; Biomedical Engineering)

Associate Professors Kei-Hoi Cheung (Anesthesiology; Computer Science; Genetics), Michael Krauthammer (Pathology), Andrew Miranker (Molecular Biophysics & Biochemistry), Corey O'Hearn (Mechanical Engineering; Physics), Valerie Reinke (Genetics), David Tuck (Pathology)

Assistant Professors Thierry Emonet (Molecular, Cellular & Developmental Biology), Alison Galvani (Epidemiology & Public Health), Antonio Giraldez (Genetics), Tae Hoon Kim (Genetics), Steven Kleinstein (Pathology), Steven Ma (Epidemiology & Public Health), Annette Molinaro (Epidemiology & Public Health), James Noonan (Genetics), Jeffrey Townsend (Ecology & Evolutionary Biology)

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).

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 folowing courses: CB&B 740a, CB&B 750a, and CB&B 752b. A typical program will include nine courses. Completion of the core curriculum will typically take three to four terms, depending in part on the prior training of the student. Students will typically take two to three courses each term and three research rotations 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 MB&B 676b, Responsible Conduct in Research (or another course that covers the material with approval of the CB&B director of graduate studies [DGS]).

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 nine 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). 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 nine

required courses taken at Yale, (2) complete the required course work for the Ph.D. program with an average grade of High Pass, (3) successfully complete three research rotations, and (4) meet the Graduate School's Honors requirement.

Terminal M.S. 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 645b/STAT 645b, Statistical Methods in Genetics and Bioinformatics

Jing Zhang

Introduction to problems, algorithms, and data analysis approaches in computational biology and bioinformatics; stochastic modeling and statistical methods applied to problems such as mapping disease-associated genes, analyzing gene expression microarray data, sequence alignment, SNP analysis, transcription regulation and sequence motif finding, and RNA/protein structure prediction. Statistical methods include maximum likelihood, EM, Bayesian inference, Markov chain Monte Carlo, and some methods of classification and clustering; models include hidden Markov models, Bayesian networks, and the coalescent. The limitations of current models, and the future opportunities for model building, are critically addressed. Prerequisite: STAT 361, 538a, or 542b. Prior knowledge of biology is not required, but some interest in the subject and a willingness to carry out calculations using R is assumed. TTH 10:30–11:45

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. HTBA

CB&B 750a/MCDB 750a, Core Topics in Biomedical Informatics Perry Miller and staff

Introduction to common unifying themes that serve as the foundation for different areas of biomedical informatics, including clinical, neuro-, and genome informatics. The course is designed for students with significant computer experience and course work who plan to build computational tools for use in bioscience research. Emphasis is on understanding basic principles underlying informatics approaches to biomedical data modeling, interoperation among biomedical databases and software tools, standardized biomedical vocabularies and ontologies, modeling of biological systems, and other topics of interest. The course involves lectures, class discussions, student presentations, and computer programming assignments. Prerequisites: previous computer programming experience and permission of the instructor. HTBA

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 for data integration. Prerequisites: MB&B 301b and MATH 115a or b, or permission of the instructor. MW 1–2:15

[CHEM 526b^U, Computational Chemistry and Biochemistry]

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 www.cs.yale.edu M.S., M.Phil., Ph.D.

Chair Abraham Silberschatz

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, Martin Schultz, Zhong Shao, Abraham Silberschatz, Daniel Spielman, Steven Zucker

Associate Professors Yiorgos Makris (*Electrical Engineering*), Andreas Savvides (*Electrical Engineering*), Brian Scassellati, Sekhar Tatikonda (*Electrical Engineering*), Yang Richard Yang, Edmund Yeh (*Electrical Engineering*)

Assistant Professors Daniel Abadi, Kei-Hoi Cheung (Medical Informatics), Bryan Ford

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; 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 MATH 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 521a^U, Compilers and Interpreters Zhong Shao

Compiler organization and implementation: lexical analysis, formal syntax specification, parsing techniques, execution environment, storage management, code generation and

optimization, procedure linkage, and address binding. The effect of language-design decisions on compiler construction. MW 1–2:15

CPSC 522b^U, Operating Systems Bryan Ford

The design and implementation of operating systems. Topics include synchronization, deadlocks, process management, storage management, file systems, security, protection, and networking. MW 1–2:15

[CPSC 524b^U, Parallel Programming Techniques]

[CPSC 525b^U, Theory of Distributed Systems]

CPSC 527a^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++. TTH 1-2:15

CPSC 528b, Language-Based Security Zhong Shao

Basic design and implementation of language-based approaches for increasing the security and reliability of systems software. Topics include proof-carrying code; certifying compilation; typed assembly languages; runtime checking and monitoring; highconfidence embedded systems and drivers; and language support for verification of safety and liveness properties. TTH 2:30–3:45

[CPSC 530a^U, Formal Semantics]

CPSC 531a, Computer Music: Algorithmic and Heuristic Composition Paul Hudak Study of the theoretical and practical fundamentals of computer-generated music, with a focus on high-level representations of music, algorithmic and heuristic composition, and programming languages for computer music generation. Theoretical concepts are supplemented with pragmatic issues expressed in a high-level programming language. Prerequisites: ability to read music; CPSC 202a and 223b. MW 2:30–3:45

[CPSC 532a, Computer Music: Sound Representation and Synthesis]

[CPSC 533b, Computer Networks]

CPSC 534b^U, **Mobile Computing and Wireless Networking** Yang Richard Yang An introduction to the principles of mobile computing and its enabling technologies. Topics include principles of mobile computing; wireless systems; information management; location-independent/dependent computing models; disconnected and weakly connected operation models; human-computer interactions; mobile applications and services; security; power management; and sensor networks. Taught in alternate years. MW 2:30–3:45

[CPSC 535a^U, Large-Scale Network Design]

CPSC 536a^U, Networked Embedded Systems and Sensor Networks

Andreas Savvides

Introduction to the fundamental concepts of networked embedded systems and wireless sensor networks, presenting a cross-disciplinary approach to the design and implementation of smart wireless embedded systems. Topics include embedded systems programming concepts; low-power and power-aware design; radio technologies; communication protocols for ubiquitous computing systems; and mathematical foundations of sensor behavior. Laboratory work includes programming assignments on low-power wireless devices. TTH 11:35–12:50

CPSC 537b^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. TTH 1–2:15

[CPSC 538b, Database System Implementation and Architectures]

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. TTH 2:30–3:45

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 555a/ECON 563a, Economics and Computation]

[CPSC 561b, Foundations of Cryptography]

CPSC 562a, Graphs and Networks Daniel Spielman

A mathematical examination of graphs and their applications in the sciences. Families of graphs include social networks, small-world graphs, Internet graphs, planar graphs, well-shaped meshes, power-law graphs, and classic random graphs. Phenomena include connectivity, clustering, communication, ranking, and iterative processes. TTH 2:30–3:45

CPSC 563b^U, Introduction to Machine Learning Dana Angluin

Paradigms and algorithms for learning classification rules and more complex behaviors from examples and other kinds of data. Topics may include version spaces, decision trees, artificial neural networks, Bayesian networks, instance-based learning, genetic algorithms, reinforcement learning, inductive logic programming, the MDL principle, the PAC model, VC dimension, sample bounds, boosting, support vector machines, queries, grammatical inference, and transductive and inductive inference. MW 2:30–3:45

[CPSC 565b, Topics in Algorithms]

[CPSC 567a^U, Cryptography and Computer Security]

CPSC 568a^U, **Introduction to Computational Complexity** Joan Feigenbaum Introduction to the theory of computational complexity. Basic complexity classes, including polynomial time, nondeterministic polynomial time, probabilistic polynomial space, logarithmic space, and nondeterministic logarithmic space. The roles of reductions, completeness, randomness, and interaction in the formal study of computation. TTH 1-2:15

CPSC 569b^U, Randomized Algorithms James Aspnes

Beginning with an introduction to tools from probability theory including some inequalities like Chernoff bounds, the course covers randomized algorithms from several areas: graph algorithms, algorithms in algebra, approximate counting, probabilistically checkable proofs, and matrix algorithms. Taught in alternate years. TTH 1–2:15

CPSC 570a^U, Artificial Intelligence Brian Scassellati

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 573b, Intelligent Robotics Brian Scassellati

An 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. MW 10:30–11:20

CPSC 575b/ENAS 575b^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. Prerequisites: MATH 120a or b and CPSC 112a or b, or permission of the instructor. MW 1–2:15

[CPSC 577a^U, Neural Networks for Computing]

[CPSC 578b^U, Computer Graphics]

CPSC 579a^U, Advanced Topics in Computer Graphics Holly Rushmeier

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. TTH 2:30–3:45

[CPSC 662a, Spectral Graph Theory]

[CPSC 671a, Advanced Artificial Intelligence]

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 723b, Graduate Seminar

тн 2:30-3:45

CPSC 772a, Graduate Seminar

тн 2:30-3:45

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 for data integration. Prerequisites: MB&B 301b and MATH 115a or b, or permission of the instructor. MW 1–2:15

CPSC 820a or b, Directed Readings in Programming Languages and Systems By arrangement with faculty.

CPSC 840a or b, Directed Readings in Numerical Analysis By arrangement with faculty.

CPSC 860a or b, Directed Readings in Theory By arrangement with faculty.

CPSC 870a or b, Directed Readings in Artificial Intelligence By arrangement with faculty.

CPSC 991a/MATH 991a, Ethical Conduct of Research Vladimir Rokhlin HTBA

EAST ASIAN LANGUAGES AND LITERATURES

308 Hall of Graduate Studies, 203.432.2860 www.yale.edu/eall M.A., M.Phil., Ph.D.

Chair Edward Kamens

Director of Graduate Studies

John Treat (307 HGS, 203.432.2864, john.treat@yale.edu)

Professors Kang-i Sun Chang, Edward Kamens, Tina Lu, Haun Saussy (*Comparative Literature*), John Treat

Associate Professors Aaron Gerow, Jing Tsu

Assistant Professors Paize Keulemans, Chloë Starr (Divinity School)

Senior Lecturer Koichi Shinohara (Religious Studies)

Senior Lectors Seungja Choi, Koichi Hiroe, Zhengguo Kang, Ninghui Liang, Angela Lee-Smith, Yoshiko Maruyama, Ling Mu, Michiaki Murata, Hiroyo Nishimura, Masahiko Seto, Mari Stever, Wei Su, Peisong Xu, William Zhou

Lectors Hsiu-hsien Chan, Min Chen, Rongzhen Li, Fan Liu, Yukie Mammoto, Yu-Lin Wang-Saussy, Jianhua Shen, Haiwen Wang

Fields of Study

Fields for doctoral study are Chinese literature and Japanese literature. (See also the Combined Ph.D. Program in Film 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 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 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 Studies Program, a combined Ph.D. in East Asian Languages and Literatures and Film Studies. For further details, see Film Studies. Applicants to the combined program must indicate on their application that they are applying both to Film 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, www.yale.edu/ eall.

Courses

Courses in Chinese language at the elementary, intermediate, and advanced levels are listed in *Yale College Programs of Study*.

CHNS 500a^U, Man and Nature in Chinese Literature Kang-i Sun Chang

Concepts of man and nature in traditional Chinese literature, with special attention to aesthetics and cultural meanings. Topics include Taoism, Buddhism, and lyricism; body and sexuality, contemplation, and self-cultivation; travel in literature; landscape and the art of description; images of Utopian communities as compared to the Western notion of Utopia; ideas of self-identity; and dream, pilgrimage, and allegory. No knowledge of Chinese required. TTH 1–2:15

CHNS 501b^U/WGSS 770b^U, Women and Literature in Traditional China

Kang-i Sun Chang

The course focuses on major women writers in traditional China, as well as representations of women in works by male authors. Topics include the dichotomy of *yin* and *yang*, women and the fox spirits, the power of women's writing, women in exile, Daoist nuns, widow poets, courtesans and the literati culture, women's poetry clubs, women's script (*nushu*), the cross-dressing ladies, foot binding and representations of the female body, food and sexuality, notions of *qing* (love), aesthetics of illness, women and revolution, and the function of memory in women's literature. All readings in translation; no knowledge of Chinese required. TTH 1–2:15

CHNS 560a^U, Introduction to Literary Chinese I Paize Keulemans

Reading and interpretation of texts in various styles of literary Chinese (*wenyan*), with attention to basic problems of syntax and literary style. Prerequisite: CHNS 142b or 151b or equivalent. TTH 11:35–12:50

CHNS 570b^U, Advanced Readings in Modern Chinese 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. Prerequisite: CHNS 153b or 159b or equivalent. W 3:30-5:20

CHNS 571b^U, Introduction to Literary Chinese II Paize Keulemans

Continuation of CHNS 560a. Prerequisite: CHNS 560a or equivalent. TTH 11:35-12:50

CHNS 602b^U, Readings in Classical Chinese Prose Kang-i Sun Chang

Readings of classical Chinese prose with commentaries and notes in modern Chinese. Exploration of a variety of themes and styles. Lectures and discussion in English and Chinese. Because readings are different year to year, this course may be repeated for credit. W 1:30-3:20

CHNS 603a^U, Readings in Classical Chinese Poetry Kang-i Sun Chang

Fundamentals of classical Chinese poetry and poetics. Primary readings in Chinese, lectures and discussion in English and Chinese. Because readings are different year to year, this course may be repeated for credit. W 1:30–3:20

CHNS 828a, The Chinese Erotic Novel Jin Ping Mei Paize Keulemans

The course focuses on reading the late-sixteenth-century novel *Jin Ping Mei* in its historical and cultural context. The primary aim of the course is to read all 100 chapters of this work in its entirety. To do so we employ different editions, look carefully at some of its illustrations, compare the novel with some of its source materials, and investigate briefly a sampling of the novel's sequels and adaptations. In addition, we use the novel as a way of investigating some crucial aspects of late-Ming culture and in turn discuss the way these different cultural discourses helped to structure the text in terms of content, form, and ideology. Aspects of late-Ming culture to be discussed include the flourishing of print culture, the relationship between sexual practice and medicinal knowledge, the unprecedented wealth of material culture, the circulation of news and gossip, the importance of gender roles and identity, notions of space and place, the relationship between the commodity and the gift, and issues of censorship and political power. W 9:25–11:15

CHNS 833b/HIST 854b, Chinese Biographical Writings Annping Chin

The course examines the biographies of Chinese men and women written in both China and the West. We consider how biographers handled their sources and how they chose to tell their stories. Readings in English focus on the roots of this genre and on examples from the seventeenth to the twentieth century, which include the lives of the powerful and the powerless, poets and scholars, aesthetes and assassins, rebels and reformers. Open to advanced undergraduates (juniors and seniors) with permission of the instructor. TH 3:30–5:20

CHNS 870b, Topics in Sinophone Literature Jing Tsu

The course deals with the theoretical and historical concerns in the field of Sinophone literature in a global context. Range of topics varies and may include language, dialects, diaspora, globalization, nationalism, race, modernism, realism, nativism, postmodernism, Chinatowns, and postcolonialism. T 3:30–5:20

CHNS 872a, Methods and Approaches to Modern Chinese Literature Jing Tsu

The course considers the different conceptual and comparative problems in the field of modern Chinese literary studies. Range of topics varies and may include national and world literatures, regionalism and urbanization, war and revolution, westernization, national and ethnic identities, and transdisciplinary approaches to literary studies. T3:30-5:20

CHNS 900, Directed Readings Faculty

Offered by permission of instructor and DGS to meet special needs not met by regular courses.

CHNS 990, Directed Research Faculty

Offered as needed with permission of instructor and DGS for student preparation of dissertation prospectus.

Courses in Japanese language at the elementary, intermediate, and advanced levels are listed in *Yale College Programs of Study*.

JAPN 559b^U, Readings in Literature and the Humanities John Treat

Canonical Japanese short stories and essays read in line-by-line translation. Use of reference works and the Internet to research structures and vocabulary. Intended for those at the fourth-year level in their study of modern Japanese, the course is designed to help students prepare for either graduate-level courses in Japanese literature or independent study of written Japanese. TTH 11:35–12:50

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 Edward Kamens

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 581b^U, Japanese Literatures after 1970 John Treat

Study of Japanese literature published between 1970 and the present. Writers may include Murakami Ryu, Maruya Saiichi, Shimada Masahiko, Nakagami Kenji, Yoshimoto Banana, Yamada Eimi, Murakami Haruki, and Medoruma Shun. No knowledge of Japanese required. TTH 2:30–3:45

JAPN 586a^U, Japanese Cinema before 1960 Aaron Gerow

An investigation of the history of Japanese cinema to 1960, including the social, cultural, and industrial backgrounds to its development. Periods covered include the silent era, the coming of sound and the wartime period, the occupation era, the golden age of the 1950s, and the new modernism of the late 1950s. No knowledge of Japanese required. TTH 11:35–12:50

JAPN 871b/FILM 871b, Readings in Japanese Film Theory Aaron Gerow

Theorizations of film and culture in Japan from the 1910s to the present. Through readings in the works of a variety of authors, the course explores both the articulations of cinema in Japanese intellectual discourse and how this embodies the shifting position of film in Japanese popular cultural history. T 1:30–3:20

JAPN 885a, Modern Japanese Novel John Treat

A seminar primarily designed as a three-year course in which graduate students specializing in Japanese literature are required to read major works of modern Japanese fiction in the original. W 2:30–4:20

JAPN 900, Directed Readings Faculty

Offered by permission of instructor and DGS to meet special needs not met by regular courses.

JAPN 990, Directed Research Faculty

Offered as needed with permission of instructor and DGS for student preparation of dissertation prospectus.

Courses in Korean language at the elementary, intermediate, and advanced levels are listed in *Yale College Programs of Study*.

EAST ASIAN STUDIES

The MacMillan Center 320 Luce Hall, 203.432.3426 http://eastasianstudies.research.yale.edu M.A.

Chair

Haun Saussy (451 College St., Rm. 214, 203.432.4753, haun.saussy@yale.edu)

Director of Graduate Studies

Deborah Davis (140 Prospect St., 203.432.3327, deborah.davis@yale.edu)

Professors Daniel Botsman (History), Kang-i Sun Chang (East Asian Languages & Literatures), Deborah Davis (Sociology), Fabian Drixler (History), Koichi Hamada (Economics), Valerie Hansen (History), Edward Kamens (East Asian Languages & Literatures), William Kelly (Anthropology), Tina Lu (East Asian Languages & Literatures), Peter Perdue (History), Frances Rosenbluth (Political Science), Haun Saussy (Comparative Literature; East Asian Languages & Literatures), Helen Siu (Anthropology), John Whittier Treat (East Asian Languages & Literatures), Anne Underhill (Anthropology), Mimi Hall Yiengpruksawan (History of Art)

Associate Professors Aaron Gerow (East Asian Languages & Literatures; Film Studies), Pierre Landry (Political Science)

Assistant Professors Alexander Beecroft (*Comparative Literature*), Seok-Ju Cho (*Political Science*), William Honeychurch (*Anthropology*), Paize Keulemans (*East Asian Languages & Literatures*), Karen Nakamura (*Anthropology*), Andrew Quintman (*Religious Studies*), Jun Saito (*Political Science*), Chloë Starr (*Divinity; East Asian Languages & Literatures*), Jing Tsu (*East Asian Languages & Literatures*), Jessica Weiss (*Political Science*)

Senior Lecturers Annping Chin (History), Koichi Shinohara (Religious Studies; East Asian Languages & Literatures)

Lecturer William Summers (History)

Senior Lectors Seungja Choi, Koichi Hiroe, Zhengguo Kang, Ninghui Liang, Yoshiko Maruyama, Ling Mu, Michiaki Murata, Hiroyo Nishimura, Masahiko Seto, Mari Stever, Wei Su, Peisong Xu, William Zhou

Lectors Hsiu-hsien Chan, Min Chen, Angela Lee-Smith, Rongzhen Li, Fan Liu, Yukie Mammoto, Yu-lin Wang Saussy, Jianhua Shen, Haiwen Wang

Fields of Study

The Master of Arts program in East Asian Studies offers a concentrated course of study designed to provide a broad understanding of Chinese, Japanese, or Korean history, culture, contemporary society, politics, and economy. This program is designed for students preparing to go on to the doctorate in one of the disciplines of East Asian Studies

(i.e., 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 program is designed to be completed by successfully taking eight courses approved for graduate credit by the director of graduate studies (DGS) over the course of one academic year. Normally, students entering the program are expected to have already completed the equivalent of at least two years of Chinese, Japanese, or Korean language, so that the three-year language requirement can be completed in the two terms spent at Yale. A program of study for completion of the degree in one year consists of at least eight term courses that normally include two terms of language study at Yale's third-year level (unless the language requirement has already been met through previous study) and six other term courses selected from the current year's offerings of advanced language courses and lecture courses or seminars in any relevant subject area, with the approval of the DGS.

Special Requirements for the M.A. Degree

Students must earn two Honors grades ("H") over the course of their two terms at Yale. Honors grades earned in any Chinese or Japanese language class cannot be counted toward satisfying this requirement, except with the permission of the DGS.

Joint-Degree Programs

As the East Asian Studies M.A. degree is a one-year program, there are no joint-degree programs available. 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://eastasianstudies.research.yale.edu. Applications are available online at www.yale.edu/graduateschool/admissions; e-mail, graduate.admissions@yale.edu.

Please consult the course information available online at http://eastasianstudies.research. yale.edu/academic.php and http://students.yale.edu/oci for a complete list of East Asian-related courses offered at Yale University.

ECOLOGY AND EVOLUTIONARY BIOLOGY

Osborn Memorial Laboratories, 203.432.3837 www.eeb.yale.edu M.S., Ph.D.

Chair Richard Prum

Director of Graduate Studies David Post (OML 426B, david.post@yale.edu)

Professors Leo Buss, Peter Crane (*Forestry & Environmental Studies*), Michael Donoghue, Vivian Irish (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics; Psychiatry*), Nancy Moran, David Ochman, Jeffrey Powell, Richard Prum, Oswald Schmitz (*Forestry & Environmental Studies*), David Skelly (*Forestry & Environmental Studies*), Stephen Stearns, J. Rimas Vaisnys (*Electrical Engineering*), Günter Wagner

Associate Professors Walter Jetz (on leave), David Post, Paul Turner

Assistant Professors Suzanne Alonzo (*on leave*), Antónia Monteiro, Thomas Near, Melinda Smith, Jeffrey Townsend, David Vasseur (*on leave*)

Lecturers Adalgisa Caccone, Mary Beth Decker, Marta Martínez Wells

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 545b, a program of ethics of research and authorship, which is part of E&EB 500, Advanced Topics; (2) weekly E&EB seminars; and (3) 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). Teaching experience is regarded as an integral part of the graduate training program. All students are required to teach three courses, normally at the TF 3 level, during their first two years of study. In addition to all other requirements, students must successfully complete E&EB 545b, Problems in Bioethics/Ethics Course for Advanced Topics, prior to the end of their first year of study.

By the middle of the fourth term of study, each student organizes a formal preprospectus 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 result 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 Kline Science Library.

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.) Satisfactory completion of the first two years of study leading to the Ph.D. up to, but not necessarily including, the prospectus.

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, www.eeb.yale.edu.

Courses

E&EB 500a/b, Advanced Topics in Ecology and Evolutionary Biology Staff Topics to be announced. 2 HTBA

E&EB 510a^U/**STAT 501a**^U, **Introduction to Statistics: Life Sciences** Günter Wagner Statistical and probabilistic analysis of biological problems presented with a unified foundation in basic statistical theory. Problems are drawn from genetics, ecology,

epidemiology, and bioinformatics. Graduate students are expected to finish a course project in addition to regular homework and exams. TTH 1-2:15

E&EB 520a^U, General Ecology David Post

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 522b^U, Principles of Evolution, Ecology, and Behavior Stephen Stearns

The major principles of evolution, ecology, and behavior explained and illustrated by recent advances that have changed the field. Emphasis on major events in the history and key transitions in the organization of life. Ecological processes from organisms through populations and communities to the biosphere. Foraging, mating, and selfish and cooperative behavior placed in evolutionary and ecological context. MWF 11:35–12:25

$E\&EB~523Lb^{\scriptscriptstyle U},$ Laboratory for Principles of Evolution, Ecology, and Behavior

Marta Wells

Experimental approaches to organismal and population biology, including study of the diversity of life. TWTH 1:30

E&EB 525b^U, Evolutionary Biology Antónia Monteiro, Jeffrey Townsend

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. Recommended preparation: E&EB 522. TTH 11:35–12:50

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 535a, Evolutionary Medicine Stephen Stearns

The course surveys the evolutionary insights that make important differences in medical research and clinical practice. Background is given on evolutionary mechanisms and the medical issues they affect. Topics include individual genetic variation in susceptibility; evolutionary conflicts and tradeoffs in reproductive medicine; the evolution of antibiotic resistance and virulence in pathogens; emerging diseases; the evolution of aging; cancer as an evolutionary process.

[E&EB 540a^U, Animal Behavior]

E&EB 545b, Problems in Bioethics/Ethics Course for Advanced Topics Paul Turner M 2–4

E&EB 546b^u, Plant Diversity and Evolution Staff

Introduction to the evolutionary relationships of plant lineages. Exploration of the complexity, diversity, and characteristics of the major plant groups, including the green algae, mosses, ferns, conifers, and flowering plants, within a phylogenetic context. MW 1–2:15

E&EB 547Lb^U, Laboratory for Plant Diversity and Evolution Staff

Local flora field research; hands-on experience with the plant groups examined in the accompanying lectures. T 1–4

[E&EB 548b^U, Insect Development and Evolution]

[E&EB 549Lb^U, Laboratory for Insect Development and Evolution]

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

E&EB 555b, Invertebrates I Leo Buss

A systematic treatment of the invertebrate phyla, with emphasis on anatomy, functional organization, and evolutionary history. Prerequisite: E&EB 522b or G&G 125b or permission of instructor. MW 1–2:15

E&EB 556Lb, Laboratory for Invertebrates I Leo Buss

Study of the anatomy of representative living invertebrates accompanied by examination of museum specimens of living and fossil invertebrates. Concurrently with E&EB 555b. TH 1:30-5

[E&EB 557b, Invertebrates II]

[E&EB 558Lb, Laboratory for Invertebrates II]

E&EB 564a^U, Ichthyology Thomas Near

A survey of fish diversity including jawless vertebrates, chimaeras and sharks, lungfishes, and ray-finned fishes. Topics include the evolutionary origin of vertebrates, the fossil record of fishes, evolutionary diversification of major extant fish lineages, biogeography, ecology, and reproductive strategies of fishes. MWF 1:30–2:20

E&EB 565a^U, Laboratory for Ichthyology Thomas Near

Laboratory and field studies of fish diversity, form, function, behavior, and classification. The course primarily involves study of museum specimens and of living and fossil fishes. Must be taken concurrently with E&EB 564a. HTBA

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 11:35–12:50

E&EB 610b^u, Evolutionary Genetics Jeffrey Powell

Introduction to population genetics and phylogenetics. Theoretical fundamentals and empirical data, with an emphasis on molecular aspects.

[E&EB 626a^U, Molecular Ecology]

[E&EB 627a or b, Research Topics in Molecular Ecology]

[E&EB 630a, Ecosystem Analysis]

[E&EB 632b, The Analysis of Ecological Time Series]

[E&EB 640b, Community Ecology]

[E&EB 66ob^U, Wildlife Conservation Ecology]

E&EB 665a^U/F&ES 500a, Landscape Ecology David Skelly

An introduction to the study of large-scale ecological patterns and processes. Landscape ecology is a relatively young, rapidly changing field. The topics covered reflect the diverse interests of ecologists: species-area relationships, island biogeography, metapopulation theory, individual-based models, cellular automata, models of biodiversity, etc. Throughout the course the emphasis is on when and how to integrate a spatial perspective into consideration of major ecological questions. Readings from the primary literature augment material covered in lectures. Students complete a project resulting in a manuscript on a landscape-related topic.

[E&EB 670a^U/F&ES 738a, Aquatic Ecology]

E&EB 672b^U, Ornithology Richard Prum

Structure, function, behavior, evolution, and diversity of birds. A general overview of avian biology and evolution. Topics include the evolutionary origin of birds, avian phylogeny, anatomy, physiology, neurobiology, behavior, 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. Must be taken concurrently with E&EB 672b. HTBA

[E&EB 678b, Mathematical Models and Quantitative Methods in Evolution and Ecology]

E&EB 690a, Evolution of Development Antónia Monteiro

An introduction to the ways that developmental mechanisms change through time to give rise to organismal diversity. Topics include how mutations influence the processes of gene regulation, tissue growth, and cell and organ differentiation. TTH 9-10:15

[E&EB 710b, Sexual Selection and Social Evolution]

[E&EB 729a, Microbial Ecology and Evolution]

[E&EB 810a, Dynamics of Evolving Systems]

[E&EB 826a^U, Phylogenetics and Macroevolution]

[E&EB 827La^U, Laboratory for Phylogenetics and Macroevolution]

E&EB 900a-b, First-Year Introduction to Research and Rotations DGS

E&EB 930a, Seminar in Systematics Staff

E&EB 950a or b, Second-Year Research

By arrangement with faculty.

E&EB 960a/b, Studies in Evolutionary Medicine Stephen Stearns, Durland Fish,

Alison Galvani, Paul Turner

This two-term course 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 tradeoffs and the evolution of aging; the evolution of virulence and drug resistance.

E&EB 961a, Studies in Evolutionary Medicine II Paul Turner

ECONOMICS

28 Hillhouse Avenue, 203.432.3575 www.econ.yale.edu M.A., M.Phil., Ph.D.

Chair Benjamin Polak (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, Lanier Benkard, Dirk Bergemann, Steven Berry, Truman Bewley, William Brainard (*Emeritus*), Donald Brown, Xiaohong Chen, Zhiwu Chen (*School of Management*), Eduardo Engel, Robert Evenson (*Emeritus*), Ray Fair, Howard Forman (*School of Public Health*), John Geanakoplos, Pinelope Goldberg, Mikhail Golosov, Timothy Guinnane, Philip Haile, Koichi Hamada, Johannes Hörner, Jonathan Ingersoll (*School of Management*), Gerald Jaynes, Dean Karlan, Yuichi Kitamura, Alvin Klevorick, Naomi Lamoreaux, Richard Levin, Giovanni Maggi, Costas Meghir, Robert Mendelsohn (*Forestry & Environmental Studies*), Giuseppe Moscarini, William Nordhaus, Joseph Peck (*Emeritus*), Peter Phillips, Benjamin Polak, Gustav Ranis (*Emeritus*), Mark Rosenzweig, Larry Samuelson, Herbert Scarf (*Emeritus*), T. Paul Schultz (*Emeritus*), Robert Shiller, Martin Shubik (*Emeritus*), Anthony Smith, T. N. Srinivasan, Aleh Tsyvinski, Christopher Udry, Edward Vytlacil

Associate Professors Fabian Lange, Ebonya Washington

Assistant Professors Konstantinos Arkolakis, David Atkin, Björn Brügemann, Eduardo Faingold, Amanda Kowalski, Guillermo Ordoñez, Taisuke Otsu, Nancy Qian, Kareen Rozen, Melissa Tartari, 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 www.econ.yale.edu/graduate/application_info.htm.

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. (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, and satisfactory completion of one of the following: the comprehensive examination in economic theory, the course requirement in econometrics, or the course requirement in economic history.

The M.A. in International and Development Economics is described under International and Development Economics.

Program materials are available on our Web site: www.econ.yale.edu.

Courses

ECON 500a, General Economic Theory: Microeconomics Truman Bewley,

Kareen Rozen

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 Eduardo Faingold,

Larry Samuelson

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 Eduardo Faingold

This course covers mathematical methods important in economic theory, including Kuhn-Tucker theory, continuous time optimal control theory, dynamic programming, zero sum games, and repeated sum games.

ECON 510a, General Economic Theory: Macroeconomics Eduardo Engel,

Guillermo Ordoñez

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,

Mikhail Golosov

Theories of saving, investment, portfolio choice, and financial markets. Longer-run developments; economic growth, capital accumulation, income distribution.

ECON 520a, Advanced Microeconomic Theory I Kareen Rozen, Joel Watson 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 Dirk Bergemann, Juuso Välimäki 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 Staff

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 Eduardo Engel, Per Krusell

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, Guillermo Ordoñez 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. The 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 this course, it is part of the graduate macroeconomics sequence (including also ECON 510a, 511b, 525a, and 526b). However, this course does not list these other courses as requirements.

ECON 530a, Mathematical Economics I John Geanakoplos

This is a first course in general equilibrium analysis of market economies. The focus of the course is Walrasian competition, monopolistic competition, and competition in markets with affective agents, i.e., affective competition. Topics include testable implications of these models, counterfactual analysis, and algorithms for solving calibrated models. The mathematical framework is Tame Topology and O-minimal Structures, where the Tarski-Seidenberg Theorem on Quantifier Elimination and Laskowski's Theorem on the VC-Dimension of Definable Sets are the basis of our analysis.

ECON 531b, Mathematical Economics II Staff

This course examines the foundations of money and finance from the perspective of general equilibrium with incomplete markets. The relevant mathematical tools from

elementary stochastic processes to differential topology are developed in the course. Topics include asset pricing, variations of the capital asset pricing model, the "Hahn paradox" on the value of flat money, default and bankruptcy, collateral equilibrium, market crashes, adverse selection and moral hazard with perfect competition, credit card equilibrium, and general equilibrium with asymmetric information.

[ECON 535a and b, Prospectus Workshop in Mathematical Economics]

ECON 537a and 538b, Microeconomic Theory Workshop Staff Presentations by research scholars and participating students.

ECON 540a and 541b, Student Workshop in Macroeconomics Staff

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 Staff

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 544a/INRL 560a, Economic Analysis Cheryl Doss

Introduces International Relations students to more advanced concepts in economics. Course emphasizes reading and evaluating the economic content of articles on a wide range of topics, including consumer behavior, firm behavior, comparisons of welfare, labor markets, capital markets, and public goods. These articles represent research from both developed and developing economies. Prerequisite: microeconomics. MW 9–10:15

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 546a, Macroeconomics Irasema Alonso

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. For IDE students.

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 Xiaohong Chen

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 Yuichi Kitamura

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

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 Edward Vytlacil

This course develops the concepts needed to approach empirical problems in microeconomics with econometrics. The focus is less on developing a catalogue of econometric methods than on developing a conceptual basis for understanding how data, econometric methodology, and assumptions combine to produce statistical inference.

ECON 558b, 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 561a, Computational Method for Economic Dynamics]

[ECON 563a/CPSC 555a, Economics and Computation]

ECON 567a and 568b, Econometrics Workshop Staff

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 Staff

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

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 Naomi Lamoreaux

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.

[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 600a, Industrial Organization I Lanier Benkard, Steven Berry

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 Philip Haile

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 Staff

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 Staff

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 Joseph Altonji, 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, Melissa Tartari

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 Staff

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 Staff Workshop for students doing research in labor economics and public finance.

ECON 670a/MGMT 740a, Financial Economics I Zhiwu Chen

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. T 2:30–5:20

ECON 671b/MGMT 741b, Financial Economics II 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 672a/MGMT 745a, 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). This is a research-oriented course aimed at Ph.D. students. Undergraduate students with outstanding academic records and prior experience of graduate courses may register with the instructor's permission. Grades are based on a small number of referee reports and a final exam.

ECON 680a, Public Finance I Aleh Tsyvinski, Mikhail Golosov

ECON 681b, Public Finance II Amanda Kowalski

Topics include theory of public goods, an introduction to preference revelation, the problem of externalities and their control, and the methodology of cost-benefit analysis and some applications.

ECON 702a, International Economics Andrea Bubula

International monetary theory and its implications for economic policy. Topics include mechanisms of adjustment in the balance of payments; fiscal, monetary, and exchange rate policy for internal and external balance; international movements of capital. For IDE students.

ECON 708b/INRL 561b, International Economic Analysis Cheryl Doss

A continuation of ECON 544a. Extends the use of economic analysis to international economic issues with a focus on international trade and growth and development. In addition, emphasis is placed on quantitative tools and analysis of data to address international economic issues and evaluate policies. The second half of the course focuses on readings of current issues and debates on international economic issues, including relationships among trade liberalization, poverty and inequality, economic growth, and globalization. W 1:30–3:20

[ECON 709a, International Economics and Open Economy Macroeconomics]

ECON 720a, International Trade I Giovanni Maggi

This course covers the theory of international trade, policy, and institutions. Discussion of Classical, Neo-classical, and more recent imperfect-Competition-Scale-Economiesbased 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, Pinelope Goldberg 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 David Atkin, T. N. Srinivasan

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 Dean Karlan, Mark Rosenzweig

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, Economic Development IDE Michael Boozer

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. For IDE students.

[ECON 735b^U, Economics of Agriculture]

[ECON 736a^U, Economics of Technology]

ECON 737a^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 75ob, Trade and Development Workshop Staff

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 Staff

Workshop for students doing research in development to present and discuss work.

ECON 776b^u, Economics of Population Nancy Qian

The course investigates issues such as the causes and consequences of declining fertility rates, gender discrimination, disease, famine, and wars in the context of developing countries as well as historically in countries that are developed today. The class uses economic methods, and students are expected to solve simple models and replicate empirical studies using STATA. Readings are mainly based on journal articles, while textbooks are mainly used as a reference. The course is graded on problem sets and two in-class exams. Prerequisites: statistics and intermediate microeconomics. TTH 10:30–11:20, 1 HTBA

ECON 790a/PLSC 725a, Political Economy Aleh Tsyvinski, Mikhail Golosov Political competition in democracies is party competition. We develop, from the formal viewpoint, theories of party competition in democracies. We develop a theory in which parties (1) compete over several issues, not just one issue as in A. Downs; (2) are uncertain about how citizens respond to platforms; and (3) represent interest groups in the population. Applications, particularly to the theory of income distribution and tax. HTBA

ECON 791a/PLSC 595a, Theories of Distributive Justince John Roemer

We survey the main theories of distributive justice proposed by economists and political philosophers since 1950, critiquing each theory from both the economic and philosophical perspective. Topics covered include Arrow's impossibility theorem and its resolution, axiomatic bargaining theory (J. Nash and followers), utilitarianism according to J. Harsanyi and others, egalitarianism according to J. Rawls and A. Sen, the veil of ignorance as a thought experiment, neo-Lockeanism according to R. Nozick, resource egalitarianism according to R. Dworkin, and equality of opportunity according to R. Arneson, G.A. Cohen, and J. Roemer. The main text, *Theories of Distributive Justice* (J.E. Roemer, 1996), is supplemented with other readings. Prerequisite: PLSC 517a or equivalent sophistication in microeconomic modeling. W 9:25–11:15

ECON 792b/PLSC 721b, Political Economy of Institutions and Development

Alexandre Debs

How do political institutions affect economic outcomes? How do economic conditions determine political institutions? The course reviews recent advances in the emerging field of the political economy of institutions and development, with a focus on formal modeling and quantitative studies. We start with an introduction to the importance of institutions in affecting economic performance. Second, we review some basic models of democratic politics, focusing on the impact of economic conditions (such as inequality) on political outcomes. Third, we cover major theories of democratization, for example studying the effects of income and inequality on institutional change. Fourth, we study basic models of dictatorships, looking at the effect of nondemocratic institutions on growth and international conflict. Finally, we take a critical look at the role of institutions and consider the possibility of policy persistence despite institutional change. W 9:25–11:15

ECON 899a or b, Individual Reading and Research

By arrangement with faculty.

ELECTRICAL ENGINEERING

Dunham Laboratory, 203.432.4250 M.S., M.Phil., Ph.D.

Chair A. Stephen Morse

Director of Graduate Studies Hongxing Tang (hong.tang@yale.edu)

Professors Richard Barker (*Emeritus*), James Duncan, Jung Han, Peter Kindlmann (*Adjunct*), Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), J. Rimas Vaisnys, Yang Richard Yang

Associate Professors Eugenio Culurciello, Hür Köser, Richard Lethin (*Adjunct*), Yiorgos Makris, Andreas Savvides, Lawrence Staib, Hemant Tagare, Sekhar Tatikonda, Edmund Yeh

Assistant Professors Minjoo Lee, Hongxing Tang

Fields of Study

Fields include biomedical sensory systems, communications and signal processing, computer engineering, control systems, microelectromechanical and nanomechanical systems (MEMS and NEMS), nanoelectronic science and technology, neural networks, optoelectronic materials and devices, sensor networks, semiconductor materials and devices, wireless networks, and VLSI design and testing.

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

ENGINEERING & APPLIED SCIENCE

Dunham Laboratory, 203.432.4250 www.seas.yale.edu M.S., M.Phil., Ph.D.

Dean T. Kyle Vanderlick

Associate Dean for Educational Affairs Roman Kuc

Programs of study are offered in the areas of applied mechanics and mechanical engineering, chemical engineering, electrical engineering, biomedical engineering, and environmental engineering. All programs are under the School of Engineering & Applied Science.

Biomedical Engineering

Chair Mark Saltzman

Director of Graduate Studies

Richard Carson (richard.e.carson@yale.edu)

Professors Richard Carson, Todd Constable, James Duncan, Jay Humphrey, Laura Niklason, Douglas Rothman, Mark Saltzman, Fred Sigworth, Steven Zucker (*Computer Science*)

Associate Professors Robin de Graaf, Tarek Fahmy, Fahmeed Hyder, Themis Kyriakides, Evan Morris, Xenophon Papademetris, Lawrence Staib, Hemant Tagare

Assistant Professors Rong Fan, Anjelica Gonzalez, Michael Levene, Kathryn Miller-Jensen, Smita Sampath, Erik Shapiro

FIELDS OF STUDY

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

Chemical Engineering

Chair Menachem Elimelech

Director of Graduate Studies

Michael Loewenberg (michael.loewenberg@yale.edu)

Professors Eric Altman, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Michael Loewenberg, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, Mark Saltzman, T. Kyle Vanderlick, Paul Van Tassel, Kurt Zilm

Associate Professors Tarek Fahmy, Yehia Khalil (*Adjunct*), William Mitch, Jordan Peccia

Assistant Professors Eric Dufresne, Chinedum Osuji, Andre Taylor, Corey Wilson, Julie Zimmerman

FIELDS OF STUDY

Fields include separation processes, catalysis, combustion, statistical mechanics of adsorption, high-temperature chemical reaction engineering, colloids and complex fluids, nanotechnology, convective heat and mass transfer, biomolecular engineering, biotechnology, molecular beams, aerosol science and technology, materials processing, surface science, and environmental engineering.

Electrical Engineering

Chair A. Stephen Morse

Director of Graduate Studies

Hongxing Tang (hong.tang@yale.edu)

Professors Richard Barker (*Emeritus*), James Duncan, Jung Han, Peter Kindlmann (*Adjunct*), Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), J. Rimas Vaisnys, Yang Richard Yang

Associate Professors Eugenio Culurciello, Hür Köser, Richard Lethin (*Adjunct*), Yiorgos Makris, Andreas Savvides, Lawrence Staib, Hemant Tagare, Sekhar Tatikonda, Edmund Yeh

Assistant Professors Minjoo Lee, Hongxing Tang

FIELDS OF STUDY

Fields include biomedical sensory systems, communications and signal processing, computer engineering, control systems, microelectromechanical and nanomechanical systems (MEMS and NEMS), nanoelectronic science and technology, neural networks, optoelectronic materials and devices, sensor networks, semiconductor materials and devices, wireless networks, and VLSI design and testing.

Environmental Engineering

Professors Gaboury Benoit, Stephen Edberg, Menachem Elimelech, Thomas Graedel, Edward Kaplan, Joseph Pignatello (*Adjunct*), James Saiers

Associate Professors Michelle Bell, Ruth Blake, Yehia Khalil (*Adjunct*), William Mitch, Jordan Peccia

Assistant Professor Julie Zimmerman

Lecturer James Wallis

FIELDS OF STUDY

Fields include aquatic and environmental chemistry, physical and chemical processes for water quality control, transport and fate of pollutants in the environment, environmental nanotechnology, green engineering, environmental engineering microbiology, environmental molecular biology, bioaerosols, water reuse, disinfection by-product formation, emerging contaminants, membrane separations for water quality control, industrial ecology, and chemical reactions at the mineral-water interface.

Mechanical Engineering

Chair Mitchell Smooke

Director of Graduate Studies

Udo Schwarz (udo.schwarz@yale.edu)

Professors David Bercovici, Ira Bernstein (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Robert Gordon, Shun-Ichiro Karato, Amable Liñan-Martinez (*Adjunct*), Marshall Long, Daniel Rosner, Udo Schwarz, Ronald Smith, Mitchell Smooke, Forman Williams (*Adjunct*)

Associate Professors Corey O'Hern, Ainissa Ramirez, Jan Schroers

Assistant Professors Aaron Dollar, Eric Dufresne, John Morrell, Nicholas Ouellette, Hong Tang

Lecturers Beth Anne Bennett, Kailasnath Purushothaman

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.

Soft matter/complex fluids Jamming and slow dynamics in gels, glasses, and granular materials; mechanical properties of soft and biological materials; dynamics of macromolecules. Several faculty in Mechanical Engineering are also affiliated with the Integrated Graduate Program in Physical and Engineering Biology (www.peb.yale.edu).

Material science Characterization of crystallization and other phase transformations; studies of thin films; MEMS; smart materials such as shape memory alloys, amorphous metals, and nanomaterials including nanocomposites; NEMS; nano-imprinting; classical and quantum optomechanics; atomic-scale investigations of surface interactions and properties; classical and quantum nanomechanics; nanotribology.

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; human-powered vehicles.

Integrated Graduate Program in Physical and Engineering Biology (IGPPEB)

The Yale IGPPEB program brings together faculty drawn mainly from four member areas (MB&B, MCDB, Physics, and Engineering). All faculty involved recognize the importance of interdisciplinary research at the interface of the biological and physical sciences, and have recently developed interdisciplinary research collaborations among IGPPEB colleagues. Core courses for Engineering students in this Ph.D. program are listed in the core course list below for each participating department.

Special Requirements for the Ph.D. Degree

A pamphlet titled *Qualification Procedure for the Ph.D. Degree in Engineering & Applied Science* describes the requirements in detail. The student is strongly encouraged to read it carefully. Here, key requirements are briefly summarized.

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

The core courses for each department and program are as follows:

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 Engineering Classical and Statistical Thermodynamics (ENAS 521), Energy, Mass, and Momentum Processes (ENAS 603), Chemical Reaction Engineering (ENAS 602). 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. Students in the IGPPEB program must also take Methods and Logic in Interdisciplinary Research (ENAS 517), Biological Physics (ENAS 541), Biology Boot Camp (MB&B 520), Integrated Workshop (ENAS 991), and Systems Modeling in Biology (MCDB 561).

Electrical Engineering (Computer Engineering track) Introduction to VLSI System Design (ENAS 875), Advanced Topics in Computer Engineering (ENAS 921).

Electrical Engineering (Microelectronics track) 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).

Environmental Engineering 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), Advanced Engineering Mathematics (ENAS 505), Applied Spatial Statistics (F&ES 781), Multivariate Statistical Analysis in the Environmental Sciences (F&ES 758), or Multivariate Statistics for Social Sciences (STAT 660).

Mechanical Engineering Students must demonstrate competence in one of four areas: Fluid and Thermal Sciences, Soft Matter/Complex Fluids, Materials Science, or Robotics/Mechatronics. Core courses for these areas are specified in the *Qualification Procedure*. Some of the core 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), Mathematical Methods of Physics (PHYS 506), or Linear Systems (ENAS 902), depending on the research area. Some research areas will also require Mathematical Methods II (ENAS 501). Students in the IGPPEB program must also take Methods and Logic in Interdisciplinary Research (ENAS 517), Biological Physics (ENAS 541), Biology Boot Camp (MB&B 520), Integrated Workshop (ENAS 991), and Systems Modeling in Biology (MCDB 561).

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.

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, www.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 Charles Ahn

Vector analysis in three dimensions (2 weeks), linear algebra (4 weeks), functions of a complex variable (4 weeks), topics at the discretion of the instructor (3 weeks), e.g., (1) specific examples to reinforce the material already presented and (2) new topics (to choose among: Fourier series in one and more dimensions, Laplace transformations, Fourier integrals in one and more dimensions, optimization, elements of ODE). TTH 2:30–3:45

ENAS 501b, Mathematical Methods II Juan de la Mora

Special functions, the Laplace transformations, Fourier series, Fourier integrals, and partial differential equations including separation of variables, methods of characteristics, variational techniques, and a brief discussion of numerical methods. TTH 1–2:15

ENAS 502b^U, Stochastic Processes Sekhar Tatikonda

Elements of set and measure theory. Probability distributions, moments, characteristic functions. The central limit theorem. Basic properties of random processes. Stationarity and ergodicity. Correlation functions and power spectra. Linear and nonlinear operations on random processes. MW 1–2:15

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

ENAS 505a, Advanced Engineering Mathematics Michael Loewenberg

A beginning graduate-level introduction is given to ordinary and partial differential equations, vector and tensor analysis, and linear algebra. Laplace transform, series expansion, Fourier transform, and matrix methods are given particular attention. Applications to problems frequently encountered by chemical, biomedical, and environmental engineers are stressed throughout. MW 2:30–3:45

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

Required for 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. HTBA

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. MW 11:35–12:50

ENAS 510a^U, Physical and Chemical Basis of Bioimaging and Biosensing

Douglas Rothman, Fred Sigworth, Richard Carson, Erik Shapiro 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 511b^U, Physics and Devices of Optical Communication Jung Han

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 1-2:15

ENAS 513a^U, Introduction to Analysis Staff

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 517a/MB&B 517a2/PHYS 517a2, Methods and Logic in Interdisciplinary

Research Enrique De La Cruz, Eric Dufresne, Thierry Emonet, Paul Forscher, Christine Jacobs-Wagner, Michael Levene, Simon Mochrie, Corey O'Hern, Lynne Regan, Elizabeth Rhoades, Corey Wilson

This half-term IGPPEB class is intended to introduce students to integrated approaches to research. Each 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. Required for students in IGPPEB. MW 5–7

ENAS 518a/MB&B 635a^U, Mathematical Methods in Biophysics Elizabeth Rhoades, Yong Xiong, Corey O'Hern

Applied mathematical methods relevant to analysis and interpretation of biophysical and biochemical data, including statistics and error analysis, differential equations, linear algebra, and Fourier transforms. The class covers both analytical and numerical implementations of these topics. Prerequisites: MATH 120a or b and MB&B 300a or equivalents, or permission of the instructors. MWF 10:30–11:20

ENAS 521a, Classical and Statistical Thermodynamics Abbas Firoozabadi

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, and Boltzmann's statistics, Fermi-Dirac and Bose-Einstein statistics. Application to ideal monatomic and diatomic gases is covered. MW 9–10:15

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 530a, Optimization Techniques A. Stephen Morse

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. MW 2:30–3:45

ENAS 534a, 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. TTH 9–10:15

ENAS 535b, Tissue/Biomaterial 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 541a/MB&B 523a/PHYS 523a, Biological Physics Eric Dufresne

An introduction to the physics of several important biological phenomena, including molecular motors, protein folding, bacterial locomotion, and allostery. The material and approach are positioned at the interface of the physical and biological sciences. Required for students in IGPPEB. TTH 2:30–3:45

ENAS 549b, Biomedical Data Analysis Richard Carson

The course focuses on the analysis of biological and medical data associated with applications of biomedical engineering. It provides basics of probability and statistics, and analytical approaches for determination of quantitative biological parameters from noisy, experimental data. Programming in MATLAB to achieve these goals is a major portion of the course. Applications include Michaelis-Menten enzyme kinetics, Hodgkin Huxley, neuroreceptor assays, receptor occupancy, MR spectroscopy, PET neuroimaging, brain image segmentation and reconstruction, and molecular diffusion. MWF 9:25–10:15

ENAS 550a^U/C&MP 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

ENAS 551a^U, **Biomedical Engineering I: Quantitative Physiology** Tarek Fahmy Demonstration of the use of engineering analysis and synthesis in problems in the life sciences and medicine; focus on modeling of molecular physiological processes and design of artificial organs. The lectures in the course are coordinated with the sequence of lectures in ENAS 550a to illustrate how engineering analysis can be used to understand physiological processes. In addition, the course presents elements of pharmacokinetics, heat and mass transfer in physiological systems, hemodialysis, drug delivery, and tissue engineering. TTH 11:35–12:50

ENAS 553b, 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. TTH 2:30–3:45

ENAS 557b^u, Biomechanics Staff

An introduction to the application of mechanical engineering principles to biological materials and systems. Topics include ligaments, tendons, bones, muscles; joints, gait analysis; exercise physiology. The basic concepts are directed toward an understanding of the science of orthopaedic surgery and sports medicine. 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, scaffold fabrication, cell sources, cell seeding, bioreactor design, drug delivery, and tissue characterization. Class sessions include lectures and hands-on laboratory work. MW 9:25–10:15, W 2:30–4:20

ENAS 570b^U/C&MP 560b^U/MCDB 560b^U/PHAR 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

ENAS 575b^u/CPSC 575b, 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. Prerequisites: MATH 120a or b and CPSC 112a or b, or permission of the instructor. MW 1–2:15

ENAS 580a, Clinical Research in Biomedical Engineering 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. HTBA

ENAS 585b^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. TH 3:30–5:20

ENAS 600a^U, Computer-Aided Engineering Marshall Long

Aspects of computer-aided design and manufacture including reasons for increased use of CAD/CAM, the computer's role in the mechanical engineering design and its manufacturing process, hardware and software elements of typical commercial systems, and computer graphics and drafting. TTH 9–10:15

ENAS 601a, Materials Chemistry Gary Haller

The approach is chemical and molecular and, of course, includes nanomaterials. We follow the Fahlman text outline on solid-state chemistry, metals, semiconducting materials, organic "soft" materials, and nanomaterials for two-thirds of the course. The last third of the course focuses on materials characterization by microscopy and spectroscopy and includes some surface characterization techniques. There are problem sets, at least one paper on a particular material or characterization technique, and both a midterm and final exam. HTBA

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 603b, Energy, Mass, and Momentum Processes Daniel Rosner

Application of continuum mechanics approach to the understanding and prediction of fluid flow systems that may be chemically reactive, turbulent, or multiphase. HTBA

ENAS 605b, Colloidal Chemical Engineering Paul Van Tassel

A graduate-level introduction to modern colloid science as practiced by engineers. Topics include self-assembly in solution and at surfaces, surface chemistry, the electric double layer, colloidal forces, and polymers. Applications to problems frequently encountered by chemical, biomedical, and environmental engineers are stressed throughout. TTH 2:30–3:45

[ENAS 606b, Polymer Physics]

[ENAS 608b, Surface and Surface Processes]

[ENAS 610a^U, Biomolecular Engineering]

ENAS 611a^U, Separation Processes Daniel Rosner

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. MW 9–10:15

[ENAS 614b, Surface and Thin-Film Characterization]

ENAS 615b, Synthesis of Nanomaterials Lisa Pfefferle

The course focuses on the synthesis and engineering of nanomaterials, a primary frontier for the development of new and improved materials with new properties. We also introduce different types of nanomaterials, unique properties at the nanoscale, and measurement and important applications of nanomaterials (including biomedical, electronic, and energy applications). Synthesis methods covered include gas phase and high vacuum techniques (CVD, MOCVD) as well as wet chemistry techniques such as reduction of metal salts, sonochemistry, and sol gel methods. Taking sample applications, we discuss the properties necessary for each, and how to control these properties through synthesis control, such as by using templating methods. This course is directed to chemistry, biology, and engineering students. MW 1-2:15

[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. TTH 9–10:15

ENAS 628b^u, Sensors and Biosensors Eugenio Culurciello

The course provides students with the knowledge of basic integrated analog blocks and how to combine these circuits into sensory systems for biomedical applications. Target areas are in physiology, brain-machine interfaces, neural recording and stimulation, imaging and bioimaging. Lectures include details on operational amplifiers, voltage amplifiers, current mode circuits, analog-to-digital converters, photo-transduction circuits, layout, simulation, and design of VLSI circuits and systems. HTBA

[ENAS 639a, Management of Water Resources and Environmental Systems]

ENAS 640b/F&ES 707b^U, Aquatic Chemistry Gabriel 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. TTH 11:35–12:50

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. MW 1–2:15

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 643a, Transport and Fate of Organic Chemicals in the Environment]

[ENAS 644b, Environmental Chemical Kinetics]

ENAS 645b/F&ES 884b, Industrial Ecology Thomas Graedel

Industrial ecology is an organizing concept that is increasingly applied to define various interactions of today's technological society with both natural and altered environments. Technology and its potential for modification and change are central to this topic, as are implications for government policy and corporate response. The course discusses how industrial ecology is being applied in corporations to minimize the environmental impacts of products, processes, and services, and shows how industrial ecology serves as a technological framework for science, policy, and management in government and society. MW 1–2:15

ENAS 648a^U, Environmental Transport Processes Joseph Pignatello

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. TTH 4–5:15

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. HTBA

[ENAS 655a^U, Environmental Risk Assessment]

ENAS 658a, MEMS Design Hür Köser

An introduction to the broad field of microelectromechanical systems (MEMS), using examples and design projects drawn from real-world MEMS applications. Topics include material properties, microfabrication technologies, structural behavior, sensing techniques, actuation schemes, fluid behavior, simple electronic circuits, and feedback systems. Student teams design complete microsystems to meet a set of specifications based on realistic microfabrication processes. Emphasis on modeling and simulation in the design process. MW 10:30–11:20

ENAS 66ob^U/F&ES 885b, Green Engineering and Sustainability

Matthew Eckelman

The course focuses on a green engineering design framework, the Twelve Principles of Green Engineering, highlighting 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.

ENAS 704b, Theoretical Fluid Dynamics Nicholas Ouellette

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 708a, Fundamentals of Combustion Alessandro Gomez

Review of relevant aspects of chemical thermodynamics and chemical kinetics. Explosion and oxidation of fuels. Laminar premixed fuels. Detonations. Diffusion flame and droplet burning. HTBA

ENAS 711b, Biomedical Microtechnology and Nanotechnology Rong Fan

Principles and applications of micro- and nanotechnologies for biomedicine. Approaches to fabricating micro- and nanostructures. Fluid mechanics, electrokinetics, and molecular transport in microfluidic systems. Integrated biosensors and microTAS for laboratory medicine and point-of-care uses. High-content technologies including DNA, protein microarrays, and cell-based assays for differential diagnosis and disease stratification.

Emerging nanobiotechnology for systems medicine. Prerequisites: CHEM 112a, 114a, or 118a, and ENAS 194a or b. TTH 10:30–11:20

[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 761a/G&G 525a, Introduction to Continuum Mechanics]

ENAS 787a, Intermolecular and Surface Forces 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 a 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. HTBA

ENAS 802a^U, Nano and Microsystem Technology Hong Tang

Cross-disciplinary laboratory experiments covering microfabrication, silicon micromachining, MEMS device fabrication and characterization, scanned probe microscopy, electron microscopy, microfluidics, lab-on-a-chip system. Students fabricate MEMS, BioMEMS, and microfluidic devices in a cleanroom environment. TH 1:30–5:20

[ENAS 806b^U, Photovoltaic Energy]

ENAS 812b/NSCI 612b, Molecular Transport and Intervention in the Brain

Mark Saltzman, Richard Carson

A graduate-level seminar on mechanisms and rates of movement of molecules in the brain and the design of novel drug delivery systems. Topics include mathematical methods for modeling diffusion and flow processes, diffusion in the brain interstitium, fluid flows in the brain and spinal cord, the blood-brain barrier, microdialysis measurements, controlled release systems, microfluidic approaches for drug delivery. Weekly readings are assigned from neuroscience and engineering texts; current papers from the literature are used to guide discussion each week. HTBA

ENAS 821b^u, Physics of Medical Imaging Todd Constable

The physics of image formation with special emphasis on techniques with medical applications. Concepts that are common to different types of imaging are emphasized, along with an understanding of how information is limited by the basic physical phenomena involved. Mathematical concepts of image analysis, the formation of images by ionizing radiation, ultrasound, NMR, and other energy forms, and methods of evaluating image quality. MW 11:35–12:50

ENAS 825a, 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. WF 2:30–3:45

ENAS 836b^U, Biophotonics and Optical Microscopy Michael Levene

A review of linear and nonlinear optical microscopies and other biophotonics applications. Topics include wide-field techniques, linear and nonlinear laser scanning microscopy, fundamentals of geometrical and physical optics, optical image formation, laser physics, single molecule techniques, fluorescence correlation spectroscopy, and light scattering. Discussion of fluorescence and the underlying physics of light-matter interactions that provide biologically relevant signals. MW 4-5:15

ENAS 850a^U and 851b^U/APHY 548a^U and 549b^U/PHYS 548a^U and 549b^U, Solid State

Physics I and II Paul Fleury, Daniel Prober

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: TTH 1–2:15; Spring: TTH 2:30–3:45

[ENAS 864a, Current Topics in Nanoelectronics, Nanomechanics, and Nanophotonics]

ENAS 866a, MOS Device Physics and Technology Tso-Ping Ma

Topics include basic MOS device physics, science and technology of thermal SiO₂, interface properties of MOS structures, experimental techniques to probe MOS parameters, hot-carrier effects, radiation effects, channel mobility and carrier transport in MOS inversion layers, scaling of MOS devices, low-temperature properties of MOS devices, SOI device physics and technology, advanced gate dielectrics, MOS devices with widebandgap semiconductors, nonvolatile memory devices, ferroelectric memory devices, single-electron MOS transistors, and other MOS topics of current interest. T 3:30–5:20

ENAS 875a^U, Introduction to VLSI System Design Richard Lethin

Chip design. Provides background in integrated devices, circuits, and digital subsystems needed for design and implementation of silicon logic chips. Historical context, scaling, technology projections, physical limits. CMOS fabrication overview, complementary logical circuits, design methodology, computer-aided design techniques, timing, and

area estimation. Case studies of recent research and commercial chips. Objectives of the course are (1) to give students the ability to complete the course project (design of a digital CMOS subsystem chip through layout), and (2) to understand the directions that future chip technologies may take. Selected projects are fabricated and packaged for testing by students. Prerequisite: circuits at the level of introductory physics and computer programming. TH 1:30–3:20

ENAS 902a, 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 robotics, systems, and information sciences. MW 1–2:15

[ENAS 907b^U, Computer Systems]

ENAS 912a^U, Biomedical Image Processing and Analysis James Duncan,

Lawrence Staib

A study of the basic computational principles related to processing an analysis of biomedical images (e.g., magnetic resonance, computed X-ray tomography, fluorescence microscopy). Basic concepts and techniques related to discrete image representation, multidimensional frequency transforms, image enhancement/restoration, image segmentation, and image registration. TTH 9–10:15

ENAS 920b, Programming for Image Analysis Xenophon Papademetris

Topics include using scripting languages for visualization, introduction to scripting languages, in particular Tcl, introduction to the Visualization Toolkit (Tcl) and local extensions, designing graphical user interfaces using Tk, introduction to object-oriented programming (using [Incr Tcl]), using compiled languages to implement additional algorithms, intoduction to C++ programming, extending VTK by implementing additional image processing algorithms, an overview of the Insight Toolkit (ITK), and advanced software engineering techniques. Prerequisite: ENAS 912a, or permission of the instructor. WF 2:30–3:45

ENAS 921a, Advanced Topics in Computer Engineering Viorgos Makris

Review of current topics and principles of modern computing systems, including concepts from computer architecture, computer-aided design, reconfigurable computing, VLSI design and testing, as well as hardware security. Reading material is based on recent research papers and other similar sources. Laboratory work consists of the completion of a project using computer-aided design and test tools as well as reconfigurable or custom hardware design platforms. Prerequisite: permission of the instructor. M 2:30–4:20

[ENAS 930b, Advanced Semiconductor Fundamentals]

ENAS 936b^U, Systems and Control Kumpati Narendra

Design of feedback control systems with applications to engineering, biological, and economic systems. Topics include stat-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 944a^U, Digital Communications Systems Edmund Yeh

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. TTH 1–2:15

[ENAS 954b^U/STAT 664b^U, Information Theory]

[ENAS 960a^U, Networked Embedded Systems and Sensor Networks]

[ENAS 961b^U, Advanced Topics in Networks and Sensing Systems]

[ENAS 964b, Communication Networks]

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

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/PHYS 991b, Integrated Workshop Simon Mochrie,

Eric Dufresne, Paul Forscher, Corey O'Hern, Lynne Regan

This required course for students in IGPPEB 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 are acquired, and students learn from each other. HTBA

ENGLISH LANGUAGE AND LITERATURE

Linsly-Chittenden Hall, 203.432.2233 www.yale.edu/english M.A., M.Phil., Ph.D.

Chair Michael Warner

Director of Graduate Studies Paul Fry (106a LC, 203.432.2226, graduate.english@yale.edu)

Professors Elizabeth Alexander, Harold Bloom, Leslie Brisman, David Bromwich, Jill Campbell, Janice Carlisle, Michael Denning, Wai Chee Dimock, Roberta Frank, Paul Fry, Langdon Hammer, Margaret Homans, Amy Hungerford, David Scott Kastan, Pericles Lewis, Lawrence Manley, Alastair Minnis, Linda Peterson, Caryl Phillips, David Quint, Claude Rawson, Joseph Roach, Marc Robinson, John Rogers, Robert Stepto, Katie Trumpener, Michael Warner, Ruth Bernard Yeazell

Associate Professors Ala Alryyes, Jessica Brantley, Stefanie Markovits, Barry McCrea, Caleb Smith

Assistant Professors GerShun Avilez, Susan Chambers, Ian Cornelius, Paul Grimstad, Wendy Lee, Justin Neuman, Catherine Nicholson, Shital Pravinchandra, Jessica Pressman, Anthony Reed, Sam See, Brian Walsh, R. John Williams

Fields of Study

Fields include English language and literature from Old English to the present, American literature, and Anglophone 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 ten- to fifteen-page writing sample.

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.
- Satisfy the language requirement in one of three ways by the end of the second year. *Two languages, by course and exam:* one language to be completed by passing an advanced literature course at Yale (graduate or upper-level undergraduate course

taught in and requiring papers in the language in question) with a grade of Honors or High Pass; the other to be passed by departmental exam (reading knowledge with dictionary).

Two languages by exam: strong reading knowledge of one language, as demonstrated by passing a departmental exam without use of a dictionary; reading knowledge of a second language, demonstrated by passing a departmental exam with dictionary.

Three languages by departmental exam or, in the case of an ancient language, by satisfactory completion of two terms of introductory Latin or Greek (GREK 110–111 or LATN 110–111). Languages to be selected from the following: (a) Latin or Greek; (b) French or German; (c) one of the preceding languages or Biblical Hebrew, Italian, Russian, Spanish, or another language agreed upon by the director of graduate studies (DGS). Students specializing in periods after 1750 may, with the permission of the DGS, substitute a third language for selection (a). Two terms of Old English (or one term of Old English and one of the History of the Language) may be substituted for selection (c).

- 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 director of graduate studies.
- 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 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 six 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

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 poems: *Caedmon's Hymn, The Dream of the Rood, The Battle of Maldon, The Wife's Lament, The Wanderer,* and *The Seafarer.* MW 9–10:15

ENGL 501b/LING 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

ENGL 519b, Medieval Manuscripts and Literary Forms Jessica Brantley

The course investigates the relation between manuscript studies and traditional literary criticism. It includes an introduction to working with medieval manuscripts (no prior experience required), and continues with a series of case studies that ask what thinking about manuscripts can contribute to literary scholarship. Manuscripts to be considered include the Ellesmere Chaucer, the Douce 104 *Piers Plowman*, the Vernon MS (a devotional miscellany), the Book of Brome (a household miscellany), the York Register (cycle drama), and Cotton Nero A.x (the Gawain poet). M 9:25–11:15

ENGL 550b, Spenser David Quint

A survey of Spenser's major works, with the bulk of attention on the *Faerie Queene*, six and a half epics for the price of one. We read Spenser's poem with attention to his Italian predecessors Ariosto and Tasso, in the context of Elizabethan politics and English policy in Ireland, and in relationship to theories of allegory. Student reports and one term paper. TH 1:30–3:20

ENGL 561a, Studies in Seventeenth-Century English Literature John Rogers A survey of seventeenth-century poetry and prose, exclusive of Milton. Authors include Bacon, Donne, Hobbes, Herbert, Browne, Crashaw, Marvell, Cavendish, Bunyan, and Dryden. M 3:30–5:20

ENGL 567a, Trilingual England Ian Cornelius

A study of the cultural politics of linguistic practice in fourteenth- and fifteenth-century England. We examine the shifting status and functions of England's three principal languages, and study the strategies by which writers of English texts represented their relations to Latin and French culture. Focus on three textual sites: fourteenth-century religious writing, especially Wycliffite; *Piers Plowman* and documents from the 1381 peasants' revolt; and Chaucer and fifteenth-century "Chaucerians." Final syllabus depends on interests of the seminar's participants. T 1:30–3:20

ENGL 589a/HIST 561a, Renaissance Ways with Words Keith Wrightson,

David Scott Kastan

The course explores the great variety of users and uses of early modern English, tracing a set of social, linguistic, and literary developments in English in the period 1500–1700. Each session focuses on a particular "genre," understanding this in the widest sense: both familiar "literary" genres, such as ballads, plays, and prose fiction, and nonliterary genres, such as letters, court depositions and examinations, wills, and petitions. We look also at dictionaries and rhetorical manuals, all with the aim of understanding how the language was used and how its users understood it. A course that combines social history, literary criticism, and sociolinguistics (thinking, for example, about regional and class variation), the seminar provides an unusual window onto early modern England, giving students opportunities to develop or improve skills in researching the various available archives and a lens through which to understand the origins of the process by which English transformed itself from a literally insular language spoken perhaps by fewer than six million people in 1600 to the world language it is today. W 3:30–5:20

ENGL 623b, Jacobean Shakespeare Lawrence Manley

A study of Shakespeare's later plays, emphasizing form and dramaturgy, in relation to works by his contemporaries and to the institutions of the Jacobean theater. Nine plays by Shakespeare and masques and plays by Marston, Middleton, Chapman, Tourner, Webster, and Beaumont and Fletcher. W 3:30–5:20

ENGL 714b, Swift, Pope, and Their Circle Claude Rawson

The circle of Jonathan Swift and Alexander Pope also included John Gay, Thomas Parnell, John Arbuthnot, and the prime minister Robert Harley. It was one of the great literary coteries, central in the literature and politics of England and Ireland in the first half of the eighteenth century. Principal texts: poems of Swift, Pope, Gay, and Parnell; Swift, *Tale of a Tub, Gulliver's Travels, Modest Proposal*, and other prose writings; Pope, *Peri-Bathous, Or, The Art of Sinking in Poetry*; Gay, *Beggar's Opera;* Arbuthnot, *History of John Bull* and other writings; and the collaborative *Memoirs of Martinus Scriblerus*. T 1:30–3:20

ENGL 723b/CPLT 646b, The Rise of the European Novel Katie Trumpener

Over the eighteenth century, the novel became a key literary form in many parts of Europe. Yet now-standard narratives of its "rise" often offer a view that is temporally and linguistically foreshortened. The course examines key early modern novels in a range of European languages and tackles some of the major literary-historical accounts explaining novelistic form, audiences, timing, and social function. It centers on key eighteenth-century British and French novels by Montesquieu, Defoe, Swift, Sterne, Diderot, Laclos, Edgeworth, and Austen. Yet we begin by considering earlier picaresque novels and secret histories such as *Lazarillo de Tormes*, Grimmelshausen's *Courage*, and Madame de Lafay-ette's *The Princess of Cleves*, and end with novellas by Goethe, Kleist, and Pushkin. All texts available in translation, although students are strongly encouraged, if possible, to read in the original. M 1:30–3:20

ENGL 742a/WGSS 769a, Fiction, Didacticism, and Political Critique, 1789–1818 Jill Campbell

A study of writings that seek a specific effect in their reader – whether didactic instruction and moral formation, or an instigation to take action toward political change – and their uneasy alliance in the late eighteenth and early nineteenth centuries with the literary genre of prose fiction. How do writings that seek to inform or reform the real person or the real world put fictional narratives to use? How is the genre of the novel shaped, explicitly or implicitly, by writing to a specific "end"? Texts include novels, tales for children, life-writing, poetry with a "cause," polemical essays; possible authors include Olaudah Equiano, Edmund Burke, William Godwin, Mary Wollstonecraft, Hannah More, Maria Edgeworth, Jane Austen, Anna Barbauld, and Mary Shelley. w 9:25–11:15

ENGL 756b, Byron, Shelley, Keats Paul Fry

Poetry and prose of Byron, Shelley, and Keats with emphasis on both their differences and their common qualities. Special attention is given to the complex interactions of these poets with Wordsworth and Coleridge. T 9:25–11:15

ENGL 773a^U/CPLT 805a, Readings in Romantic Poetry: Function, Medium, Affect Geoffrey Hartman

A seminar on the place of romantic poetry in literary history, and how it projects its own historical perspectives. We also try to understand the rise of a more theoretical criticism. But we do not neglect generic qualities this poetry shares with major poems in other periods. Our discussions should come to terms with attempts to theorize affects that have been described as peculiarly poetic or aesthetic, and with questions concerning art's function, in the sense of cognitive qualities, cultural utility, or some definable end like Schiller's "aesthetic education." If there is time, the instructor welcomes a discussion of what is – or remains of – poetry's role as a medium in the context of new media and technologies of communication. Intensive readings of individual poems or passages, accompanied by critical or theoretical texts. Blake, Wordsworth, Coleridge, Keats, and Shelley play the major roles. Students have an opportunity to raise issues about poetry in languages/traditions other than English. Questions about "noncanonical" authors are welcome. One short paper and one significantly longer term paper. Enrollment limited to ten; this number may include two or three auditors or advanced undergraduates with permission of the director of undergraduate studies. T 3:30-5:45

ENGL 828a, Nineteenth-Century Long Narrative Poetry Stefanie Markovits The course explores the phenomenon of long narrative poetry in the context of contemporary debates about genre. We pay particular attention to the fate of epic, the role of lyric in longer works, voice (especially first-person), and the force (market and cultural) of the novel. Texts: Wordsworth, *The Prelude;* Byron, *Don Juan;* Clough, *The Bothie of Toper-na-fuosich, Amours de Voyage;* Tennyson, *Maud, Idylls of the King;* Elizabeth Barrett Browning, *Aurora Leigh;* Robert Browning, *The Ring and the Book.* M 1:30–3:20

ENGL 829b, Late Victorian Poetry and Prose Linda Peterson

Poetry, essays, and novels of the 1870s, '80s, and '90s as they respond to and react against high Victorianism in both form and ideology. The focus is on the "new" movements: neo-Hellenism, neo-medievalism, aestheticism, decadence, and the New Woman. Authors include Swinburne, Pater, Wilde, and Gilbert and Sullivan, with some consideration of Hardy, Grant Allen, Mary Cholmondeley, and Mary Humphry Ward. TH 9:25–11:15

ENGL 831a, Character, Things, and the Nineteenth-Century Novel

Ruth Bernard Yeazell

Reading of selected nineteenth-century novels from Jane Austen to Henry James in light of the recent revival of critical interest in fictional character, on the one hand, and the representation of material objects, on the other. In addition to Austen and James, readings may include works by Charles Dickens, George Eliot, Wilkie Collins, and Anthony Trollope, as well as a range of critical and theoretical commentary. TH 1:30–3:20

ENGL 846b/CPLT 539b, American Literature: Regional, National, Global

Wai Chee Dimock

How does the choice of scale affect our understanding of American literature: its histories, its webs of relations, the varieties of genres that make up its landscape? Through three interlocking prisms – regional, national, and global – we explore multiple permutations of locality and distance; the size of events; lengths and widths of causal connection; and the expanding or contracting spheres of race and gender. Authors include Anne Bradstreet, Nathaniel Hawthorne, Henry James, Sarah Orne Jewett, Ernest Hemingway, Gertrude Stein, Ezra Pound, Paul Bowles, Langston Hughes, Robert Lowell, Monique Truong, Edwidge Danticat. W 1:30–3:20

ENGL 865a/AMST 676a/WGSS 778a, Walt Whitman Michael Warner

An intensive reading in Whitman. A central topic is sexuality, including the relations among Whitman's rhetoric of sex, his quasi-religious ambitions, and the rhetoric of critical worldliness. The course also attempts to situate Whitman's diverse writings in the landscape of genres and circulating forms in the transatlantic world of his day. Related topics include mid-nineteenth-century media shift; periodical verse; author cults; New York City literary culture and its emergent bohemian scene; nationalism, race, the state, and ambiguities of antislavery politics; stranger sociability, intimacy, and the pragmatics of "self" in Whitman. Seminar papers dealing with these broader topics are warmly invited, even if Whitman is not their primary focus. T 9:25–11:15

ENGL 898a/AMST 850a, American Literary Coteries Amy Hungerford

The work and workings of two literary coteries based in San Francisco, the Beats and the McSweeney's group. Focus on major and minor figures; contact between literature and other arts; formal ambitions; class and social dynamics; race, gender, and sexuality in the groups' constitution and reception; and the groups' relation to the city and American culture. The comparative aspect highlights questions of genre, historical context, literary value, and the history of the book; supplemental readings in the sociology of literature and affect theory. Students pursue collaborative research and may choose other literary coteries from the period under study, such as the Black Arts movement, the NOON group, the n+1 group, or the L=A=N=G=U=A=G=E poets. TH 9:25–11:15

ENGL 943a/AFAM 748a/AMST 639a, Rethinking the African American Literary

Canon Elizabeth Alexander

As we move into the twenty-first century, we now have behind us a serious body of literary criticism and theory on African American literature. This is a moment to consider, discuss, and perhaps revise some of the touchstones of the African American canon. We read works considered canonical along with the critical material surrounding them, studying these books in their historical contexts and finding new methods and contexts for reading them. The course assumes that students may have read many of these works but will reread with fresh eyes, moving toward original research and new propositions about these works as well as questions of tradition, doctrine, the idea of "genius" and "masterpiece," and creative resistance. For a final project, students present a work not on the syllabus and argue for its necessity to African American literary study. Works include Frederick Douglass's *Narrative, Incidents in the Life of a Slave Girl, The Collected Poems* of Paul Laurence Dunbar, *Cane, The Collected Poems* of Langston Hughes, *Their Eyes Were Watching God, The Collected Poems* of Gwendolyn Brooks, *Invisible Man, The Collected Poems* of Robert Hayden, *A Raisin in the Sun,* and *Beloved.* T 1:30–3:20

ENGL 948b^U/**AFAM 588b**^U/**AMST 710b**^U, **Autobiography in America** Robert Stepto At least a dozen North American autobiographies are studied, mostly from the "American Renaissance" to the present. Discussion of various autobiographical forms and strategies as well as of various experiences of American selfhood and citizenship. Slave narratives, spiritual autobiographies, immigrant narratives, autobiographies of childhood or adolescence, relations between autobiography and class, region, or occupation. M 1:30–3:20

ENGL 962a/AMST 677a/CPLT 914a, Drama, Performance, Mass Culture Joseph Roach

Taking account of the genealogy of modern drama in eighteenth-century performance, the seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events 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*. M 3:30–5:20

ENGL 990a, The Teaching of English Langdon Hammer

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 995a/b, Directed Reading Staff

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.

ENVIRONMENTAL ENGINEERING

Dunham Laboratory, 203.432.4250 M.S., M.Phil., Ph.D.

Professors Gaboury Benoit, Stephen Edberg, Menachem Elimelech, Thomas Graedel, Edward Kaplan, Joseph Pignatello (*Adjunct*), James Saiers

Associate Professors Michelle Bell, Ruth Blake, Yehia Khalil (*Adjunct*), William Mitch, Jordan Peccia

Assistant Professor Julie Zimmerman

Lecturer James Wallis

Fields of Study

Fields include aquatic and environmental chemistry, physical and chemical processes for water quality control, transport and fate of pollutants in the environment, environmental nanotechnology, green engineering, environmental engineering microbiology, environmental molecular biology, bioaerosols, water reuse, disinfection by-product formation, emerging contaminants, membrane separations for water quality control, industrial ecology, and chemical reactions at the mineral-water interface.

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

EPIDEMIOLOGY AND PUBLIC HEALTH

60 College Street, 203.785.6383 http://info.med.yale.edu/eph M.S., M.Phil., Ph.D.

Dean Paul Cleary

Director of Graduate Studies Christian Tschudi (203.785.6383)

Acting Director of Medical Studies Mayur Desai

Director of Medical Research Elizabeth Claus

Professors Serap Aksoy, Elizabeth Bradley, Michael Bracken, Kelly Brownell (*Psychology*), Richard Bucala (*Medicine*), Michael Cappello (*Pediatrics*), Elizabeth Claus, Paul Cleary, Erol Fikrig (*Medicine*), Durland Fish, Robert Heimer, Theodore Holford, Jeannette Ickovics, Edward Kaplan (*School of Management*), Stanislav Kasl, Harlan Krumholz (*Medicine*), Brian Leaderer, Robert Makuch, Lawrence Marks, Linda Mayes (*Child Study Center*), Susan Mayne, Diane McMahon-Pratt, I. George Miller (*Pediatrics*), A. David Paltiel, Peter Peduzzi, Rafael Pérez-Escamilla, Jeffrey Powell (*Ecology & Evolutionary Biology*), Harvey Risch, Robert Rosenheck (*Psychiatry*), Peter Salovey (*Psychology*), Mark Schlesinger, Jody Sindelar, Mary Tinetti (*Medicine*), Daniel Zelterman, Heping Zhang, Hongyu Zhao, Tongzhang Zheng

Associate Professors Michelle Bell (Forestry & Environmental Studies), Susan Busch, Rani Desai (Psychiatry), David Fielin (Medicine), Alison Galvani, Yongtao Guan, Josephine Hoh, Melinda Irwin, Amy Justice (Medicine), Trace Kershaw, Albert Ko, Douglas Leslie (Psychiatry), Becca Levy, Haiqun Lin, Judith Lichtman, Xiaomei Ma, Melinda Pettigrew (on leave), Jennifer Prah Ruger, Nina Stachenfeld (Obstetrics, Gynecology & Reproductive Sciences), Christian Tschudi, Herbert Yu, Yong Zhu

Assistant Professors Achyuta Adhvaryu, Andrew DeWan, Maria Diuk-Wasser, Adrienne Ettinger, Jason Fletcher, Jhumka Gupta, Patricia Keenan, Tené Lewis, Shuangge Ma, Kathleen McCarty, Annette Molinaro, Joan Monin, Ingrid Nembhard, Anita Wang, Yawei Zhang, Bingqing Zhou

Fields of Study

Programs of study are offered in the areas of Biostatistics, Chronic Disease Epidemiology, Environmental Health Sciences, Health Policy and Administration, and Epidemiology of Microbial Diseases (infectious disease epidemiology, vector-borne diseases, immunology, and parasitology). The Social and Behavioral Program (SBS), within the Chronic Disease Epidemiology division, offers students specialized instruction in the theory and methods of the social and behavioral sciences. All programs are under the faculty of the Department of Epidemiology and Public Health.

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. Students whose native language is not English must submit scores from the TOEFL or IELTS examination.

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 Epidemiology and 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 divisional requirements. 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 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 will be offered annually and is graded Satisfactory/Unsatisfactory. Students must take this course prior to the end of the first year.

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.

The special course requirements for each division are: *Biostatistics*, an average of three to four courses per term plus seminars and colloquia; *Chronic Disease Epidemiology*, an average of three to four courses per term plus seminars and colloquia; *Environmental Health Sciences*, an average of three to four courses per term plus seminars and colloquia; *Epidemiology of Microbial Diseases*, two years of course work, lab rotations, and seminars developed with a faculty adviser; *Health Policy and Administration*, an average of three to four courses per term plus seminars.

Teaching is regarded as an integral aspect of the graduate training program. Doctoral students are required to satisfactorily complete four terms as Teaching Fellows (10 hours/ week). 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.

All doctoral students are required to complete 40 hours (four Level 2 assignments at 10 hours/week or an equivalent combination) as a Teaching Assistant. 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.

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 division as outlined in the most current School of Public Health Bulletin, achieving grades of Honors in at least two full-term courses and achieving an overall HP average; (2) obtain an average grade of High Pass on the qualifying examination; and (3) submit a dissertation prospectus. The qualifying examination must be 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 within a year of passing the qualifying examination.

The DAC reviews and approves the prospectus as developed by the student and recommends to the DGS and the Departmental Doctoral 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. At that time the chair/adviser of the DAC submits its recommendation to the DGS and the Departmental Doctoral Committee, and its recommendation of suitable readers.

Doctoral dissertations originating in EPH must 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 Departmental Doctoral Committee are required to attend the presentation.

Master's Degrees (in Epidemiology and Public Health)

Terminal M.S. in EPH The department offers a terminal master's degree program leading to an M.S. in Epidemiology and 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 EPH. In other divisions (Environmental Health Sciences, Epidemiology of Microbial Diseases, or Health Policy Administration) students must have successfully completed (prior to withdrawal) at least one year of the doctoral program and be in good academic standing in order to receive an M.S.

M.Phil. (en route to the Ph.D.) Students who have completed all requirements for the Ph.D. except the dissertation may petition the Graduate School for the Master of Philosophy degree.

FIELDS OF STUDY

Terminal M.S. in EPH-Biostatistics

Faculty in the Biostatistics division of the Department of Epidemiology and 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 EPH–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. Students whose native language is not English must submit scores from the TOEFL or IELTS examination.

A minimum of twelve courses must be completed, and a grade of Honors achieved in at least two courses with an overall grade average of High Pass. An acceptable master's thesis must be submitted.

Terminal M.S. in EPH-Chronic Disease Epidemiology

Faculty in the Chronic Disease Epidemiology division of the Department of Epidemiology and Public Health offer a one-year terminal Master of Science degree. This one-year program is designed for medical and health care professionals who seek the skills necessary to conduct epidemiological research in their professional practice.

Requirements for M.S. in EPH-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. Part-time enrollment is not encouraged.

Applicants must take the GRE General Test. Students whose native language is not English must take the TOEFL or IELTS examination.

A minimum of ten courses must be completed and a grade of Honors achieved in at least one course. It is expected that this program will be completed during a single academic year. Satisfactory completion of the capstone experience is required. Examples of a capstone experience are completion of an NIH-type grant application that is deemed reasonably competitive by a faculty member; completion of a manuscript that is suitable for submission for publication; completion of a systematic review deemed eligible for publication. Manuscripts and grant applications may be derived from any of the courses taken by the student.

M.D./Ph.D. Program Requirements for Epidemiology and Public Health

All M.D./Ph.D. students must meet with the DGS in Epidemiology and Public Health as soon as they affiliate with EPH. 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 as a TA 2 (10 hours/week) is required. If a student has served as a teaching assistant 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 four-week rotations/internships with potential advisers in EPH. 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. Divisional 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 EPH 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 EPH. 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), Epidemiology and Public Health, Yale University, PO Box 208034, New Haven CT 06520-8034; 203.785.6383; e-mail, melanie. elliot@yale.edu.

Courses for all Epidemiology and Public Health Graduate School Degrees

BIS 505a, Introduction to Statistical Thinking I Elizabeth Claus

The course provides an introduction to the use of statistics in the fields of epidemiology and public health. Topics include descriptive statistics, probability distributions, parameter estimation, and hypothesis testing, as well as an introduction to sampling and simple linear regression. Statistical analysis using the SAS software on the PC is introduced.

BIS 505b, Introduction to Statistical Thinking II Daniel Zelterman

This continuation of BIS 505a covers multiple regression, analysis of variance, nonparametric tests, survival analysis, Poisson regression, and logistic regression. The course concludes with a review of commonly used statistical methods. As in the first term, the SAS software package is used for statistical analysis. Prerequisite: BIS 505a.

BIS 511a, GIS Applications in Epidemiology and Public Health Theodore Holford The study of epidemiology often seeks to determine associations between exposure risk and disease that are spatially dependent. Geographic information systems (GIS) are modern computer-based tools for the capture, storage, analysis, and display of spatial information. GIS technologies are just beginning to be used for public health planning and decision making. Public health applications of GIS provide cost-effective methods for evaluation interventions and modeling future trends, and also provide a visual tool for data exploration. The class teaches the technical and design aspects of implementing a GIS project in public health and provides students with basic tools for using GIS. Examples are given to introduce a variety of applications in the field of epidemiology.

BIS 525a and b, Seminar in Biostatistics Faculty

Faculty and invited speakers present and discuss current research.

BIS 540a, Fundamentals of Clinical Trials Robert Makuch

The course addresses issues related to the design, conduct, and analysis of clinical trials. Topics include protocol development, examination and selection of appropriate experimental design, methods of randomization, sample size determination, appropriate methods of data analysis including time-to-event (possibly censored) data, and interim monitoring and ethical issues. Prerequisite: BIS 505a or equivalent and second-year status.

BIS 561b, Practical Issues and Case Studies in Multicenter Clinical Trials

Peter Peduzzi, Maria Ciarleglio

The course addresses practical issues related to the design, conduct, monitoring, and analysis of multicenter randomized clinical trials. Topics include organizational, regulatory, and ethical issues; an overview of design strategies; topics in sample size estimation, interim monitoring and analysis; and case studies of landmark clinical trials, such as the polio vaccine field trial, Physicians Health Study, and the VA Shingles Prevention Trial. Prerequisite: BIS 505a.

BIS 623a, Applied Regression Analysis Heping Zhang

The course covers linear regression, estimation, and testing hypotheses in multivariate regression, regression diagnostics, analysis of variance, and adjusting for covariates. Emphasis is on the application of methods. SAS software is used throughout the course. Prerequisite: BIS 505b or equivalent.

BIS 625a, Categorical Data Analysis Zuoheng Wang

The course presents methods for analyzing categorical data in public health, epidemiology, and medicine. Topics include discrete distributions, log-linear models, and logistic regression. Emphasis is placed on the application of the methods and the interpretation of results by applying the techniques to a variety of data sets. Prerequisite: BIS 505b.

BIS 628b, Longitudinal Data Analysis Haiqun Lin

The course covers methods for analyzing data in which repeated measures have been obtained for individuals over time. Different methods are discussed to handle both continuous and discrete longitudinal response data. Both subject-specific and population averaged approaches are covered (with particular reference to capturing the heterogeneity between different individuals). Some of the approaches covered include linear, nonlinear, and generalized mixed effects models, as well as generalized estimating equations. The course also covers exploratory methods, approaches for handling missing data, and possibly transition models and advanced topics such as multivariate longitudinal responses, nonparametric longitudinal responses, the joint consideration of longitudinal and survival data, and the joint consideration of longitudinal and spatial data. Emphasis is placed on applying the methods, understanding underlying assumptions, and interpreting
results. Both SAS and S-Plus/R software are used throughout the course. Prerequisites: BIS 623a and 625a.

BIS 630b, Applied Survival Analysis Hongyu Zhao

This half-term course demonstrates statistical methods for analyzing and interpreting time to failure data. The techniques described include the construction and analysis of failure rates, survival curves, significant tests for comparing survival curves, and semiparametric models for the analysis of time to failure data including the proportional hazards model. Skills for using statistical software to perform the calculation are developed. In addition, study design is covered, including sample size and power calculations. Prerequisites: BIS 505a and 505b; BIS 623a or 625a.

[BIS 631a/GENE 631a, Topics in Genetic Epidemiology]

BIS 632b, Design and Analysis of Epidemiologic Studies Hongyu Zhao

This half-term course considers methods for analyzing the association of one or more factors with disease. Topics include the analysis of cohort studies, case-control studies, and vital rates. The analysis of matched data is also discussed. Emphasis is placed on the application and interpretation of the techniques. Issues of study design are also covered. Prerequisites: BIS 505a and 505b; BIS 623a or 625a.

BIS 643b, Theory of Survival Analysis and Its Applications Shuangge Ma

This course presents the statistical theory underlying survival analysis. It covers different models of censoring and the three major approaches to analyzing this type of data: parametric, nonparametric, and semi-parametric methods. The application of this theory through some exemplary data sets is also presented. Prerequisites: STAT 541a and 542b. Offered every other year.

[BIS 645a/GENE 645a, Statistical Methods in Human Genetics]

BIS 646b, Nonparametric Statistical Methods and Their Applications Yongtao Guan

BIS 651b, Spatial Statistics Yongtao Guan

Statistical methods for the analysis of spatial data that arise from health studies are developed in order to account for spatially correlated outcomes. Techniques to be discussed include methodology for continuous responses such as inverse distance weighting and Kriging. Bayesian models for smoothing disease risk maps are derived. Environmental exposure models are developed. In addition, spatial/temporal models are discussed that allow the analysis of both sources of correlation. Techniques are illustrated using data from ongoing studies. Prerequisites: STAT 541a and 542b. Offered every other year.

[BIS 691b, Theory of Generalized Linear Models]

BIS 695c, Summer Rotation in Statistical Research Theodore Holford

The purpose of this course is to provide students with the opportunity of gaining practical experience in the analysis and the development of biostatistical methods as part of a health sciences research team including medicine, public health, pharmaceutical industry, or health care delivery. This experience in a research laboratory provides a basis for developing a dissertation proposal that has practical significance for addressing important scientific questions. Students work with a biostatistics faculty mentor to select a suitable placement for the rotation, and a one-page description of the plans is submitted to the head of the Biostatistics division at least three weeks prior to starting the program, for approval by the biostatistical faculty within two weeks. Upon completion of the rotation, a written report of the work must be submitted to the head of the Biostatistics division no later than October 1, and an oral presentation given during the fall term. Prerequisite: completion of one term of the Ph.D. program.

CDE 505a/PSYC 657a, Social and Behavioral Influences on Health

Jeannette Ickovics

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 1-2:50

CDE 508a/EMD 508a, Principles of Epidemiology I Robert Dubrow

The course presents an introduction to epidemiologic concepts and methods. Topics include measurement of disease rates, descriptive epidemiology, ecologic studies, cohort studies, case-control studies, cross-sectional studies, randomized controlled trials, causation, random variation and statistical significance, bias, confounding, effect modification, epidemic investigation, measurement validity, screening, and molecular epidemiology. The course utilizes a wide variety of case studies from both chronic and infectious disease epidemiology.

CDE 516b, Principles of Epidemiology II Mayur Desai

An intermediate-level course on epidemiologic principles and quantitative methods used in epidemiologic studies. Topics covered at the introductory level are revisited and covered in more depth and breadth, with an emphasis on quantitative issues involved in the design, analysis, and interpretation of epidemiologic studies. Certain new concepts and areas of studies are also introduced. Through readings, lectures, and problem sets, students are expected to (1) develop an increased understanding of epidemiologic principles and methods; (2) identify strengths and pitfalls in the design, analysis, and interpretation of epidemiologic studies in the literature; (3) improve relevant quantitative skills; and (4) master epidemiologic methods to a degree necessary to initiate their own research projects and analyses. Prerequisites: CDE/EMD 508a and BIS 505a.

CDE 518b, Introduction to Pharmacoepidemiology Michael Bracken

The course provides a basic orientation to the study of safety, efficacy, and utilization of ethical pharmaceuticals. The application of epidemiologic methods to the field is emphasized. Among the subjects considered are the usefulness of databases from HMOs, governmental, international, and other sources; current pharmacoepidemiology research within Yale School of Medicine; the role of the Food and Drug Administration; the assessment of drug safety; and assessment of quality of life and the role of pharmaco-epidemiology in a managed care environment. Prerequisites: CDE/EMD 508a, BIS 505a, and BIS 505b. Offered every other year.

CDE 523b, **Measurement Issues in Chronic Disease Epidemiology** Xiaomei Ma The course addresses the measurement issues in chronic disease epidemiology from a practical perspective. The first part of the course covers the use and limitations of currently available techniques for measuring exposure to a number of etiologic factors such as diet, alcohol, tobacco, physical activity, psychological factors, and environmental/occupational exposures. The latter part of the course focuses on the measurement of outcome for some of the major chronic diseases, along with some practical considerations involved in conducting chronic disease epidemiology research. Prerequisite: CDE/EMD 508a.

CDE 531a/PSYC 664a, Health and Aging Becca Levy

Since 1900 the number of individuals aged sixty-five and older has tripled and life expectancy has increased by about thirty years. The course examines some of the health issues related to this growing segment of the population. Class discussions address such questions as: How does the aging process differ between cultures? What kinds of interventions can best reduce morbidity in old age? How can health policy adapt to the aging populations? This course integrates psychosocial and biomedical approaches.

CDE 532b, Epidemiology of Cancer Brenda Cartmel

The course applies epidemiologic methods to the study of cancer etiology and prevention. Introductory sessions cover cancer biology, carcinogenesis, cancer incidence and mortality rates in the United States, and international variation in cancer rates. The course then focuses on risk factors for cancer (including tobacco, alcohol, diet, radiation, and occupation) and on major cancer sites (including colon, breast, and prostate). Emphasis is placed on critical reading of the literature. Prerequisite: CDE/EMD 508a or permission of the instructor.

CDE 533a, Topics in Perinatal Epidemiology Kathleen Belanger

Pregnancy, delivery, and reproduction provide the course's organizing focus. The current perinatal epidemiologic literature is critically reviewed from a methodological perspective. Subjects studied include infertility, miscarriage, fetal growth retardation, preterm labor and delivery, aspects of prenatal care, perinatal risks for cancer and other chronic diseases, SIDS, and infant mortality. Students develop an understanding of what evidence is needed to establish causal relationships in this specialty. Implications of research findings for public health policy, individual decision making, and future studies are considered.

CDE 534b, Approaches to Data Management and Analysis of Epidemiologic Data Mayur Desai

The course provides students with basic skills of data management and data analysis. The SAS statistical program is used. Main topics include using SAS data sets, data manipulation, bivariate and multivariable analyses. Using existing data sets, students test their own hypotheses and develop a research project. Emphasis is placed on the practical application of the skills learned. The course is a useful preparation for the summer internship and for thesis data analysis. Prerequisites: BIS 505a, CDE/EMD 508, and CDE major or

doctoral status (permission of the instructor for non-CDE majors required); students must have taken or must be currently taking BIS 505b and CDE 516b.

CDE 535b, Epidemiology of Heart Disease and Stroke Judith Lichtman

Heart disease and stroke are the leading causes of death and disability among industrialized nations. The course introduces students to the major categories of cerebrovascular and cardiovascular disease. Students are challenged to think about how individual diseases contribute to the epidemic of cardiovascular disease and stroke in the United States. In this course, students learn basic principles about the rates of disease, risk factors, clinical trial results, and outcomes of vascular diseases. Through the critical review of current studies, students apply basic epidemiology to critically evaluate current literature and topics in the field of vascular epidemiology. Sessions include a clinical overview of a specific disease or risk factor, as well as highly interactive discussion of a specific epidemiologic topic or principle. Students are encouraged to develop their own solutions to current gaps in the epidemiologic literature.

CDE 545b, Health Disparities by Race and Sex: Epidemiology and Intervention Beth Jones

The United States Public Health Service states that "eliminating health disparities" is one of the two overarching goals for the national health promotion/disease prevention agenda. The course takes a life course perspective to examine the epidemiology of disparities from the perinatal period (e.g., birth weight) to older adulthood (e.g., mortality). We focus on differences in morbidity and mortality between females and males and between diverse racial/ethnic groups. The primary focus of this course is on understanding the critical determinants and consequences of health disparities, learning to think critically about studies in the field, and developing creative ideas for new approaches to research, intervention, and policy. The course covers state-of-the-science information, taken primarily from journal articles, across a broad range of topics including heart disease, cancer, and AIDS, as well as important psychological, social, and behavioral factors that influence health. Emphasis is placed on methodological issues, including measurement, study design, and conducting ethically responsible community-based research. The course focuses not just on understanding disparities, but on evaluating and developing interventions to reduce or eliminate them. Prerequisite: CDE 505a or 571b.

CDE 562a, Nutrition and Chronic Disease Susan Mayne

The course provides students with a scientific basis for understanding the role of nutrition and specific nutrients in the etiology, prevention, and management of chronic diseases. Nutrition and cancer are particularly emphasized. Other topics include cardiovascular diseases, osteoporosis, obesity, diabetes mellitus, and aging. Biology, biochemistry, and physiology helpful.

[CDE 570a, Epidemiology of Psychiatric Disorders]

CDE 571b, Psychosocial and Behavioral Epidemiology Tené Lewis

The course provides a systematic overview of psychosocial and behavioral influences on health, illness, and recovery. The factors of interest that influence health include: individual stable characteristics (e.g., traits), characteristics of the primary social environment (e.g., family, friends), settings defined by social roles (e.g., work), and broader contextual factors reflecting social structural variables (e.g., social class). The interplay of the foregoing factors of interest with biomedical and clinical variables constitutes a central theme. Prerequisite: CDE 505a.

CDE 572a, Preventive Interventions: Theory, Methods, and Evaluation

Melinda Irwin

The course reviews the theory, methods, and evaluation of health promotion and disease prevention interventions conducted in multiple settings. Topics of promotion and prevention include physical activity, nutrition, obesity, cancer, cancer screening, cardiovascular disease, diabetes, smoking, alcohol and substance abuse, HIV and STDs, condom and contraception use, adolescent pregnancy, and psychiatric and mental health problems. The course combines didactic presentations, discussion, and critiques of health promotion and disease prevention interventions by students. The course is intended to increase the student's skills in evaluating health promotion and disease prevention interventions, at both the individual and community levels. Prerequisite: CDE 505a.

CDE 574b, Developing a Health Promotion and Disease Prevention Intervention Trace Kershaw

The course is intended to be a practical "how to" application of concepts and methods learned in CDE 572a. The primary objective of the course is to gain experience in intervention research by developing a health promotion and disease prevention intervention. Students choose a health problem (e.g., physical inactivity, smoking, HIV risk) and develop an intervention focused on favorably changing the determinants and behavior that influence the health problem. The course emphasizes transferring concepts from the abstract to the concrete. Students develop an intervention manual consisting of actual intervention materials, and methods that specifically outline how the intervention will be designed, conducted, evaluated, and disseminated. Throughout the course students participate in a peer review process to evaluate and give feedback for each section of the intervention manual. Prerequisite: CDE 572a.

CDE 575b, Religion, Health, and Society Peter Van Ness

The course examines the impact of various dimensions of religiousness on mortality and health status, giving special attention to the relation between religion and other social factors such as age, gender, race, and class. Discussion focuses on the public health implications of the epidemiological findings including the nature and significance of faith-based programs serving health needs. Special attention is given to studies drawn from religiously diverse populations.

CDE 617b, Developing a Research Protocol Robert Dubrow

The objective of this course is to develop a research protocol from hypothesis formation to appropriate study design. Review of relevant background literature, consideration of appropriate statistical techniques, provision of adequate personnel and environment, and understanding of strengths and weaknesses of the proposed study are included. Students are divided into groups, with each group responsible for developing a research protocol suitable for submission as a grant proposal to NIH. Special attention is given to writing techniques and style. Prerequisites: CDE 516b (can be taken concurrently) and doctoral student status, or permission of the instructor.

CDE 619a, Advanced Epidemiologic Research Methods Harvey Risch

This advanced course focuses on quantitative issues and techniques relevant to the design and analysis of observational epidemiologic studies. Starting with formal definitions of the commonly used epidemiologic parameters, and assuming a working knowledge of ANOVA and linear regression, the course covers analyses based on various related types of regression, e.g., logistic, Poisson, Cox, etc. The GLIM and PECAN computer programs are described and used throughout. Students analyze and discuss data sets of generally increasing complexity. Prerequisites: BIS 505a, 505b, and doctoral student status, or permission of the instructor.

CDE 630a, Molecular Epidemiology of Chronic Disease Herbert Yu

The course provides an in-depth overview of issues addressed in molecular epidemiology and its application in cancer research. Subjects covered in the course include basic biochemistry and molecular biology, biological mechanisms related to molecular epidemiology research, principles of molecular and biochemical analysis, biotechnologies and laboratory methods used in molecular epidemiology, and interpretation of study results. The course emphasizes the development of abilities to design and conduct molecular epidemiology research and to critically evaluate findings in the literature. Prerequisite: CDE/EMD 508a or permission of the instructor; biochemistry and cell and molecular biology are helpful, but not required.

CDE 650a, Introduction to Evidence-Based Medicine and Health Care

Michael Bracken

Evidence-based health care uses best current evidence in addressing clinical or public health questions. The course introduces principles of evidence-based practice in formulating clinical or public health questions, systematically searching for evidence, and applying it to the question. Types of questions considered include: examining the comparative effectiveness of clinical and public health interventions, etiology, diagnostic testing, and prognosis. Particular consideration is given to the methodology of synthesizing evidence in a systematic review. Also addressed is the role of evidence in informing economic analysis of health care programs, clinical decision analysis, and clinical practice guidelines. Using a problem-based approach, students contribute actively to the classes and small-group sessions. Students complete a systematic review in their own field of interest using Cochrane Collaboration methodology. Prerequisite: students must have passed or be concurrently taking CDE 516b, or obtain permission of the instructor.

CDE 66ob, Doctoral Seminar in Epidemiology Faculty

In this seminar, doctoral students present and discuss recently published articles that have strong relevance to the methodological conduct of epidemiological research, or that make significant advances to the content area of specific disease etiology, prevention, prognosis, diagnosis, and treatment. In addition, faculty present their ongoing research and scholarship, and more advanced students share their prospectus and preliminary results for comment and feedback from course participants. Prerequisite: doctoral student status or permission of the instructor.

[CDE 669a, Research Seminar in Psychosocial Epidemiology]

CDE 670a and b, Advanced Field Methods in Chronic Disease Epidemiology Faculty

The course offers direct experience in field methods in chronic disease epidemiology for doctoral students who have not yet taken qualifying exams. Students are expected to actively participate as part of a research team (8–10 hours per week) doing field research in some aspect of chronic disease epidemiology. It is expected that their progress will be directly supervised by the Principal Investigator of the research project. This course can be taken for one or two terms and may be taken for credit (pass/fail). Prerequisite: doctoral student status.

EHS 502a, Physiology for Environmental Health Sciences Catherine Yeckel

The purpose of this course is to describe the basic physical properties associated with exposure to environmental stress and the physiological strategies used to maintain homeostasis in the human body. Prerequisites: biology, chemistry.

EHS 503a/F&ES 896a, Introduction to Toxicology Jonathan Borak, Cheryl Fields The course examines factors that affect the toxicity of foreign substances. The course first focuses on absorption, distribution, excretion, and metabolism and their contributions to dose-response relationships. Specific toxicological problems are then considered including the effects of metals and solvents, chemical carcinogenesis, neurotoxicology, and developmental toxicology.

EHS 505b, Introduction to Industrial Hygiene Judy Sparer

Students are introduced to the practice of industrial hygiene: the recognition, evaluation, and control of health hazards in the workplace. Several visits are made to industrial worksites. Topics include regulation of health and safety in the workplace, air sampling and interpretation of sampling results, and approaches to reducing place exposures.

EHS 507a, Environmental Epidemiology Tongzhang Zheng

Environmental epidemiology can provide insight about the association between environmental exposures of a population and adverse health outcomes. The potentials and the limitations of environmental epidemiology are explored as they are inherent in the design of suitable studies and as they manifest themselves in actual studies that have been conducted. The analysis and interpretation of such studies, as well as the consequences for the design and conduct of proposed studies, are examined. Prerequisite: CDE/EMD 508a or permission of the instructor.

EHS 508b/F&ES 897b, Assessing Exposures to Environmental Stressors

Brian Leaderer

The course examines human exposure to environmental stressors as it applies to environmental epidemiology and risk assessment. Indirect and direct methods of assessing exposures are reviewed and case studies are presented.

EHS 511b/F&ES 893b, Applied Risk Assessment Jonathan Borak, Cheryl Fields The course introduces students to the nomenclature, concepts, and basic skills of quantitative risk assessment (QRA). The goal is to provide an understanding necessary to read and critically evaluate QRA. Emphasis is on the intellectual and conceptual basis of risk assessment, particularly its dependence on toxicology and epidemiology, rather than its mathematical constructs and statistical models. Specific cases consider the use of risk assessment for setting occupational exposure limits, establishing community exposure limits, and quantifying the hazards of environmental exposures to chemicals in air and drinking water.

EHS 525a and b, Seminar in Environmental Health Faculty

Students are introduced to a wide variety of research topics, policy topics, and applications in environmental health. Faculty members, public health professionals, and students make brief oral presentations and engage in related dialogues. The course is designed to help students develop topics for their M.P.H. theses. Second-year students have the opportunity to receive feedback on their developing research. Prerequisite: permission of the instructor.

EHS 545b, Introduction to Environmental Genetics Yong Zhu

The course provides an introduction to genetic susceptibility markers and their interactions with environmental exposures in human disease development. The first part of the course covers basic concepts of human genetics that are fundamental to understanding and conducting environmental genetic studies. The second part of the course emphasizes the genetic responses and effects of exposures to environmental agents. The final part of the course utilizes profiles from gene-environment interactions to illustrate possible etiology of human diseases such as cancer and asthma.

[EHS 553b, Epidemiological Methods in Injury Control]

EHS 575a and b, Introduction to Occupational and Environmental Medicine Faculty

This yearlong course presents a broad overview of the principles of occupational and environmental medicine. In the fall term the major diseases of environmental origin are presented. In the spring term the major hazards – chemical, physical, and biologic – and the settings in which they occur are examined. Prerequisite: M.D. degree or permission of the instructor.

EHS 58ob, Environmental Hormones and Human Health Yawei Zhang

The course provides students a scientific orientation in environmental hormones and human health. The course introduces the basic concepts of four different types of hormones, including endogenous hormones, natural environmental hormones, pharmaceutical hormones, and environmental endocrine disruptors. The course discusses the current understanding of the relationship between hormones and human health, with emphasis on the methodology of studying the relationship between environmental hormones and environmental endocrine disruptors and human cancer risk. Prerequisites: CDE/EMD 508a and BIS 505a.

[EHS 585b/F&ES 898b, The Environment and Human Health]

EMD 508a/CDE 508a, Principles of Epidemiology I Robert Dubrow

The course presents an introduction to epidemiologic concepts and methods. Topics include measurement of disease rates, descriptive epidemiology, ecologic studies, cohort studies, case-control studies, cross-sectional studies, randomized controlled trials, causation, random variation and statistical significance, bias, confounding, effect modification, epidemic investigation, measurement validity, screening, and molecular epidemiology. The course utilizes a wide variety of case studies from both chronic and infectious disease epidemiology.

EMD 512a, Immunology for Epidemiologists Peter Krause

The course is designed to introduce students to the fundamentals of immunology including antigens, antibodies, methods for detecting antibodies, cells of the immune system, products of such cells, and immune mechanisms. Experience will be gained in the analysis of primary research papers with relevance to immunologic aspects of epidemiologic studies. Prerequisite: two terms of college biology.

EMD 530b, Hospital Epidemiology Louise-Marie Dembry

The history, descriptive epidemiology, surveillance methods, risk analysis methods, and economics of nosocomial infections are outlined in this introductory course. In-depth explorations of host, agent, and environmental factors influencing typical nosocomial illnesses in pediatric and adult services are reviewed by clinical faculty. Descriptive and analytical epidemiological methods are emphasized.

[EMD 536b, Investigation of Disease Outbreaks]

[EMD 542b, Biology and Epidemiology of Infectious Agents]

EMD 547b/MBIO 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 goal of designing better and more efficacious vaccines. Vaccine-preventable diseases now include many infectious diseases as well as cancer. The course briefly reviews the immunological basis of immunity to infection and disease. It then explores the basic science underlying vaccine development, current vaccine-preventable diseases, as well as vaccines under development. Prerequisites: immunology and microbiology. MW 10–11:20

[EMD 548a/ARCG 762a^U/F&ES 726a/G&G 562a^U, Remote Sensing: Observing the Earth from Space]

EMD 557b/NURS 713b, Public Health Issues in HIV/AIDS Kaveh Khoshnood An introductory, broad-based course for students of all levels interested in the epidemiology of HIV/AIDS. The course covers virology, clinical issues, natural history of infection, laboratory testing, transmission, and prevention of HIV/AIDS. Designed to give students a general, comprehensive understanding of HIV/AIDS issues, it is targeted to students beginning work in public health or HIV/AIDS, or those who wish to expand their specialized knowledge base regarding HIV/AIDS. Regular attendance at the Yale AIDS Colloquium Series (YACS) and written synopsis are required.

[EMD 560b, Epidemiologic Methods in STD/HIV Research]

EMD 565a, Modeling the Epidemiology and Evolution of Infectious Diseases Alison Galvani

The course is designed for students to develop an understanding of the ways mathematical and computational modeling can be used to explore the epidemiology and evolutionary ecology of infectious diseases. The appropriateness of alternative modeling techniques for different types of research questions is explained. Interdisciplinary approaches are highlighted, including combining epidemiology with population genetics, evolutionary biology, and economics.

EMD 572b, Ecology and Epidemiology of Vector-Borne and Zoonotic Diseases M. Diuk-Wasser

The purpose of this course is to explore factors underlying the risk to humans of acquiring vector-borne and zoonotic diseases (VBZD) like malaria, dengue, West Nile virus, Lyme disease, rabies, hantavirus, etc. Students learn how human risk for these diseases can be described and predicted by understanding the ecology of vectors and reservoirs and the factors allowing for maintenance and transmission of pathogens. The course utilizes a combination of lectures, discussion of primary literature, practical exercises on risk mapping, and guest speakers.

EMD 583b, Public Health Surveillance Amanda Durante

The course is intended to provide students with a strong foundation in public health surveillance of both infectious and noninfectious disease. The course teaches the theory and practice of surveillance, supported by many examples of surveillance systems from the developing world. The class builds on and reinforces basic epidemiological concepts. Students are given the opportunity to design and evaluate a surveillance system.

EMD 670a, 670b, 671a, Advanced Research Laboratories Christian Tschudi The course is required for all EMD graduate students and is taken for three terms. The course offers experience in directed research and reading in selected research laboratories. The first two terms must be taken in the first year of the doctoral program while the third term is normally taken in the summer after the first year. Prerequisite: doctoral student status.

EMD 680a/MBIO 680a, Molecular and Cellular Processes of Parasitic Eukaryotes

Diane McMahon-Pratt, Christian Tschudi

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.

EMD 682a, Vector-Borne Diseases: Biotechnology Applied to Disease Control

Serap Aksoy, Brian Weiss

Insects transmit many emerging and re-emerging human and agriculture-related diseases. These insect-borne diseases have a directly negative impact on public health, especially in the developing world, and can cause further indirect devastation by significantly reducing agricultural productivity and nutrient availability and exacerbate poverty and deepen disparities. The course introduces students to the major groups of important arthropod disease vectors and the pathogens they transmit. Lectures cover aspects of the ecology and physiology of arthropod vectors as they relate to pathogen transmission and disease control strategies. A major focus of the course is on evaluating the insect-based disease intervention methods. Current research trends are presented and critically evaluated. Prerequisites: biology, chemistry, microbiology, or permission of the instructors.

EPH 600b, Research Ethics and Responsibilities Christian Tschudi

The course seeks to introduce major concepts in the ethical conduct of research and some of the personal and professional issues that researchers encounter in their work. Sessions are run in a seminar/discussion format. Prerequisites: doctoral student status and permission of the instructor.

HPA 510a, Health Policy and Health Systems Mark Schlesinger

The course provides an introduction to the making and understanding of health policy. The various goals of policy making and the alternative means of achieving those goals are examined. Health issues are placed in the context of broader social goals and values. The current performance of the health care system is assessed, with particular emphasis on shifting needs, rising costs, and changing institutional arrangements. The course provides an overview of the important actors in the health care and political systems and introduces students to methods for understanding their behavior. Students apply these methods to a set of concrete policy issues.

HPA 514b, Health Politics and Policy Faculty

The course is designed to familiarize students with the various processes by which governmental health policy is made in the United States, and with current policy debates. One focus of the course is to understand the politics underlying the successes and failures of health policy making during the course of the twentieth century. This includes a discussion of the relevant governmental institutions, political actors, the major national programs that have been established, and how political actors use resources and set their strategies.

HPA 529a, Advanced Applications in Policy Analysis Patricia Keenan

The course provides students with policy analysis skills and teaches students to think critically and write succinctly about health care policy. The course integrates the study of policy analysis and the world of health politics as analysts must do in real life. The course begins broadly by thinking first about the nature of public policy and the theories of policy analysis and policy decision making. Next, eight key components of the policy analysis process are considered, and the impact of major political organizations and institutions on the process of analyzing and selecting public health care policy is jointly examined. Prerequisite: HPA 510a, 514b, or permission of the instructor.

HPA 531b/INRL 627b, Health in Societies in Transition: Eastern Europe and Former Soviet Union Teresa Janevic

The collapse of the socialist regimes of Eastern Europe and the former Soviet Union (EE/FSU) following 1989 has had a profound effect on both health care systems and population health in Eastern Europe and Central Asia. The unique social and economic transition this region has experienced has resulted in public health challenges distinct

from those of many low-income and high-income countries, along with some marked successes. The course critically reviews these issues, using a multilevel conceptual framework of the determinants of health that incorporates macro-level factors (e.g., public policy, conflict, and political economy); community-level factors (e.g., social cohesion and stress); and individual-level factors (e.g., health behavior). While each session is designed to explore a particular topic in depth, a number of crosscutting issues are addressed throughout the term: for example, human rights, inequalities in health, health and development, political and economic transition and health, demographic transition and health, and health system decentralization. A multidisciplinary perspective is welcomed in class discussion and class assignments. T 3:30–5:20

[HPA 538a, Regulation and Public Health Policy]

HPA 542a, Health of Women and Children Mary Alice Lee

The focus of this course is women's and children's health care in the United States. Emerging health issues and related health policy are presented and discussed in terms of epidemiology, including racial/ethnic disparities and effects of poverty; utilization and financing of children's health care; and existing programs and public policies that facilitate access to care. Data sources and data needs are identified. Topics may include history of MCH programs and policy, Medicaid and SCHIP, low birth weight and infant mortality, maternal mortality, reproductive health, breast and cervical cancer screening, pediatric oral health, pediatric asthma, childhood obesity, adolescent health care and teen pregnancy, children with special health care needs, childhood injuries, and injury prevention. Students are expected to critically evaluate the public health implications of selected conditions and the effect of public policy on availability, accessibility, acceptability of services, and accountability in health care for women and children.

HPA 544a, Public Law and Public Health: The Law, the Individual, and the State

John Culhane

The course provides students with a basic orientation to the law, the legal system, and legal decision making as they relate to the public's health. Emphasis is on the relation between the autonomy of the individual and the power of the state in addressing issues affecting the public's health. Topics include civil commitment, right to refuse treatment, foster care, religious practices, and seat belt and helmet laws. Issues that must be considered in assessing the state's silence, omission, intervention, or intrusion into health matters of the person, the family, or the group are discussed. Prerequisite: second-year M.P.H. status.

HPA 545b, Health Care Disparities Shelley Geballe

The course explores what constitutes and explains a disparity in health care. Emphasis is placed on studying the history of disparities in the United States in order to understand the current state of disparities, and on evaluating the effectiveness of ongoing strategies to eliminate them, such as increasing insurance coverage and the delivery of culturally competent health care. The course also examines sociological models that explain disparities in health care and requires students to evaluate and expand on these models. Prerequisites: HPA 510a and CDE 505a.

HPA 546a, Ethical Issues in Public Health Bruce Jennings

Public health policy is always the product of controversy. Scientific considerations blend with political and ethical conflicts in public health; questions of autonomy, coercion, justice, and the common good are central. The seminar discusses these issues of ethics and political theory in reference to selected public health issues such as preventive medicine and behavior modification, smoking, control of infectious disease, and contraception and teen pregnancy.

HPA 547a, Law and Ethics for Health Care Organizations Theodore Ruger

The course is a survey of legal topics important to the management of health care organizations. It is designed to acquaint the future health care manager with the basic legal issues that daily affect the provision of health care services. The course examines the relationships among the parties involved in the delivery of health care; the law of business organizations, including that of corporations and partnerships; the legal constraints that affect health care organizations, including state and federal regulatory laws, labor relations, and antitrust doctrines; and doctrines particularly applicable to managed care organizations. The course also considers a variety of emerging legal issues in the health care field.

[HPA 560b, Health Care Finance and Delivery]

[HPA 562b, Managing Performance Improvement in Health Care Delivery Organizations]

[HPA 564a, Integrated Clinical/Financial Information Management]

HPA 570a, Cost-Effectiveness Analysis and Decision Making A. David Paltiel The course introduces students to the methods of decision analysis and cost-effectiveness analysis in health-related technology assessment, resource allocation, and clinical decision making. The course aims to develop the following: (1) technical competence in the methods used; (2) practical skills in applying these tools to case-based studies of medical decisions and public health choices; and (3) an appreciation of the uses and limitations of these methods at the levels of national policy, health care organizations, and individual patient care.

HPA 580a/MGT 630a, Leadership, Organizational Behavior, and Improvement in Health Care Ingrid Nembhard

The course is designed to provide participants with an understanding of leadership and organizational behavior within health care organizations (HCOs). Increasingly, the Institute of Medicine and other leading health agencies point to expertise in leadership and organizational behavior as key determinants of HCOs' effectiveness and ability to improve the quality of care delivered to patients. Like any organization, HCOs consist of individuals, typically working in groups to deliver services within environmental and organizational constraints. However, the health care system presents heightened challenges for leading and managing HCOs. In this course, students become skilled at identifying the forces that challenge the effective management of HCOs at multiple levels – individual, group, and organization. Moreover, they become skilled at developing and analyzing efforts to improve HCOs' performance. Through case studies, readings,

in-class exercises, and class discussions, participants learn analytic frameworks, concepts, tools, and skills necessary for leading and managing organizational learning, innovation, and overall performance improvement in health care organizations.

HPA 583b, Methods in Health Services Research Faculty

The course introduces students to both quantitative and qualitative methods for research in health services. Topics include research objectives and hypotheses formulation, study design, sampling techniques, measurement, data analysis, results presentation, and discussion. Students synthesize these skills in the final paper. Prerequisite: BIS 505a.

HPA 586b, Microeconomics for Health Care Professionals Faculty

The course introduces students to microeconomics. Emphasis is placed on topics in microeconomics of particular relevance to the health care sector. Attention is paid to issues of equity and distribution, uncertainty and attitudes toward risk, and alternatives to price competition. The course is designed for students with minimal previous exposure to economics.

HPA 587b, Health Care Economics Susan Busch

The course applies the principles learned in Microeconomics for Health Care Professionals (HPA 586b) to the health of individuals, to health care institutions and markets, as well as to health care policy. The economic aspects of health behaviors, hospital markets, cost-benefit analysis, regulation, and the market for physician services are covered. Prerequisite: microeconomics or permission of the instructor.

[HPA 590b, Economics of Drugs and Crime]

HPA 592a/NURS 723a, Concepts and Principles of Aging Meredith Wallace

This multidisciplinary course provides the major concepts and principles of gerontology. Students are introduced to a variety of theories of aging in the biopsychosocial spheres. Delivery systems of care for the elderly are explored along with recent social policy initiatives as they relate to the elderly. Research initiatives are presented throughout the course.

HPA 592b/INRL 528b^U, Strategic Thinking in Global Health Elizabeth Bradley,

Leslie Curry, Michael Skonieczny

The course defines and applies a set of core principles regarding development and implementation of grand strategy and problem solving in global health. Students understand and apply principles of grand strategy and strategic problem solving, which are taught at both a conceptual and a practical level as applied to common problems in global health. Students develop expertise in political and policy analysis as well as organizational theory and leadership skills that are central to addressing global health issues in lowand middle-income countries. M 3:30-5:30, 2 HTBA

HPA 595b, Social, Economic, and Political Dimensions of Development

Jennifer Prah Ruger

The course provides a framework for understanding social, economic, and political dimensions of development and examines how these dimensions impact individuals, groups, and communities, particularly the health and well-being of disadvantaged and at-risk populations in developing countries. The course explores how social, economic,

and political forces and frameworks shape social justice, institutions, and policy and analysis in developing and transitioning economies. It explores a range of issues, trends, and forces within each of the three dimensions of development and as they relate to individual and population health. The focus is primarily international, and case studies from developing and transitioning economies are used. In general the course presents a multidimensional view of the political economy of development through in-depth qualitative research on the conceptualization and meaning of poverty, and qualitative and quantitative research on the determinants of economic opportunities, the role of institutions in empowering individuals, and the role of public finance in social-sector development. A major theme is the philosophical foundations that underlie the field of development and that distinguish different development paradigms.

HPA 598a, Medicaid/SCHIP – Increasing Access to Care for Low-Income Children and Families Mary Alice Lee

In this course, Medicaid and SCHIP are examined and evaluated in terms of program history, eligibility, enrollment trends, benefits, financing, and program administration. Factors that contribute to eligible children being uninsured are identified and discussed. The effect of SCHIP on uninsured children and enrollment in Medicaid is examined. Eligibility and benefits for other adults (elderly and disabled) are discussed. Emerging issues, including the impact of state budget crises, Medicare prescription drug coverage, federal budget, and other factors are identified and assessed in terms of possible effects on eligibility, enrollment, and benefits. Prerequisites: HPA core courses.

HPA 599a/INRL 524a/LAW 20576/PHIL 709a/PLSC 594a, Global Health Ethics,

Politics, and Economics Thomas Pogge, Jennifer Prah Ruger

Billions lack access to basic medical care, and global health inequalities are wide and growing. Such radical disparities cast doubt on the justice of supranational institutional arrangements (such as the TRIPS Agreement) and also pose ethical challenges for the global health community, especially international and domestic health and development institutions. Seeking to illuminate the normative issues involved, the course features a series of distinguished visitors, including academics as well as a few important representatives of international organizations, politics, foundations, NGOs, and relevant industries. Follows Law School academic calendar. T 10:10–12

HPA 600a and b, Readings in Health Services Research and Policy Faculty

The seminar explores current and cutting-edge topics in the broad fields of community and personal health services. It is designed to familiarize students with a breadth of research opportunities. Students review existing research projects and critique recent research publications. Prerequisite: doctoral student status or permission of the instructor.

[HPA 603b, The Ethical Conduct of Research]

HPA 617a, Colloquium in Health Policy and Health Services Research I

Jody Sindelar, Susan Busch

The seminar focuses on the analysis of current issues in health policy and on stateof-the-art methodological issues in health services research. The format includes guest speakers and presentations by EPH as well as other faculty and graduate students of ongoing research projects. Students participate in critical discussions of the issues that arise in both types of sessions. Prerequisite: doctoral student status or permission of the instructors.

HPA 617b, Colloquium in Health Policy and Health Services Research II

Jody Sindelar, Susan Busch

The seminar includes in-depth discussions of major policy concerns in the health and health care of vulnerable populations such as the poor, young, old, and disabled. The seminar also includes student presentations of their own research. Prerequisite: doctoral student status or permission of the instructors.

HPA 650a, Colloquium on Mental Health Services Research I Jason Fletcher

The seminar focuses on state-of-the-art methods in the evaluation and measurement of need for treatment and organization of mental health services. Students review ongoing research projects and develop research on the use of mental health services, prepare annotated bibliographies, and participate in the examination of relevant issues. Prerequisite: doctoral student status or permission of the instructor.

HPA 650b, Colloquium on Mental Health Services Research II

Jody Sindelar, Susan Busch

The seminar focuses on social and cultural factors in the development, diagnosis, treatment, and prevention of mental illness. Attention is given to the underlying theory and research in the social epidemiology of mental illness and the relation between stress and psychiatric status. The seminar also includes student presentations of their own research in mental health services and/or social psychiatry. Prerequisite: doctoral student status or permission of the instructors.

EUROPEAN AND RUSSIAN STUDIES

The MacMillan Center 342 Luce Hall, 203.432.3423 www.yale.edu/macmillan/europeanstudies M.A.

Chair Philip Gorski

Director of Graduate Studies

Adam Tooze (344 Luce, 203.432.3423)

Professors Bruce Ackerman (Law), Julia Adams (Sociology), Rolena Adorno (Spanish & Portuguese), Vladimir Alexandrov (Slavic Languages & Literatures), Dudley Andrew (Film Studies), Dirk Bergemann (Economics), R. Howard Bloch (French), Paul Bracken (Management), David Bromwich (English), Paul Bushkovitch (History), David Cameron (Political Science), Katerina Clark (Slavic Languages & Literatures), Mirjan Damaška (Law; Emeritus), Carlos Eire (History), Laura Engelstein (History), Paul Freedman (History), John Gaddis (History), Bryan Garsten (Political Science), John Geanakoplos (Economics), Harvey Goldblatt (Slavic Languages & Literatures), Bruce Gordon (Divinity), Philip Gorski (Sociology), Robert Greenberg (Adjunct; Slavic Languages & Literatures), Benjamin Harshav (Comparative Literature), Paula Hyman (History), Stathis Kalyvas (Political Science), David Kastan (English), Paul Kennedy (History), John MacKay (Slavic Languages & Literatures), Lawrence Manley (English), Ivan Marcus (History), Millicent Marcus (Italian), Robert Nelson (History of Art), Steven Pincus (History; on leave), David Quint (English), Susan Rose-Ackerman (Law), Nicholas Sambanis (Political Science), Maurice Samuels (French), Frank Snowden (History), Timothy Snyder (History), Alec Stone Sweet (Law), Peter Swenson (Political Science), Ivan Szelenyi (Sociology), Adam Tooze (History), Francesca Trivellato (History), Katie Trumpener (Comparative Literature), Frank Turner (History), Tomas Venclova (Slavic Languages & Literatures), Miroslav Volf (Divinity), James Whitman (History), Jay Winter (History), Keith Wrightson (History)

Associate Professors Bruno Cabanes (*History*), Keith Darden (*Political Science*), Stefanie Markovits (*English*)

Assistant Professors Karuna Mantena (*Political Science*), Douglas Rogers (*Anthropology*), Youval Rotman (*History*), Marci Shore (*History*), George Charles Walton (*History*)

Senior Lectors Irina Dolgova, Krystyna Illakowicz, Rita Lipson, Constantine Muravnik, George Syrimis (*Hellenic Studies*), Julia Titus, Karen von Kunes

The European Studies Council formulates and implements new curricular and research programs to reflect current developments in Europe. The geographical scope of the council's activities extends from Ireland to the lands of the former Soviet Union. Its concept of Europe transcends the conventional divisions into Western, Central, and Eastern Europe, and includes the Balkans and Russia. In 2006 the U.S. Department of Education again

designated the council a National Resource 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. The requirements permit students to choose a particular national or thematic focus, geared to their individual interests and language skills, while requiring that they 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 may concern Europe-wide problems or the countries of Central or Western Europe. In this way, the program translates the political realities and challenges of the post-Cold War era into a flexible and challenging academic opportunity.

Fields of Study

European languages and literatures; economics; history; political science; law; music; sociology.

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. Students are required to take at least one course in at least three of the four fields relevant to the program, specifically, history, literature, social sciences, and law (i.e., three courses altogether). For the purposes of this program, "history" includes history of art, history of science, and history of music. One of the sixteen term courses may be taken for audit. 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. If students take a course of language study to fulfill degree requirements, 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 L4 or better proficiency in two European languages besides 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.

Through agreements the MacMillan Center has negotiated with the professional schools, CES now offers joint master's degrees with the School of Forestry & Environmental Studies, the Law School, the School of Management, and the School of Public Health. Application for admission must be made both to the Graduate School and to the appropriate professional school, with notation made on each application that this is to be considered for the joint-degree program. 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 no later than April 10 of the student's second year.

Program materials are available upon request to the European Studies Council, Yale University, PO Box 208206, New Haven CT 06520-8206.

Courses

E&RS 642b, Topics in European & Russian Studies: Rules, Numbers, and Wisdom Philippe Urfalino

Each year this course focuses on the specialty of the visiting professor from the École des Hautes Études en Sciences Sociales (France). This course is about collective decision making as a meaningful, social process, as opposed to a simple aggregation of preferences. The course draws on work from a wide range of disciplines and fields, including political science, political philosophy, social choice theory, philosophy of law, and anthropology, and will employ case studies of actual decision-making processes in the European Council, African palabra, scientific committees, constitutional courts, monastic and episcopal elections, and ancient and modern political assemblies. Centered on the history, the choice, and the justifications of rules of collective decision making (unanimity, supermajority, absolute majority, and apparent consensus), the course focuses on the persistent importance of the concern for the quality of decisions in the functioning of collective decisions, including our use of majority rules. Well beyond the medieval church, our modern collective decisions are still characterized by the concern for reconciling numbers and wisdom.

E&RS 652b/INRL 549b, The European Union's Contemporary Challenges

Tassos Belessiotis

Each year, the course addresses a different set of issues facing the EU. Recent issues have included trade policy, regulation policy, building European monetary power, international trade policy and the WTO, and science, precaution, and policy making. The course is taught by the EU fellow visiting the MacMillan Center. HTBA

E&RS 900a or b, Proseminar in European & Russian Studies Faculty

This seminar is required for first-year European & Russian Studies M.A. students. It introduces the various topics, issues, research, and faculty encompassed by the European Studies Council.

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 www.yalepath.org/edu/ExPath/index.htm M.S., M.Phil., Ph.D.

Chair

Jon Morrow

Director of Graduate Studies

Gerald Shadel (BML 371, 203.785.2475, gerald.shadel@yale.edu)

Professors Richard Bucala (Internal Medicine), David Chhieng, Young Choi, José Costa (Internal Medicine/Oncology), S. Evans Downing (Emeritus), Gary Friedlaender (Orthopaedics), Earl Glusac (Dermatology), Robert Homer, S. David Hudnall, Michael Kashgarian (Emeritus, Molecular, Cellular & Developmental Biology), Jung Kim (Emeritus), Diane Krause (Laboratory Medicine), Paul Lizardi, Joseph Madri, Nita Jane Maihle (Obstetrics, Gynecology & Reproductive Sciences), Vincent Marchesi (Director, Boyer Center for Molecular Medicine; Cell Biology), Jennifer McNiff (Dermatology), Mark Mooseker (Molecular, Cellular & Developmental Biology), Jon Morrow (Molecular, Cellular & Developmental Biology), Jordan Pober (Immunobiology; Dermatology), David Rimm, Marie Robert (Internal Medicine), John Rose, Gerald Shadel, John Sinard (Ophthalmology), Jeffrey Sklar (Laboratory Medicine), David Stern, Fattaneh Tavassoli (Obstetrics, Gynecology & Reproductive Sciences), A. Brian West, Raymond Yesner (Emeritus)

Associate Professors Marcus Bosenberg (*Dermatology*), Demetrios Braddock, Janet Brandsma (*Comparative Medicine*), Shawn Cowper (*Dermatology*), G. Kenneth Haines III, Liming Hao, Pei Hui, Dhanpat Jain, Christine Ko (*Dermatology*), Diane Kowalski (*Surgery/Otolaryngology*), Michael Krauthammer, Gary Kupfer (*Pediatrics*), Themis Kyriakides, Rossitza Lazova (*Dermatology*), Wang Min, Gilbert Moeckel, Vinita Parkash, Manju Prasad, Michael Robek, Antonio Subtil-Deoliveira (*Dermatology*), David Tuck, Alexander Vortmeyer

Assistant Professors Adebowale Adenrian, Veerle Bossuyt, Natalia Buza, Guoping Cai, Paul Cohen, Akosua Domfeh, Angela Galan, Malini Harigopal, Michael Hurwitz (*Yale Cancer Center; Medicine*), Anita Huttner, Barton Kenney, Sihem Khelifa, Steven Kleinstein, Angelique Levi, Robert Means, Kisha Mitchell, Don Nguyen, Marguerite Pinto, Katerina Politi (*Yale Cancer Center*), Ozlen Saglam, Constantine Theoharis, Narendra Wajapeyee, Zenta Walther, Qin Yan, Eduardo Zambrano

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 Pharmacological Sciences and Molecular Medicine track, within the interdepartmental graduate program in the Biological and Biomedical Sciences (see the entry on Biological and Biomedical Sciences, under Non-Degree-Granting Programs, Councils, and Research Institutes).

Special Requirements for the Ph.D. Degree

Course requirements Experimental Pathology students must take PATH 650b, Cellular and Molecular Biology of Cancer, and PATH 690a, Molecular Mechanisms of Disease. Three additional 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 MB&B 676b, Responsible Conduct of Research.

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.

- 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 fellow-ship 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.

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. With the approval of the DGS and associate dean, some courses taken toward the M.D. degree can be counted toward the five courses required for the Ph.D., although PATH 650b, Cellular and Molecular Biology of Cancer, and PATH 690a, Molecular Mechanisms of Disease, are still required.

Master's Degrees

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 one year of the doctoral program and received a grade of Honors in at least two core courses (i.e., excluding rotations and seminar courses).

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.

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, www.yalepath.org/edu/ExPath/index.htm.

Courses

Note: Pathology 600, 616, 617, and 618b are primarily geared toward medical students, but may be taken by graduate students with the permission of the director of medical studies.

PATH 600, Pathological Basis of Human Disease David Rimm 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 special organs and systems. Correlation of the clinical and anatomical manifestations is emphasized. For EPH graduate students and MSTP students who are required to take PATH 100 for graduate credit.

PATH 616, Autopsy Pathology John Sinard and staff

Participation in the autopsy service with members of the house staff in Pathology. Participation in autopsies and the presentation and review of the clinical and anatomical findings of postmortem examinations with senior members of the department. Opportunities exist for correlation studies with previous biopsies, and clinical investigative and cell biologic techniques in relation to necropsy material. Six weeks minimum, full-time. Enrollment limited to two students.

PATH 617, Anatomic Pathology A. Brian West and staff

The department offers an elective to medical students in the third and fourth years that provides a broad experience in general diagnostic techniques. Students have opportunities to participate in surgical pathology, cytology (including fine-needle aspiration), and autopsy. A daily diagnostic conference is scheduled for both residents and students, and an additional two hours of conference are provided each week exclusively for the students. In addition to direct responsibilities in the handling of the cases, the student has the opportunity to apply the special techniques of electron microscopy, immunohistochemistry, and flow cytometry. A minimum of four weeks is suggested for this elective. Five students are accommodated every four to six weeks.

PATH 618b, Clinical and Pathologic Correlates in Renal Disease

Michael Kashgarian

A series of clinical pathologic conferences designed to illustrate clinicopathologic correlates in renal disease. At each session, one student acts as clinician and another as pathologist in the evaluation and discussion of case material from autopsies or renal biopsies. Discussions are informal, but require preparation in advance and all participants are expected to contribute in each session. One two-hour session per week for six weeks. Given once in spring term. Limited to twelve students. **PATH 620a and b, Laboratory Rotations in Experimental Pathology** Gerald Shadel Laboratory rotations for first-year graduate students.

PATH 630b, Biomaterial-Tissue Interactions Themis Kyriakides

An in-depth survey of the interactions between tissues and biomaterials, with an emphasis on the molecular- and cellular-level events that influence the performance and longevity of clinically relevant devices. Background in chemistry and cell biology is assumed. Open to advanced undergraduates with permission of the organizer. TH 9–10:15

PATH 650b, Cellular and Molecular Biology of Cancer David Stern, Robert Means 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 670b, Biological Mechanisms of Reaction to Injury Michael Kashgarian,

Jon Morrow, Joseph Madri, 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.

PATH 680a, Seminar in Pharmacology and Molecular Medicine

Readings and discussion in topics relevant to cell biology, signal transduction, immunology, and molecular medicine. The overall theme of the papers discussed is pathogenesis of human infectious disease. The class emphasizes analysis of primary research literature and development of presentation skills. M $_{3-5}$

PATH 690a, Molecular Mechanisms of Disease Michael Robek

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 STUDIES

53 Wall Street, Rm. 216, 203.436.4668 www.yale.edu/filmstudiesprogram M.Phil., Ph.D.

Chair John MacKay

Director of Graduate Studies Brigitte Peucker (308 WLH, brigitte.peucker@yale.edu)

Professors Dudley Andrew,* Ora Avni, David Bromwich, Hazel Carby, Francesco Casetti* [F], Katerina Clark,* Michael Denning, Thomas Elsaesser (*Visiting* [Sp]), John Mack Faragher, David Joselit, Thomas Kavanagh,* John MacKay,* Millicent Marcus,* Christopher L. Miller, Charles Musser,* Alexander Nemerov, Brigitte Peucker,* Joseph Roach, Michael Roemer, Katie Trumpener,* Laura Wexler

Associate Professors Moira Fradinger, Terri Francis,* Aaron Gerow*

Assistant Professor Karen Nakamura

Senior Lecturer Ronald Gregg*

*Member of the Graduate Committee

Fields of Study

Film Studies is an interdisciplinary field drawing on the study of the history of art, national cultures and literatures, literary theory, philosophy, anthropology, and other areas. To study film at Yale, every doctoral student must be accepted into a combined program involving another discipline. Film 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, 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.

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 Studies entrance requirements but with those of the other graduate program as well. Since combined-program applicants must be admitted by both Film 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 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 www.yale.edu/graduateschool/admissions. In the "Programs of Study" section of the application, the applicant should do the following: choose Film 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 Studies program and the relevant participating department. A written protocol between each department and Film 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 Studies and the director of graduate studies of the participating department. In all cases, students are required to take two core seminars in Film Studies (FILM 601 and FILM 603) as well as at least four additional Film 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 a qualifying examination and a dissertation prospectus.

- 1. Qualifying examinations follow the regulations of the participating department with at least one member of the Film Studies Graduate Committee participating.
- 2. The dissertation prospectus is presented to a faculty committee involving at least one member of the other department who is not a member of the Film Studies Graduate Committee and may include the entire faculty of that other department. The prospectus is also circulated to the entire Film Studies Graduate Committee for their information and ratification. Once the student and dissertation adviser deem the dissertation finished or near completion, a defense shall be held involving at least one member of the Film Studies Graduate Committee and one member of the participating department who is not on that committee.

The faculty in Film 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.

Master's Degree

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

Courses

FILM 603a/AMST 814a, Historical Methods in Film Study Charles Musser Engages a range of historiographical issues in film studies including the roles of technology, exhibition, and spectatorship as well as topics such as intermediality and intertextuality. A range of methodological approaches is considered. Particular attention is given to the interaction between scholars and archives. T 1:30–3:20, screenings M 7–10

FILM 609a/CPLT 521a, Issues in World Literature and Cinema Dudley Andrew Can there be a disciplinary "area" entitled World Literature or World Cinema, or does the adjective "world" defy perimeters? Undergraduate courses and textbooks with "world" in their title have proliferated this century, but what are they aiming to define, organize, and explore? What topics, principles, methods, and conundrums do they address? This seminar aims to quickly survey the history of the "world quest" of literary studies from Goethe to Moretti, and to see if the more recent shift from International to World Cinema marks a parallel quest or something entirely different. All participants debate key texts and essays by literary scholars (Damrosch, Casanova, Pendergast, B. Anderson, et al.) and by film scholars (see *World Cinema/Transnational Perspectives*). We formulate one common seminar project to try out the kind of collaborative research often required by the scale of this "area." And each participant pursues an essay on one problem lurking today in literary or film history as these fields are pushed to a geographical limit. Questions could concern corpus, system, distribution, influence, translation, mediation, genre, and so on. TH 9:25–11:15

FILM 625a^U/CPLT 903a/HSAR 726a, Media and the Logic of Repetition

Francesco Casetti

By its very name, "media" seldom connotes originality, yet cultures grow in new ways through media. New stories or topics most often are variations on original texts or ideas. The seminar confronts this conundrum by analyzing a set of textual practices that are all defined by the presence of a repetition: a text retakes, borrows, copies, or extends a previous text. Repetition functions in parallel with other media practices: technical reproduction (which eliminates the idea of "original"); the extension of narrative (which blurs the boundary of a text); the emphasis given genre and formula (which strengthens the role of text-type); or intermediality itself (which dismantles the idea of a homogeneous discursive field). The course focuses on how repetition works in media, where it is rooted, and what concepts it is connected to. Repetition is analyzed from the point of view of semiotics, cultural history, and philosophy (with reference to scholars such as Barthes, Eco, Benjamin, Deleuze, but also to debates on film and adaptation, film genres, etc.). TH 1:30–3:20

FILM 635b/ITAL 596b, New Italian Cinema Millicent Marcus

The course is dedicated to an examination, at once panoramic and detailed, of Italian filmmaking since the year 2000. Despite dire predictions of the medium's decline, new developments and emerging talents have contributed to a revival of the cinematic art within the context of a constantly changing cultural environment. The course is organized around a series of case studies that reveal the rise of new auteurs, the formation of generic trends, and the updating of the traditions and conventions that typified an

earlier age. Of special interest is the "postmodernization" of filmic language and its problematic relationship to the tradition of realism, with its imperative to civic "reference." Technological issues, above all the shift from analog to digital filmmaking, are among our concerns in the course. We screen a film each week and devote the seminar to a close interpretation of the work, making extensive use of video clips, and relating our analysis to the theoretical and critical issues that necessarily arise. A tentative list of the films includes *I cento passi; La finestra di fronte; Il Divo; Gomorra; Il vento fa il suo giro; Buongiorno, notte; Romanzo criminale; Fame chimica;* and, in a flashback to the 1990s, *Caro diario*. W 3:30–5:20, screenings SU 7:30–10

FILM 734b/AMST 823b, Digital Documentary and the Internet Charles Musser

In the last fifteen years, new media technologies have transformed the moving image documentary. Modes of production, distribution, exhibition, promotion, and spectatorship have all undergone fundamental changes. The course explores this new world of documentary by looking at the ways established filmmakers such as Errol Morris, television stations – particularly PBS – activist groups such as Witness, and semiprofessional/amateur videomakers have made use of today's rapidly changing media formation. M 3:30–5:20, screenings SU 7

FILM 743a^U, Theory of Media John MacKay, Francesco Casetti

In this course we consider some of the main issues in media studies, including the relationship among commodity, artwork, and networks of exchange; media and public sphere; the analysis of radio and television; alternative or counter-hegemonic conceptions of media; and the viability of the concept "media" itself. The authors we discuss include Marshall McLuhan, Walter Benjamin, Bertolt Brecht, T. W. Adorno, John Grierson, Stanley Cavell, Roland Barthes, Guy Debord, Jürgen Habermas, Hans Magnus Enzensberger, Fredric Jameson, Raymond Williams, Jean Baudrillard, Régis Debray, and Arjun Appadurai. We also look at works by Dziga Vertov, Seoungho Cho, Vsevolod Pudovkin, Eija-Liisa Ahtila, Humphrey Jennings, Jean-Luc Godard, Ken Loach, Jon Alpert, Chris Burden, Richard Serra, Guy Ben-Ner, and many others, alongside television shows like *The Honeymooners, It Could Be You, The X-Files*, and *Good Morning America.* MW 10:30–11:20, 1 HTBA, screenings W 7–9

FILM 757a^U/CPLT 633a^U/FREN 755a^U, French New Wave Dudley Andrew

This lecture course lays out "the idea of cinema" that developed in the wake of World War II as French critics inaugurated the New Wave school around 1960. The intellectual development of directors such as Truffaut, Godard, and Rohmer is seen via texts by Bazin, Rivette, Robbe-Grillet, and Barthes. Postwar cultural life led to a new film aesthetic from Bresson and Cocteau through the masterworks of the New Wave, affecting the 1968 generation right up to Assayas and Desplechin today. Graduate discussion section. Knowledge of French required. MWF 11:30–12:20, screenings M 6:30–10

FILM 762a^U/GMAN 633a^U, Weimar Cinema Brigitte Peucker

The German cinema, 1919–1930. Expressionist films and films of the New Objectivity. The pressures of technology and the other arts – especially painting – on cinema; issues of spectatorship, visual pleasure, and distraction in the context of a national cinema. Readings by Simmel, Kracauer, Benjamin, and others. Films by Murnau, Lang, Pabst,

Lubitsch, Brecht, von Sternberg, and others. Conducted in English, with readings in English. T 3:30–5:20, screenings SU 7

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. W 1:30-3:20

FILM 828b/CPLT 527b/RUSS 746b, Art and Ideology Katerina Clark

Examination of texts identified as ideological art, focusing on the relationship between the conventions they use and the ideology they seek to advance. Theoretical readings include works by Benjamin, Jameson, Lukács, Bakhtin, Marx, Althusser, and Judith Butler; literary works by Balzac, Brecht, Tretiakov, Ostrovsky, Orwell, Koestler, and others; films by Eisenstein, Leni Riefenstahl, and others. W 1:30–3:20

FILM 841b/HSAR 710b, Art, Media, and Space David Joselit, Francesco Casetti The prevalence of site-specific artworks (ranging from performance to sculpture) has arisen alongside a dramatic expansion of media in urban environments, making space a newly relevant "medium." Like any experience, aesthetic and communicative images are not only embedded in a cultural context, nor only embodied in a social subject; they are also grounded as individual enunciations in a particular time and place. Art and media *take place* in the double sense of happening as an event and of seizing – or taking – space. The seminar explores the subtle relations between images – both artworks and media – and their surroundings, the capacity of images to become environments in themselves, the transitions from a space to another, and the effects of these dynamics on the symbolic economy and regimes of discipline. Readings include texts by Henri Lefebvre, Michel de Certeau, Michel Foucault, and Arjun Appadurai. Artists and filmmakers under consideration range from Woody Allen to Harun Farocki. W 1:30–3:20

FILM 861b/CPLT 632b, World War II Narratives: Home Fronts Katie Trumpener Taking a pan-European perspective, the course examines quotidian, civilian experiences of war during a conflict of unusual scope and duration. Considering key works of wartime and postwar fiction alongside diaries, memoirs, and films, we explore the

kinds of literary reflection war occasioned, how civilians experienced the relationship between history and everyday life (both during and after the war), children's experience of war, and the ways that home front, occupation, and concentration camp memories shaped postwar avant-garde aesthetics. Novels and autobiographical fiction by Elio Vittorini, Anna Seghers, Irène Némirovsky, Elizabeth Taylor, Elizabeth Bowen, Tadeusz Borowski, Georges Simenon, Harry Mulisch, Jiří Weil, Jorge Semprún, Miron Białoszewski, Christa Wolf. Diaries and memoirs by Victor Klemperer, Anne Frank, and Sarah Kofman. Films by Humphrey Jennings, Andrzej Munk, Theo Angelopoulos, Péter Forgács. M 9:25–11:15, screenings SU 6–10

FILM 871b/JAPN 871b, Readings in Japanese Film Theory Aaron Gerow

Theorizations of film and culture in Japan from the 1910s to the present. Through readings in the works of a variety of authors, the course explores both the articulations of cinema in Japanese intellectual discourse and how this embodies the shifting position of film in Japanese popular cultural history. T 1:30–3:20

FILM 900, Directed Reading Faculty

FILM 901, Individual Research Faculty

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

David Skelly (208 Kroon, 203.432.3603, david.skelly@yale.edu)

Professors Mark Ashton, Gaboury Benoit, Graeme Berlyn, Benjamin Cashore, Peter Crane, Michael Dove, Daniel Esty, Thomas Graedel, Timothy Gregoire, Xuhui Lee, Robert Mendelsohn, Chadwick Oliver, Peter Raymond, James Saiers, Oswald Schmitz, David Skelly, John Wargo

Associate Professors Michele Bell, Marian Chertow, Matthew Kotchen, Sheila Olmstead, Karen Seto

Assistant Professors Robert Bailis, Mark Bradford, Alexander Felson, Karen Hébert, Nadine Unger, Julie Zimmerman

Non-Ladder Faculty Paul Anastas, Shimon Anisfeld, Ellen Brennan-Galvin, Richard Burroughs, Ann Camp, Carol Carpenter, Susan Clark, Amity Doolittle, Paul Draghi, Helmut Ernstberger, Gordon Geballe, Bradford Gentry, John Grim, Arnulf Grubler, Lloyd Irland, Anthony Leiserowitz, Reid Lifset, Florencia Montagnini, Rajendra Pachauri, Jonathan Reuning-Scherer, Mary Evelyn Tucker

Courtesy Joint Appointments Michelle Addington, Ruth Blake, Kelly Brownell, Adalgisa (Gisela) Caccone, David Cromwell, Michael Donoghue, Menachem Elimelech, Robert Evenson, Durland Fish, Willis Jenkins, Brian Leaderer, William Mitch, William Nordhaus, Jeffrey Powell, Richard Prum, James Scott, Kalyanakrishnan Sivaramakrishnan, Ronald Smith, Karl Turekian, Ernesto Zedillo

Visiting Faculty, Fellows, Adjunct Faculty, and Faculty with primary appointments elsewhere Dale Bryk, Maureen Burke, Douglas Daly, Mary Beth Decker, William Ellis, Michael Ferrucci, James Fickle, Emil Frankel, Lawrence Kelly, Roy Lee, Lin Heng Lye, James Lyons, James MacBroom, David Mattson, Fabian Michaelangeli, Julie Newman, John Nolon, Michael Northrop, Christine Padoch, Charles Peters, Stephen Ramsey, Nicholas Robinson, Marjorie Shansky, Dennis Stevenson, Fred Strebeigh, Charles Dana Tomlin, William Vance, Gary Yohe

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 the Doctoral Student Seminar before the second term 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, and one copy to the library of the School of Forestry & Environmental Studies. 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.

In addition to all other requirements, students must successfully complete E&EB 545b, Problems in Bioethics/Ethics Course for Advanced Topics, prior to the end of their first year of study.

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.

FOUNDATIONS

F&ES 500a/E&EB 665a^U, Landscape Ecology F&ES 505a, Economics of the Environment F&ES 510a, Introduction to Statistics in the Environmental Sciences F&ES 515a, Physical Science for Environmental Problems 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

INTEGRATIVE FRAMEWORKS

F&ES 600b, Linkages of Sustainability F&ES 610a, Science to Solutions: How Should We Manage Water? F&ES 620b, Integrative Assessment

CAPSTONE

F&ES 950b, Life Cycle Assessment Practicum F&ES 951b, Managing the Global Carbon Cycle F&ES 952b, Property Rights and Natural Resource Management

ECOLOGY

Ecosystem Ecology

[F&ES 730a, Ecosystem Analysis]
F&ES 731b, Tropical Field Botany
F&ES 732a, Tropical Forest Ecology: The Basis for Conservation and Management
F&ES 733b, Ecosystem Pattern and Process
F&ES 734a, Biological Oceanography
[F&ES 735a, Biogeography and Conservation]

Wildlife Ecology and Conservation Biology

[F&ES 736b, Ecology Seminar]
[F&ES 737a, Biodiversity Conservation]
[F&ES 738a/E&EB 670a^U, Aquatic Ecology]
[F&ES 739b, Species and Ecosystem Conservation: An Interdisciplinary Approach]
F&ES 740b, Dynamics of Ecological Systems

Environmental Education and Communication

F&ES 745a, Environmental Writing F&ES 746a, Archetypes and the Environment F&ES 747a, Global Communication Skills F&ES 900a, Doctoral Student Seminar

FORESTRY

Forest Biology

F&ES 650b, Fire: Science and Policy
[F&ES 651b, Forest Ecosystem Health]
[F&ES 652b, Seminar in Ecological Restoration]
F&ES 653b, Agroforestry Systems: Productivity, Environmental Services, and Rural Development
F&ES 654a/MCDB 660a, Structure, Function, and Development of Trees and Other Vascular Plants
F&ES 656b, Physiology of Trees and Forests
F&ES 671a, Natural History and Taxonomy of Trees

Forest Management

F&ES 657b, Managing Resources [F&ES 657b, Managing Resources 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 of Silvicultural Problems] F&ES 662a, Seminar in Advanced Silviculture [F&ES 662a, Invasive Species: Ecology, Policy, and Management] F&ES 664a, Financial Analysis for Land Management F&ES 666a, Management Plans for Protected Areas [F&ES 667a, Rapid Assessments in Forest Conservation] F&ES 668b, Field Trips in Forest Resource Management and Silviculture F&ES 669b, Forest Management Operations for Professional Foresters F&ES 670b, Southern Forest and Forestry Field Trip

PHYSICAL SCIENCES

Atmospheric Sciences

F&ES 700b, Alpine, Arctic, and Boreal Ecosystems Seminar [F&ES 702b, Climate Change Seminar] F&ES 703b, Climate and Life [F&ES 704a, A Biological Perspective of Global Change] [F&ES 722b, Boundary Layer Meteorology]

Environmental Chemistry

F&ES 706b, Organic Pollutants in the Environment F&ES 707b^U/ENAS 640b, Aquatic Chemistry [F&ES 708a, Biogeochemistry and Pollution] F&ES 743a^U, Environmental Chemical Analysis F&ES 773a, Air Pollution F&ES 777b, Water Quality Control

Soil Science

F&ES 709a, Soil Science [F&ES 723b, Seminar in Soil Conservation and Management]

Water Resources

F&ES 710b, Coastal Governance
[F&ES 712b, Water Resource Management]
[F&ES 713a, Coastal Ecosystems: Natural Processes and Anthropogenic Impacts]
F&ES 714b, 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/760a, Natural Science Research Methods
F&ES 551a, Social Science Qualitative Research Methods
F&ES 552b, Master's Student Research Colloquium
[F&ES 726a/ARCG 762a^U/EMD 548a/G&G 562a^U, Remote Sensing: Observing the Earth from Space]
F&ES 751a, Sampling Methodology and Practice
F&ES 753b, Regression Modeling of Ecological and Environmental Data
F&ES 756a, 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 780a, Seminar in Forest Inventory]
F&ES 781b, Applied Spatial Statistics
F&ES 912a,b, Preparation for Research

SOCIAL SCIENCES

Economics

F&ES 802b, Valuing the Environment

F&ES 803b, Green Markets: Voluntary and Information Approaches to Environmental Management

F&ES 804a, Economics of Natural Resource Management

F&ES 805b, Doctoral Seminar in Environmental Economics

F&ES 810b, Agriculture and the Environment

F&ES 811b, Environment and Development: An Economic Approach

F&ES 890a/MGT 820a, Energy Markets Strategy
Environmental Policy

F&ES 807a/MGT 688a, Environmental Management and Strategic Advantage [F&ES 808b, International and Comparative Forestry Policy and Governance] [F&ES 809a, Environmental Policy Analysis for an Unpredictable World] F&ES 813b, Emerging Markets for Ecosystem Services F&ES 815a, The New Corporate Social Responsibility: Public Problems, Private Solutions, and Strategic Responses [F&ES 818a, Technology, Society, and the Environment] F&ES 819b, Strategies for Land Conservation F&ES 820a, Local Environmental Law and Land Use Practices [F&ES 821a, Private Investment and the Environment: Legal Foundations and Tools] F&ES 824a/LAW 20348, Environmental Law and Policy F&ES 825a, International Environmental Law and Policy F&ES 826a, Foundations of Natural Resource Policy and Management F&ES 827b, Large-Scale Conservation: Integrating Science, Management, and Policy F&ES 828b, Comparative Environmental Law in Global Legal Systems F&ES 829a, International Environmental Policy and Governance F&ES 832a/MGT 618a, Entrepreneurial Business Planning F&ES 834a,b/LAW 20316,21321, Environmental Protection Clinic F&ES 837b, Seminar on Leadership in Natural Resources and the Environment [F&ES 843b, Readings in Environmental History] F&ES 849b, Natural Resource Policy Practicum F&ES 850a, International Organizations and Conferences F&ES 851a,b, Environmental Diplomacy Practicum F&ES 852a,b, Business and the Environment Consulting Clinic [F&ES 853a, Capitalism: Success, Crisis, and Reform] F&ES 860b, Understanding Environmental Campaigns and Policy Making: Strategies and Tactics F&ES 863a, Forecasting Energy Futures: Pitfalls and Prospects F&ES 895a/MGT 684a, Management and the Environment: Issues and Topics Social and Political Ecology 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 838a, Producing and Consuming Nature F&ES 839a/ANTH 597a, Social Science of Development and Conservation F&ES 840b/ANTH 598b, Advanced Readings: Social Science of Development and Conservation [F&ES 845b, Energy Issues in Developing Countries] F&ES 846b, Topics in Environmental Justice F&ES 848a, Climate Change: Impacts, Adaptation, and Mitigation F&ES 854b, Institutions and the Environment [F&ES 856b, Environmental Ethics] [F&ES 857b, Urbanization, Global Change, and Sustainability] F&ES 858a/REL 768a, Environmental Theologies

- F&ES 859b, American Environmental History and Values
- F&ES 861a, American Indian Religions and Ecology
- [F&ES 862b, Advanced Seminar in Social and Political Dimensions of Climate Change]
- F&ES 869b/ANTH 572b, Disaster, Degradation, Dystopia: Social Science Approaches to Environmental Perturbation and Change
- [F&ES 872a/RLST 872a, Seminar on World Religions and Ecology]
- [F&ES 875a, Global Ethics and Global Problems]
- F&ES 876a/REL 810a/RLST 875a, Indigenous Religions and Ecology
- F&ES 877a/ANTH 561a, Anthropology of the Global Economy for Development and Conservation
- F&ES 878a, Anthropology of Climate and Climate Change: From Historic Origins to Current Debates
- [F&ES 879b/RLST 872b, World Religions and Ecology: Asian Religions]
- [F&ES 882b/ANTH 582b, Households, Communities, Gender (for Development and Conservation)]
- F&ES 892a/ARCH 4021a, Introduction to Planning and Development

HEALTH AND ENVIRONMENT

F&ES 891a/EMD 572a, Ecology and Epidemiology of Vector-Borne and Zoonotic Diseases

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 898b/EHS 585b, The Environment and Human Health]
- INDUSTRIAL ECOLOGY, ENVIRONMENTAL PLANNING, AND TECHNOLOGY
- F&ES 816b, Transportation and the Urban Future
- F&ES 842a, Cities and Sustainability in the Developing World
- F&ES 883b, Advanced Seminar: Business Strategy and Industrial Ecology
- F&ES 884b/ENAS 645b, Industrial Ecology
- F&ES 885b/ENAS 66ob^u, Green Engineering and Sustainability
- F&ES 886a^U, Greening Business Operations
- F&ES 888a, Ecological Urbanism

FRENCH

82-90 Wall Street, 3d floor, 203.432.4900 www.yale.edu/french M.A., M.Phil., Ph.D.

Chair Thomas Kavanagh

Director of Graduate Studies Maurice Samuels (82-90 Wall St., Rm. 325, 203.432.5046)

Professors Dudley Andrew (*Film*), Ora Avni, R. Howard Bloch, Edwin Duval, Marie-Hélène Girard (*Visiting*), Alice Kaplan, Thomas Kavanagh, John Merriman (*History*), Christopher L. Miller, Maurice Samuels

Assistant Professors Christopher Semk, Edwige Tamalet, Charles Walton (*History*), Yue Zhuo

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. A strong background in at least one other foreign language is also expected. Applicants should submit a twenty-page writing sample in French.

Special Requirements for the Ph.D. Degree

(1) Candidates must demonstrate a reading knowledge of Latin and a second language by passing department-administered examinations, Yale undergraduate courses, or Yale Summer Language Institute courses with at least a B or High Pass grade. Students must fulfill the Latin requirement before the beginning of their third term of study. The other language requirement must be satisfied before the beginning of the fifth term, and before the oral qualifying examination. (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 a language course (Latin or other) 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 predissertation 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 two combined Ph.D.s: one in French and African American Studies (in conjunction with the Department of African American Studies), and one in French and Film Studies (in conjunction with the Film Studies Program). Students in both 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. For this degree, the French department's requirement for a language in addition to Latin will normally be filled by demonstrating reading competence in a Creole language of the Caribbean or in Spanish. 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.

For students in the combined Ph.D. program in French and Film 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 Studies. In addition, Film Studies requires a dissertation defense. For further details see Film 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 the Latin requirement, and of eight courses, of which at least six are in French. Two grades of Honors in French graduate courses are required.

Program materials are available upon request to the Administrative Assistant to the Director of Graduate Studies, Department of French, Yale University, PO Box 208251, New Haven CT 06520-8251.

Courses

All classes are taught in French unless otherwise noted.

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 material are available on a DVD. Work consists of a weekly in-class translation and a final exam comprised of a sight translation passage and a familiar passage from Yale 229, and a takehome essay. No previous study of Old French necessary, although a knowledge of French is essential. Conducted in English. W 3:30–5:20

FREN 611b/HIST 625b, Old Regime, Enlightenment, and Revolutionary France

Charles Walton

The seminar introduces students to the principal themes and debates in the study of Old Regime, Enlightenment, and Revolutionary France. Topics include society, politics, institutions, Enlightenment, gender, empire, the origins of the Revolution, radicalization and terror after 1789, and the Revolution's legacy. M 7–8:50

FREN 755a^U/CPLT 633a^U/FILM 757a^U, French New Wave Dudley Andrew

This lecture course lays out "the idea of cinema" that developed in the wake of World War II as French critics inaugurated the New Wave school around 1960. The intellectual development of directors such as Truffaut, Godard, and Rohmer is seen via texts by Bazin, Rivette, Robbe-Grillet, and Barthes. Postwar cultural life led to a new film aesthetic from Bresson and Cocteau through the masterworks of the New Wave, affecting the 1968 generation right up to Assayas and Desplechin today. Graduate discussion section. MWF 11:30–12:20, screenings M 6:30–10

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 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 Speigel and *fabliaux* in a bilingual reader of translations by Ned Dubin. Conducted in English. W 3:30–5:20

FREN 821a, Montaigne and d'Aubigné Edwin Duval

Montaigne's *Essais* and d'Aubigné's *Les 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. T 1:30–3:20

FREN 876a, Libertins and philosophes Thomas Kavanagh

The seminar focuses on two major currents within eighteenth-century French literature and culture: *libertinage* and *philosophie*. Our concern is with examining how the intersection of these different options – one focusing on the body, the other on the mind; one frivolous, the other serious – represents distinct yet complementary attempts to recast the

premises of the cultural and social order. Works by Crébillon, Voltaire, Boyer d'Argens, Rousseau, Diderot, La Mettrie, Palissot, Laclos, Beaumarchais, and Sade, as well as paintings by Boucher, Fragonard, and David. M 9:25–11:15

FREN 899b/CPLT 897b, Modernity Maurice Samuels

The seminar studies literature and art from nineteenth-century France alongside theoretical and historical reflections to explore the significance of modernity. How did historical forces shape cultural trends? How did literature and art define what it means to be modern? Writers to be studied include Balzac, Baudelaire, Flaubert, Maupassant, and Zola. Theorists include Benjamin, Durkheim, Foucault, Marx, Simmel, and Weber. We also examine the painting of Manet and his followers. TH 9:25–11:15

[FREN 943b/AFAM 851b/CPLT 989b, Creole Identities and Fictions]

FREN 946b/AFAM 846b/AFST 746b/CPLT 725b, Postcolonial Theory and Its

Literature Christopher L. Miller

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage, créolité*, "minor literature"), but also gives attention to the literary texts from which they are derived (francophone and anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. Conducted in English. TH 1:30–3:20

[FREN 949a/AFAM 805a/AFST 949a/CPLT 987a, Novel, Film, and History in French Africa]

FREN 957a, Experiments in Twentieth-Century Fiction Ora Avni

The course examines modern novels and short stories that attempt to break away from traditional narratives. We work simultaneously on two planes: (1) broken narratives as they reflect postwar disillusions, fear of loss of the "self," and the bewilderment of man cast in a world that is no longer coherent; (2) formal experiments with narratives that purport to tell "stories" without the support of "heroes," "characters," proper sequence, linear time, or even events that can be attributed to a specific persona. Under these conditions, what is left of stories and storytelling? More importantly, to what extent do these experiments succeed in breaking away from literary tradition? Works by Robbe-Grillet, Sarraute, des Forêts, Modiano, Chamoiseau, Gary, Cohen, and Nothomb. T 9:25–11:15

FREN 966a, Francophone Colonial Literature of the Maghreb Edwige Tamalet A study of francophone literature of the colonial Maghreb from the 1900s to 1962 with a particular focus on the writers' engagement with the cultural, linguistic, and social transformations brought about by the colonial encounter. Special attention to issues of identity and belonging; francophonie, aesthetic interactions among European, Arab, and Berber literary traditions; the role of literature in the development of nationalism; the war of independence. Readings include Bertrand, Camus, Pélégri, Rhaïs, Haddad, Feraoun, Amrouche, Mammeri, Memmi, Dib. M 1:30–3:20

GENETICS

I-313 Sterling Hall of Medicine, 203.785.5846 http://info.med.yale.edu/genetics M.S., M.Phil., Ph.D.

Chair Richard Lifton

Director of Graduate Studies

Charles Radding (TAC S-317, 203.737.2942, charles.radding@yale.edu)

Professors Allen Bale, Douglas Brash (*Therapeutic Radiology*), Susan Baserga (*Molecular Biophysics & Biochemistry*), W. Roy Breg, Jr. (*Emeritus*), Lynn Cooley, Daniel DiMaio, Jerome Eisenstadt (*Emeritus*), Bernard Forget (*Internal Medicine/Hematology*), Patrick Gallagher (*Pediatrics*), Joel Gelernter (*Psychiatry; Neurobiology*), Peter Glazer (*Therapeutic Radiology*), Murat Genel (*Neurosurgery*), Arthur Horwich, Kenneth Kidd, Richard Lifton (*Internal Medicine/Nephrology; Molecular Biophysics & Biochemistry*), Haifan Lin (*Cell Biology*), Maurice Mahoney, Charles Radding (*Emeritus*), Shirleen Roeder (*Molecular, Cellular & Developmental Biology*), Margretta Seashore, Carolyn Slayman, Stefan Somlo (*Internal Medicine/Nephrology*), Joann Sweasy (*Therapeutic Radiology*), Peter Tattersall (*Laboratory Medicine*), Sherman Weissman, Tian Xu, Hongyu Zhao (*Epidemiology & Public Health; Biostatistics*)

Associate Professors Martina Brueckner (Pediatrics/Cardiology), Kei-Hoi Cheung (Medical Informatics), Judy Cho (Internal Medicine), Jeffrey Gruen (Pediatrics), Mustafa Khokha (Pediatrics), Michael Nitabach (Cellular & Molecular Physiology), Valerie Reinke, Gerald Shadel (Pathology), Matthew State (Child Study Center), Zhaoxia Sun

Assistant Professors Antonio Giraldez, Valentina Greco, Mark Hammarlund, Natalia Ivanova, Tae Hoon Kim, Peining Li, Janghoo Lim, Jun Lu, James Noonan, In-Hyun Park, Scott Weatherbee, Andrew Xiao

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 six 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. 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.

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

The requirements for M.D./Ph.D. students differ slightly from those for Ph.D. students. Please refer to the Genetics Handbook at http://info.med.yale.edu/genetics/graduateHandbook/GH_students.php.

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 (info.med.yale.edu/ bbs), MCGD Track.

Courses

GENE 500b, Principles of Human Genetics Allen Bale

A genetics course taught jointly for graduate students and medical students, covering current knowledge in human genetics as applied to the genetic foundations of health and disease. HTBA

GENE 603b/IBIO 603b, Teaching in the Science Education Outreach Program (SEOP) Paula Kavathas

TAs, along with volunteers, teach three projects in genetics to seventh-graders in two or three New Haven schools. In addition, TAs take a short course on teaching and serve as science judges. Dates and times to be determined. For more details visit www.seop.yale. edu. Contact Professor Kavathas.

GENE 625a/MB&B 625a^U/MCDB 625a^U, Basic Concepts of Genetic Analysis

Tian Xu, Michael Koelle, 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 631a/BIS 631a, Topics in Genetic Epidemiology]

[GENE 645a/BIS 645a, Statistical Methods in Human Genetics]

GENE 675a and b, Graduate Student Seminar James Noonan 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 for all second-year students in Genetics. Graded Satisfactory/Unsatisfactory. W 4–4:50

[GENE 703b, The Mouse in Biomedical Research Offered every other year]

GENE 705a/MB&B 705a^U/MCDB 505a, Molecular Genetics of Prokaryotes

Nigel Grindley

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Prerequisites: previous or concurrent introductory courses in genetics and biochemistry. MW 11:35–12:50

GENE 734a/MB&B 734a/MBIO 734a, Molecular Biology of Animal Viruses

Robert Means, Daniel DiMaio, and staff

This lecture course covers the molecular biology of animal viruses. Many of the major virus groups infecting vertebrate hosts are discussed in detail. Major topics covered include molecular mechanisms of viral gene regulation and genome replication, cell growth transformation, and virus-cell interactions. The course also highlights the contributions of the study of viruses to our understanding of the biology of eukaryotic cells and the strategies viruses employ to exploit and modify normal cell processes. Prerequisite: prior course work in eukaryotic cell or molecular biology. Suitable for advanced undergraduates and first- and second-year graduate students. MW 9–10:15

GENE 743b/MB&B 743b^U/MCDB 743b, Advanced Eukaryotic Molecular Biology

Mark Hochstrasser, Anthony Koleske, Christian Schlieker, 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,

Mark Hochstrasser, I. George Miller, Lynne Regan, David Schatz, 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 777b/MCDB 677b, Mechanisms of Development Valerie Reinke and staff An advanced course on mechanisms of animal and plant 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. M 9–10:15, F 2:30–3:45

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 and

Rotations Frank Slack and faculty Lab rotations and grant writing 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 Valerie Horsley

Lab rotations and ethics for Molecular Cell Biology, Genetics, and Development track students. TH $4-5{:}30$

GENE 921a and b, Reading Course in Genetics and Molecular Biology

Charles Radding and staff

Directed reading with faculty. Term paper required. Prerequisite: permission of Genetics DGS.

GEOLOGY AND GEOPHYSICS

Kline Geology Laboratory, 203.432.3124 www.geology.yale.edu M.S., M.Phil., Ph.D.

Chair David Bercovici

Director of Graduate Studies Ruth Blake

Professors Jay Ague, David Bercovici, Ruth Blake, Mark Brandon, Derek Briggs, Leo Buss, Michael Donoghue, David Evans, Jacques Gauthier, Thomas Graedel, Leo Hickey, Shun-ichiro Karato, Jun Korenaga, Mark Pagani, Jeffrey Park, Danny Rye, Brian Skinner, Ronald Smith, Karl Turekian, Elisabeth Vrba, John Wettlaufer

Associate Professor Alexey Fedorov

Assistant Professors Hagit Affek, William Boos, Kanani Lee, Maureen Long, Trude Storelvmo, Mary-Louise Timmermans, Zhengrong Wang

Lecturer Catherine Skinner

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 for 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) 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 Brian Skinner

An introduction to the formation and distribution of mineral deposits.

G&G 501a^U/ASTR 540a^U, Radiative Processes in Astrophysics/Stellar Atmospheres Debra Fischer

Theory of radiation fields and their propagation through media. Applications to stellar and planetary atmospheres and the interstellar medium including planetary energy balance and climate, terrestrial optical phenomena, solar physics, high-energy phenomena, and remote sensing. HTBA

[G&G 502b^U, Introduction to Geochemistry]

[G&G 504a^U, Minerals and Human Health]

G&G 508b, The Global Carbon Cycle Hagit Affek

The course discusses the isotopic composition of atmospheric gases. It focuses primarily on carbon dioxide and the use of its isotopes to balance the atmospheric carbon budget, and discusses other gases associated with the global carbon cycle. TTH 10:30–11:20

G&G 510a, Introduction to Isotope Geochemistry Danny Rye, Zhengrong Wang An overview of the fundamental principles of stable and radiogenic isotope geochemistry. Emphasis is placed on applications to specific geologic problems, including petrogenesis, geochronology, geothermometry, surface processes, hydrology, and biogeochemistry. MWF 9:25–10:15

[G&G 511a, Stratigraphic Principles and Applications]

G&G 512a^U, **Structure and Deformation of the Lithosphere** Mark Brandon An introduction to structure and deformation of tectonic plates. Topics include structure of the crust and mantle; deformation processes at low and high temperatures; origin of folds, faults, and earthquakes; and formation and evolution of plate boundaries and collisional mountain belts. Laboratory exercises and field trips.

G&G 513a^U, **Invertebrate Paleontology: Evolving Form and Function** Derek Briggs Exploration of the basic constraints and potentials that controlled adaptive radiation in the evolution of the invertebrate skeleton.

G&G 515b^U, Paleobotany Leo Hickey

A detailed survey of the evolutionary history of plants through geological time, the origin and diversification of their major lineages and of plant communities, and the interaction of plants and their physical environment. Laboratory exercises involve the study of fossil and modern plants. TTH 9–10:15

[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 11:35–12:50

G&G 521b^U, Rotating Fluid Dynamics Mary-Louise Timmermans

An examination of the equations governing rotating stratified flows with application to oceanic and atmospheric circulation. Mathematical models are used to illustrate the fundamental dynamical principles of geophysical fluid phenomena such as waves, boundary layers, flow stability, and turbulence. Simplified geostrophic equations appropriate for large-scale flows are derived. The important theoretical framework for understanding the large-scale circulation of the ocean is developed. TTH 1–2:15

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. MW 9-10:15

G&G 523b^U, Climate Dynamics Alexey Fedorov

An introduction to climate dynamics. Topics include conceptual models of climate, general circulation of the atmosphere, ocean wind-driven and thermohaline circulation, abrupt climate change, climate hysteresis, climate modeling by means of GCMs,

climate predictability. Special emphasis on phenomena controlled by large-scale interactions between the ocean and the atmosphere, from El Niño to decadal climate variability. Glacial cycles. Physical mechanisms of global climate change and IPCC reports. 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 David Bercovici

Composition and structure of the Earth; seismological models; geochemical models; material properties in the Earth (elasticity, anelasticity, viscosity); specific topics on Earth structure (crust, mantle, core).

G&G 528a, Science of Complex Systems Jun Korenaga

Introduction to the qualitative and quantitative analysis of complex systems with many degrees of freedom. Emphasis is placed on understanding key concepts (predictability, self-organized criticality, renormalization, etc.) through various examples in physical and biological sciences.

[G&G 529b, Introduction to Geodynamics]

G&G 533a^U, Paleogeography David Evans

Quantitative methods for measuring horizontal motions on the surface of the Earth. Histories of continental motions and supercontinents during the past three billion years. True polar wander. Foundations of paleomagnetism, including experience with field sampling and laboratory data acquisition. TTH 2:30–3:45, 1 HTBA

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 538a/ASTR 520a, Computational Methods in Astrophysics and Geophysics Paolo Coppi

The analytic and numerical/computational tools necessary for effective research in astronomy, geophysics, and related disciplines. Topics include numerical solutions to differential equations, spectral methods, and Monte Carlo simulations. Applications are made to common astrophysical and geophysical problems including fluids and N-body simulations.

G&G 540a^U, Methods in Geomicrobiology Ruth Blake

A laboratory-based course providing interdisciplinary practical training in geomicrobiological methods including microbial enrichment and cultivation techniques; light, epi-fluorescence, and electron microscopy; and molecular methods (DNA extraction, PCR, T-RFLP, FISH). TTH 1–2:15

G&G 550a^U, Paleontology and Evolutionary Theory Elisabeth Vrba

Current concepts in evolutionary and systematic theory with particular reference to how they apply to the fossil record. Emphasis on use of paleontological data to study evolutionary processes. TTH 11:35–12:50

G&G 555b^U, Petrogenesis 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 pressuretemperature-time paths of metamorphic and igneous rocks. MWF 9:25–10:15

[G&G 556b^U, Introduction to Seismology]

[G&G 557b, Advanced Seismology]

[G&G 562a^U/ARCG 762a^U/EMD 548a/F&ES 726a, Remote Sensing: Observing the Earth from Space]

G&G 567b^U, Geochemical Approaches to Archaeology Karl Turekian

The use of geochemical techniques to address archaeological problems including radioactive dating, source identification, and production of artifacts, all in the context of environmental constraints in human development. MWF 9:25–10:15

G&G 570b, Cloud Physics and Dynamics Trude Storelvmo

Basic concepts of cloud microphysics, cloud dynamics, and precipitation. Principles of cloud modeling; field observations of clouds.

[G&G 602b^U, Paleoclimates]

G&G 610b^U, Advanced Topics in Macroevolution Elisabeth Vrba

A seminar for graduate students, and selected undergraduates with a suitable prior background, in which we read and discuss publications on various macroevolutionary topics and current debates. The particular subject matter varies from year to year, often being decided by student request for a specific topic, and is announced before the start of the term. Prerequisite: permission of the instructor.

G&G 611a, Advanced Stratigraphy Leo Hickey

The theory and practice of stratigraphy for those who have a basic grounding in the field. After several lectures, the course is conducted as a series of topical seminars chosen by the instructor and the participants.

[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 Jun Korenaga, Zhengrong Wang This multidisciplinary course focuses on the structure and dynamics of Earth's mantle and its chemical evolution. After reviewing the fundamentals of thermal convection as well as igneous petrology and geochemistry, several outstanding issues in solid-earth geosciences are examined in detail from both physical and chemical points of view.

G&G 650b^U, Deformation of Earth Materials Shun-ichiro Karato

Basics of deformation of materials as applied to geological and geophysical problems. Starting from the basic background of stress-strain and thermodynamics, discussion of materials science of deformation including elastic, anelastic, and plastic deformation. Emphasis is on the nature of deformation of materials under extreme conditions (highpressure, high water fugacity) that is critical in interpreting seismological observations and geological and geophysical processes. TTH 9–10:15

[G&G 655a^U, Extraordinary Glimpses of Past Life]

[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 Jeffrey Park

Introductory course in geoscience data analysis and time series methods, with emphasis on multiple-taper time series techniques. Examples drawn from seismological, paleoclimate, and historical climate data. Weekly computer assignments. FORTRAN or Scilab/ MATLAB proficiency helpful.

[G&G 660a, Diagenesis, Weathering, and Geochemical Cycles]

G&G 666a/AMTH 666a/ASTR 666a, Statistical Thermodynamics for Astrophysics and Geophysics John Wettlaufer

Classical thermodynamics is derived from statistical thermodynamics. Using the multiparticle 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. HTBA

G&G 675b, Quantitative Tectonics Mark Brandon

Introduction to the use of quantitative methods for the study of tectonic processes. The focus of the course shifts each year, covering topics such as flexural isostasy; coupling between climate, surface erosion, and deformation; kinematics of plate motion; thermal methods for studying erosion and faulting; processes and products of deformation. The course consists of a combination of lectures and seminar discussions. Students develop and complete a significant research project, either on their own or as a group. TF 2:30–4:20

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, Seminar in Systematics Jacques Gauthier 3 HTBA

G&G 710b, Responsible and Ethical Conduct of Research Faculty

A 7-to-8-week lecture course (1 hour) that is required for 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 710b 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 735a, Principles in Organic Geochemistry Mark Pagani

The seminar focuses on advanced concepts in organic geochemistry with an emphasis on paleoenvironmental reconstruction. Each week specific topics are explored and debated using published journal articles. Topics include compound-specific carbon and hydrogen isotope analysis, temperature and CO₂ reconstruction. Meets twice a week.

G&G 740a, Student Research Seminar Mark Pagani

A seminar in which students present seminars on topics related to their own research, either by presenting their results or by discussing literature that provides an introduction to their research topic. The class offers students an opportunity to gain experience in presenting scientific data and arguments in an informal environment and forces them

to think about their research in a detailed enough way that would allow them to explain it to a mixed audience. The topics covered in these presentations depend on the diverse interests of the students participating and include all topics associated with research performed within the G&G department and related topics. It therefore exposes the students to the large variety of research fields and provides them basic general Earth science background knowledge.

G&G 742a, Seminar in Geophysical Fluid Dynamics Mary-Louise Timmermans A discussion of current and seminal literature in the field of ocean and atmosphere dynamics. Hours are arranged in consultation with enrolled graduate students.

G&G 744a/ASTR 715a, Research Seminar on Planet Formation Debra Fischer, Shun-ichiro Karato

G&G 746a or b, Seminar in Global Change Karl Turekian

[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. HTBA

G&G 775a and b, Seminar in Tectonics Mark Brandon, David Evans

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. HTBA

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 www.yale.edu/german/graduate.html M.A., M.Phil., Ph.D.

Chair

Brigitte Peucker [F] Rüdiger Campe [Sp]

Director of Graduate Studies

Rainer Nägele (304 WLH, rainer.nagele@yale.edu)

Professors Rüdiger Campe, Carol Jacobs, Rainer Nägele, Brigitte Peucker, Henry Sussman (*Visiting* [F])

Associate Professor Kirk Wetters

Assistant Professor Paul North

Lecturer William Whobrey

Affiliated Faculty Jeffrey Alexander (Sociology), Seyla Benhabib (Political Science; Philosophy), Karsten Harries (Philosophy), Paula Hyman (History; Religious Studies), Patrick McCreless (Music), Steven Smith (Political Science), Adam Tooze (History), Katie Trumpener (Comparative Literature; English), Jay Winter (History), Christopher Wood (History of Art)

Fields of Study

German literature and culture from the Reformation to the twenty-first century in Germany, Austria, and Switzerland; medieval literature; literary and cultural theory; literature and philosophy; literature and science; visuality 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. Students normally teach undergraduate language courses under supervision beginning in the third year of study for at least two years.

In the first two years of study, students take four courses per term. Two 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 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 joint degree with Film 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. Two 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. Two of those courses may be audited. Students are asked to define an area of concentration upon entry, and will meet with appropriate advisers from both within and outside the department.

Joint Ph.D. Program with Film Studies

The Department of Germanic Languages and Literatures also offers, in conjunction with the Film Studies Program, a joint Ph.D. in Germanic Languages and Literatures and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film 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 563a^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. TH 1:30–3:20

GMAN 586a^U, Walther von der Vogelweide William Whobrey

A survey of one of the Middle Ages' most prolific and versatile poets. Recognized already by his contemporaries as a great lyricist, Walther produced work ranging from the typical high *Minnesang* of the age to political satire, moral instruction, parody, and propaganda. Along with close readings of texts, the course examines questions of transmission, musicality, artistic rivalry, and patronage. Poems are read in the original Middle High German; reading knowledge of modern German is required. TTH 11:35–12:50

GMAN 622a/HIST 653a, Reading Modern German History Adam Tooze

Introduction to essential interpretative debates in modern German history and their wider implications for modern European historiography. Intended for graduate students whether specialists in German history or not. No German required. T 1:30–3:20

GMAN 633a^U/FILM 762a^U, Weimar Cinema Brigitte Peucker

The German cinema, 1919–1930. Expressionist films and films of the New Objectivity. The pressures of technology and the other arts – especially painting – on cinema; issues of spectatorship, visual pleasure, and distraction in the context of a national cinema. Readings by Simmel, Kracauer, Benjamin, and others. Films by Murnau, Lang, Pabst, Lubitsch, Brecht, von Sternberg, and others. Conducted in English, with readings in English. T 3:30–5:20, screenings SU 7

GMAN 651b/CPLT 703b/PHIL 654b^U/PLSC 583b^U, Contemporary Critical Theory: Habermas and Beyond Seyla Benhabib

Critical theory after Jürgen Habermas's "theory of communicative action" faces the challenges of a postnational society, the rise of a global worldwide net, increasing multiculturalism, the end of secularism, and a worldwide economic crisis. The course examines Habermas's response as well as that of the third generation of critical theorists to these issues. W 1:30–3:20

GMAN 661b^U/CPLT 803b, Hölderlin, Kafka, Benjamin Rainer Nägele

The seminar addresses the question of the relationship of (auto-)biography and literature based on texts by Hölderlin and his undermining of the romantic concept of literature as subjective expression; Kafka's notebooks, in which literary texts and diary entries are curiously intertwined; and finally Benjamin's autobiographical texts (*Berliner Kindheit*) as well as his essays on Kafka and Proust. Discussion in English; reading knowledge of German is strongly encouraged. W 1:30–3:20

GMAN 663a^U/CPLT 862a, Brecht, Artaud, Müller, and the Modern Theater

Rainer Nägele

The seminar concentrates on the theatrical experimentations of Brecht and Artaud and the transformations of these experiments in Heiner Müller's plays. Reading knowledge of German and French is desirable. W 1:30-3:20

GMAN 674b, Designing Weimar Classicism Rüdiger Campe

The course explores the development of Weimar classicism in Germany in the era of European Romanticism and the French Revolution. Schiller's and Goethe's theoretical and poetic works between 1790 and 1805 unfold a new thinking of form in aesthetics, epistemology, and political theory. Works to be closely read include Schiller's *Aesthetic Education of Mankind*, Goethe's *Conversations of German Refugees*, Schiller's *Bride of Messina*, Goethe's *Iphigenia*, Schiller's poetry at the time of *The Gods of Greece*, and Goethe's *Sonnets*. Readings in German. M 1:30–3:20

GMAN 680a/MUSI 847a, Wagner in and on Production Gundula Kreuzer

An exploration of Wagner's ideas on staging and their role in the theory and history of opera since the mid-nineteenth century. The seminar contextualizes his attempts at creating a lasting, correct performance as well as their consequences for productions both historical and modern, with a special focus on *Tannhäuser*, the *Ring* cycle, and *Parsifal*. We broach such methodological issues as theories and analyses of performance, production, and multimedia; approaches to and reconstructions of historical stagings; and the increasing mediatization of opera. Ultimately, the seminar seeks to understand opera more broadly in its liminal state between fixity and ephemerality. T 2:30–4:20

GMAN 900a,b, Directed Reading

By arrangement with the faculty.

HISTORY

240 Hall of Graduate Studies, 203.432.1366 www.yale.edu/history M.A., M.Phil., Ph.D.

Chair Laura Engelstein

Acting Chair, 2010–2011 Paul Freedman

Director of Graduate Studies Francesca Trivellato (236 HGS, 203.432.1361)

Professors Jean-Christophe Agnew, Abbas Amanat, Ned Blackhawk, David Blight, Daniel Botsman, Paul Bushkovitch, Jon Butler, George Chauncey, John Demos (*Emeritus*), Michael Denning, Carlos Eire, Laura Engelstein, John Mack Faragher, Paul Freedman, Joanne Freeman, John Gaddis, Glenda Gilmore, F. Bruce Gordon, Robert W. Gordon, Valerie Hansen, Robert Harms, Jonathan Holloway, Paula Hyman, Matthew Jacobson, Gilbert Joseph, Donald Kagan, Paul Kennedy, Daniel Kevles, Benedict Kiernan, Jennifer Klein, Naomi Lamoreaux, Bentley Layton, Mary Lui, Joseph Manning, Ivan Marcus, John Matthews, John Merriman, Joanne Meyerowitz, Peter C. Perdue, Steven Pincus, Stephen Pitti, Cynthia Russett, Lamin Sanneh, Stuart Schwartz, Frank Snowden, Timothy Snyder, Harry Stout, Francesca Trivellato, Adam Tooze, Frank Turner, John Harley Warner, Anders Winroth, Jay Winter, Keith Wrightson

Associate Professors Bruno Cabanes, Beverly Gage, Naomi Rogers

Assistant Professors Paola Bertucci, Patrick Cohrs, Fabian Drixler, Alan Mikhail, Alyssa Mt. Pleasant, Edward Rugemer, Paul Sabin, Marci Shore, Bruno Strasser, Jenifer Van Vleck, Charles Walton, Kariann Yokota

Lecturers* Adel Allouche, Annping Chin (Senior Lecturer), Becky Conekin (Senior Lecturer), Veronika Grimm, William Metcalf, 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 two pages) 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

All students must pass examinations in at least two foreign languages, one 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 Two languages relevant to the student's research interests, or a high level of proficiency in one language; competence in statistics or other mathematical skill may substitute for a natural language under appropriate circumstances.

Ancient French, German, Greek, and Latin.

Byzantine Greek, Latin, French, German, and any additional language, e.g., Russian, required for dissertation research.

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.

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 languages (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 should be advised to bring their writing skills up to the necessary level at the earliest opportunity.

During the first two years of study, students normally take twelve term courses, at least eight of which shall be chosen from those offered by the department, and 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. Courses graded in the Satisfactory/Unsatisfactory mode count toward the course work requirement but do not count toward the Honors requirement.

Three of the twelve courses must be research seminars in which the student produces an original research paper from primary sources. All graduate students, regardless of field, will be required to take two seminar courses in a time period other than their period of specialty.

In the second year, there are two special seminar requirements.

1. Prospectus Tutorial

This course, normally taken in the second year, must result in a draft prospectus for the dissertation. Its purpose is to familiarize the student with debates in the relevant field and to prepare the student for fieldwork. The prospectus tutorial (HIST 995) counts as one of the three research seminars.

2. Orals Tutorial

Another of the twelve courses, normally taken in the second year, must be a tutorial in any one of the selected orals fields (see below). The orals tutorial (HIST 994) provides an opportunity for students to read for an orals field with one of the future orals committee members and can take the form of one-on-one meetings, small group meetings, or a normally scheduled reading seminar on the topic of the orals field. In some cases, orals tutorial credit will be retroactively granted to students who have taken a course in a reading seminar subject provided that they submit an orals reading list to the DGS for approval. Students seeking retroactive credit for an orals tutorial will still need to complete twelve term courses. The completion of these tutorials is a precondition for enrollment in the third year. In the third year, students are expected to hold a prospectus colloquium and sit an oral examination.

- The prospectus colloquium offers the student an opportunity to discuss the dissertation prospectus with the faculty 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 for doing research away from Yale in the fourth year. The prospectus colloquium and any further language requirements normally will be completed before the student takes his/her oral examination.
- 2. The oral examination for all graduate students 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. Students will have a choice of selecting three or four fields of concentration: a major field and either two or three minor fields. If the student selects the four-field option, the major field will be examined for 30 minutes. In that case, the student's orals tutorial must be in the major field. If the student selects the three-field option, the major field will be examined for 60 minutes and each minor field for 30 minutes. Completion of these requirements 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.

During the third year of study, almost all students serve as teaching fellows in order to acquire crucial professional training. During their first term of teaching, students must attend several training sessions run by the department in conjunction with the Graduate Teaching Center.

Students usually complete the requirements for admission to candidacy in the sixth term, but it is also possible for students who have completed extensive graduate work prior to entering the Ph.D. program to petition for candidacy sooner. Students may petition for credit for previous graduate work only after successful completion of the first year.

In the fourth year, once students have advanced to candidacy, they may continue their studies while serving as teaching fellows or they may decide to pursue their research, either at Yale or elsewhere, using external funding.

In the fifth year, strongly preferably in the fall term, 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 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.

The dissertation is expected to demonstrate ability to use sources in a discriminating and original way.

Students are eligible to receive the University Dissertation Fellowship (UDF) provided that they have advanced to candidacy. Students may take the UDF in the fifth year, but they must take the fellowship no later than the sixth year. They should apply for the fellowship in the term prior to which they wish to receive it. Students may serve as teaching fellows when they are not on the UDF.

The department strongly recommends that the student apply for a UDF only after completing the first chapter conference, and that students on a UDF should have completed at least two dissertation chapters before starting the fellowship. Many students apply for jobs in the year in which they receive the UDF, and the department urges that students apply for academic positions only when they have two chapters ready to send out to potential employers.

In short, a student making timely progress should expect to finish at least one chapter by December of the fifth year, and to complete the dissertation in the sixth year, when the submission deadline for May graduation is March 15.

Registration in the seventh year is not required for students submitting their dissertations by the October deadline (which the majority of students do). If students are unable to make the October deadline, they can petition the Graduate School for extended registration. The petition, delivered first to the History DGS, will explain the particular circumstances that have prevented completion of the dissertation within the normal timetable and offer a specific plan that describes how the dissertation will be completed in the seventh year. 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 six graduate term courses at Yale, of which two must have earned Honors grades and the other four 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.

Master's Degree Program For this terminal master's degree, students must pass six 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.

Program materials are available upon request from the Director of Graduate Studies, Department of History, Yale University, PO Box 208324, New Haven CT 06520-8324.

Courses

HIST 500a, Classics and Methods Timothy Snyder

An introduction to historical methods, led by faculty in rotation, exploiting influential works of theory as well as exemplary works of historical scholarship. TH 3:30–5:20

HIST 513b/CLSS 852b, The Origins of Roman Writers John Matthews

The course studies, in detail and in their original languages, a selection of Roman writers, in both Greek and Latin, who came from different origins and cultural environments. We explore the effect this has on their choices of subject matter and the manner of their writing and on their interpretation. T 3:30-5:20

HIST 514a, The Athenian Imperial Democracy Donald Kagan

A history of Greece in the years between the Persian invasion and the Peloponnesian War, with emphasis on Athens. Prerequisite: CLCV 205 or equivalent. T 2:30–4:20

HIST 531b^U/NELC 534b^U/RLST 659b^U, Seminar: The Making of Monasticism Bentley Layton

The social and intellectual history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity and the early Middle Ages, as seen in classic texts of monastic literature and in monastic archaeology. Readings are studied in translation. Prerequisite: permission of the instructor. T 3:30–5:20

HIST 532b^U/JDST 764b^U/RLST 777b^U, Jews in Muslim Lands from the Seventh to the Sixteenth Century Ivan Marcus

Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire. Prerequisite: reading knowledge of modern Hebrew. TTH 11:35–12:50

HIST $535a^{U}/JDST$ 761 $a^{U}/RLST$ 773 a^{U} , History of the Jews to the Reformation

Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Jews, Christians, and Muslims. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. Prerequisite: reading knowledge of modern Hebrew. TTH 11:35–12:50 HIST 538b^U/JDST 794b^U/RLST 783b^U, The Jewish Enlightenment Eliyahu Stern An overview of the eighteenth- and nineteenth-century transnational Jewish Enlightenment movement. Focus is on the origins of modernity and the breakdown of traditional society. Topics include religious reform, separation between public and private spheres, emancipation, acculturation, and anti-Semitism. MW 2:30–3:45

HIST 541b/JDST 790b/RLST 776b, The Jews in Medieval Societies Ivan Marcus Research seminar that focuses on a comparison of the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain). Issues in historiography and comparative methodology complement discussions about the symbols and reality of literary, political, and economic features of each society. Prerequisite: reading knowledge of modern Hebrew. T 1:30–3:20

HIST 555b^u/RLST 649b^u, Jesus to Muhammad: Ancient Christianity to the Rise of Islam Stephen Davis

The history of Christianity and the development of Western culture from Jesus to the early Middle Ages. The creation of orthodoxy and heresy; Christian religious practice; philosophy and theology; politics and society; gender; Christian literature in its various forms, up to and including the early Islamic period. MW 10:30–11:20, 1 HTBA

HIST 561a/ENGL 589a, Renaissance Ways with Words Keith Wrightson,

David Scott Kastan

The course explores the great variety of users and uses of early modern English, tracing a set of social, linguistic, and literary developments in English in the period 1500–1700. Each session focuses on a particular "genre," understanding this in the widest sense: both familiar "literary" genres, such as ballads, plays, and prose fiction, and nonliterary genres, such as letters, court depositions and examinations, wills, and petitions. We look also at dictionaries and rhetorical manuals, all with the aim of understanding how the language was used and how its users understood it. A course that combines social history, literary criticism, and sociolinguistics (thinking, for example, about regional and class variation), the seminar provides an unusual window onto early modern England, giving students opportunities to develop or improve skills in researching the various available archives and a lens through which to understand the origins of the process by which English transformed itself from a literally insular language spoken perhaps by fewer than six million people in 1600 to the world language it is today. W 3:30–5:20

HIST 566b^U/JDST 781b^U/RLST 774b^U, History of Jewish Culture, 1500 to the Present Paula Hyman

A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. TTH 11:35–12:50

HIST 567b, Commerce and Religion in Early Modern Europe Francesca Trivellato Classic and recent studies that address three interrelated issues: (1) the place of commerce and religion in European economic and political thought; (2) the meaning of toleration and tolerance in early modern Europe and its relation to commercial policies and practices; (3) the role of religious ties in the governance of long-distance trade. Students can choose to write a historiographical or a research paper. W 3:30–5:20

HIST 570b/REL 737b, The German Reformation, 1517–1555 Bruce Gordon

Examines the turbulent course of the Reformation in German lands from Martin Luther's protest until the Peace of Augsburg. The focus is on selected themes such as crucial theological issues, the nature of imperial religious politics, the development of local religious cultures in their urban and rural contexts, the radicalization of the Reformation, the emergence of theologies of political resistance, and the respective roles of print and oral media. Key documents and visual material form the basis for class discussion. T 5:30–7:20

HIST 573a^U/JDST 765a^U, Folklore and History in the Jewish Middle Ages

Micha Perry

The course examines legends, stories, fairy tales, myths, and other works of folklore culled from the Jewish Middle Ages (800-1500). It assesses their historical value through an understanding of their literary structure and the use of folklore methodology. M 3:30-5:20

HIST 580a, Encounters: Ourselves and Others in the Early Modern World

Stuart Schwartz

An examination of the encounters between Europeans and other peoples, 1480-1800, with attention to the role of perception, conceptions, and events on both sides of such meetings. Both the history of such encounters as well as the theories of alternity and cultural perceptions are discussed. T 3:30-5:20

HIST 591a, The Medieval Mediterranean Paul Freedman

Trade, culture, and societies in the Mediterranean, 300–1500. Emphasis on Latin West (Europe), but consideration is also given to Islamic and Jewish world. T 1:30–3:20

HIST 597a, The Evolution of Evil in Early Modern Europe, 1500–1800 Carlos Eire, Charles Walton

The seminar traces how notions of evil changed in early modern Europe, from the Protestant and Catholic Reformations to the French Revolution. It explores the intellectual, social, political, and institutional dimensions of this evolution. How did authorities respond to changing perceptions of evil during the Reformation? What impact did world encounters have on those perceptions? How did Enlightenment epistemology, secularization, toleration, and republicanism alter conceptions of evil, impurity, crime, and injustice? TH 1:30–3:20

HIST 599a, Macro, Micro, World, and Global History: Perspectives from Early

Modern Europe Francesca Trivellato

Reading seminar for students in history and adjacent disciplines. Classic and recent studies of the economic and political interactions between early modern Europe and the rest of the world. Emphasis on methodological issues about the scale of analysis (micro vs. macro), the use of primary vs. secondary sources, and the comparative framework. T 7-8:50

HIST 602b, 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. W 9:25–11:15

HIST 625b/FREN 611b, Old Regime, Enlightenment, and Revolutionary France Charles Walton

The seminar introduces students to the principal themes and debates in the study of Old Regime, Enlightenment, and Revolutionary France. Topics include society, politics, institutions, Enlightenment, gender, empire, the origins of the Revolution, radicalization and terror after 1789, and the Revolution's legacy. M 7–8:50

HIST 633b, Readings in Modern European Intellectual History Marci Shore Readings and discussion of secondary works on the intellectual and cultural history of modern Europe, including Russia. Attention to historiography and to points of intersection with the fields of philosophy, political theory, comparative literature, and literary theory. Attention, too, to the relationship between lives and ideas. W 1:30–3:20

HIST 635a, Readings in Modern French History John Merriman

Readings and discussion of recent work on the social, political, economic, and cultural history of modern France. T 9:25-11:15

HIST 653a/GMAN 622a, Reading Modern German History Adam Tooze

Introduction to essential interpretative debates in modern German history and their wider implications for modern European historiography. Intended for graduate students whether specialists in German history or not. No German required. T 1:30–3:20

HIST 663b^U/RLST 796b^U, Secular and Traditional Worldviews in Modern Western Thought Eliyahu Stern

Seminar examining the historical construction of secular and traditional worldviews from the eighteenth to the twentieth century. Attention to recent scholarship on the formation of a secular ideology and its effects on notions of time, space, and knowledge. Readings include works by John Locke, Ludwig Feuerbach, Max Weber, Talal Asad, and Mark Lilla. W 9:25–11:15

HIST 666a, Russian History to 1725 Paul Bushkovitch

The major phases of Russian history from the tenth century, covering the major historiographical controversies and sources. Russian or German helpful but not required. W 1:30-3:20

HIST 669b, Topics in Russian Intellectual History Paul Bushkovitch

The course selectively investigates several crucial periods in the history of Russian thought and culture: the impact of the Enlightenment in the reign of Catherine II, the prehistory of the Decembrist movement, and the formation of nationalist, liberal, and conservative ideologies in the reign of Nicholas I. The change from a court-based cultural life to the dominance of print media (the "thick" journals) forms the background of evolving notions of politics and society. Though the main focus is on political thought, the art and literature of the period supplement the main readings. T 1:30–3:20

HIST 691b, Empire and Nation in Eastern Europe: The Nineteenth Century Timothy Snyder

A review of imperial and national politics in the Ottoman, Habsburg, Romanov, and Hohenzollern domains from 1815 through 1918. National movements from the Balkans to the Baltics, including the Greek, Serbian, Romanian, Bulgarian, Croatian, Hungarian, Polish, Czech, Lithuanian, and Ukrainian. Emphasis is placed on interactions between local and imperial or international factors. Assignments include presentations and a final research paper. TH 3:30–5:20

HIST 700a/AMST 700a, Introduction to the Historiography of the United States

Ned Blackhawk

Readings and discussion of scholarly work on U.S. history from the settlement era to the present. Members of the department faculty visit the class on a rotating basis. T 9:25–11:15

HIST 702a/AMST 802a, Readings in Early National America Joanne Freeman An introduction to the early national period and its scholarship, exploring major themes such as nationalism, national identity, the influence of the frontier, the structure of society, questions of race and gender, the creation of a national politics and culture, and the evolution of political cultures. T 1:30–3:20

HIST 704b, Readings in Early American History John Demos Reading and discussion of the scholarly literature. TH 1:30-3:20

HIST 709a/AFAM 693a/AMST 730a, Black Intellectuals since 1941

Jonathan Holloway

The goal of the course is to develop a general reading knowledge of the traditions, contexts, and trajectories of black intellectual discourse since 1941. Emphasis is placed on foundational texts in the field. M 1:30-3:20

HIST 718a/INRL 622a, Social Movements in Comparative Perspective

Becky Conekin

In this seminar we explore post-WWII social movements and their legacies across Western Europe and the United States. 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 Western Europe and North America. In addition, if students have specific interests in Eastern European and/or Latin American countries, they may bring these into the discussion and write on them in a comparative perspective in their final paper. 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 brief look at the social movements that developed out of the 1960s. T 9:25–11:15

HIST 740a/AMST 740a, Research in Western and Frontier History

John Mack Faragher, George Miles

Taught with George Miles, curator of Yale's extensive collection of Western Americana at the Beinecke Library. Meets at the Beinecke Library. Emphasis on research methods and

the use of primary evidence to construct historical arguments. The goal of the seminar is the research and writing of an original and publishable historical essay. W 9:25-11:15

HIST 741b/AFAM 817b, Readings in Comparative Slavery Edward Rugemer An introduction to the central themes of the historiography on slavery in the Americas during the eighteenth and nineteenth centuries. Readings include books and articles that have an explicitly comparative focus, as well as single-region studies. Themes include master/slave relations, African American cultures, resistance and rebellion, economic life, and the politics of slavery. T 1:30–3:20

HIST 749b/AMST 699b/RLST 707b, Religion and Modernity Kathryn Lofton Is religion a construction of modernity? Is modernity the construction of religion? The course considers the historical and theoretical problem of modernity through readings that emphasize its interpretive location within the academic study of religions, the industrialization of the West, and the emergence of the social sciences as the epistemic presumption of the twentieth century. Included in our examinations are works that seek to provide for modernity a historical philosophy, a magic, and a gender; likewise, we evaluate critiques of modernity that query its classificatory utility, its imperial suppositions, and its sexual proclivities. Threaded throughout this focus on modernity is its discursive, sociological, and institutional relationship to religion, religions, and religious studies. In addition to more recent monographs, students read from works by Frazer, Freud, Marx, and Weber to develop a critical perspective on descriptions of religion developed through formats of the modern. M 2:30–4:20

HIST 753a, Methods in Transnational History Jenifer Van Vleck

Readings in historiography after the "transnational turn." Emphasis on methods, especially research strategies, interpretive frameworks, and keywords. Topics of readings and discussions include empire, colonialism, and postcolonialism; nations and nationalisms; borders and borderlands; political economy; technology, mass culture, and globalization; and transnational approaches to the history of race and gender. w 3:30–5:20

HIST 759a/INRL 657a, One World? International History, 1914–1991

Patrick Cohrs

This research seminar pursues both a historical and a theoretical reexamination of the modern international system in the "short" twentieth century, analyzing why it was so profoundly transformed between the era of imperialism preceding World War I and the end of the Cold War. Main themes include the origins of international conflicts from the Great War and the Great Depression to the U.S.-Soviet antagonism; the peace settlements after the world wars (or absence thereof); American postwar policies and their significance for European integration and the reconstruction of Japan; changing regional configurations in East Asia, Latin America, Africa, and the Middle East; and the question why the Cold War ended as it did. Particular attention to the changing premises and constraints of international politics that influence the making and unmaking of legitimate international orders in the twentieth century. T 3:30–5:20

HIST 760a/LAW 20102, American Legal History, 1880–1980 Robert Gordon The course deals with selected topics in the modern history of American law, legal thought, legal institutions, and the legal profession. Likely topics include the law and regulation of corporate organizations and labor relations in the age of enterprise; the law of race relations in the Jim Crow South and urban North; the development of "classical" legalism in the private law of contract and tort and the public law of constitutional limitations; the Progressive and legal-realist critiques of "classical" legalism; the rise of the modern administrative state; the regulation of public order and perceived threats to it including political dissent, deviant sexuality, immorality, alcohol, and immigration; the construction of law schools, law firms, the organized legal profession, the personalinjury bar, and public-interest law; the legal thought of O.W. Holmes, Jr., and Louis Brandeis; New Deal legal thought and legislation; the legal order of the 1950s; expansion of enterprise liability and rise of the mass tort class action; the civil rights movements and enforcement from the 1940s through 1980s; the "rights revolution" of the Warren Court and Great Society and the ensuing backlash. Self-scheduled examination with an option (open to a limited number of students) to write a research paper based on primary sources. HTBA

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

George Chauncey, Joanne Meyerowitz

Selected topics in the history of sexuality. Emphasis on key theoretical works and recent historical literature. M 2:30-4:20

HIST 776a/AMST 780a, Class and Capitalism in Twentieth-Century America Jennifer Klein

Readings course on class formation, labor, and political economy in the twentiethcentury United States; how regionalism, race, and class power shaped development of American capitalism. Reconsiders relationship between economic structure and American politics and political ideologies; relationship 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 780a/AFAM 763a/AMST 731a, 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. F 9:25-11:15

HIST 781b/AMST 733b, The History of the Transpacific World Kariann Yokota A seminar introducing students to the emerging interdisciplinary field of Pacific Studies. The assigned readings present a global perspective on the circulation of people, objects, and ideas in the region in their discussion of the politics of material and cultural exchange in the transpacific world. The class focuses on how foreign expansion from the mideighteenth to the mid-nineteenth century influenced the transpacific world and, conversely, how this involvement shaped the development of American society and culture. We look specifically at the study of the objects that circulated throughout the area and were eventually preserved in cabinets of curiosity, universities, and museums in diverse locations such as Honolulu, London, and Salem, Massachusetts. W 1:30–3:20

HIST 799b/AMST 799b, The American Century, 1941-1961

Jean-Christophe Agnew

The seminar looks at recent work in the intellectual and cultural history of WWII and Cold War America – the years between the New Deal and the New Frontier. Secondary readings highlight current directions in historiography as well as the range of research opportunities available, while class assignments and discussions focus for the most part on the different ways one can teach the period and its documentary sources, including literature, film, music, and painting. The seminar aims to suggest the richness and coherence of this period as a subject for intellectual and cultural historians – especially for those wishing to pursue a research topic in this area – and as an occasion to explore the possibilities for interdisciplinary teaching. W 1:30–3:20

HIST 802b/INRL 658b, Classic and New Approaches to International History

Patrick Cohrs

This graduate 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 in which trends may have had the opposite effect. On this basis, the seminar seeks to explore what are the new frontiers of scholarship. T 3:30–5:20

HIST 803b, Human Rights in the Twentieth Century Jay Winter,

Hanne Hagtvedt Vik

The course focuses on the emergence of human rights discourse in the twentieth century. It examines intellectual, institutional, and legal frameworks within which human rights instruments were developed, adopted, and deployed. Its focus is on the difficulty of specifying what human rights are through the examination of key instances of their violation. Problems of definition of undocumented migrants' rights, women's rights, and indigenous rights are addressed as well. Cases to be studied are drawn from Europe, the United States, and Latin America. M 3:30-5:20
HIST 807a/AMST 650a/ANTH 510a, Resistance, Rebellion, and Survival Strategies in Modern Latin America Gilbert Joseph, Patricia Pessar

An interdisciplinary examination of new conceptual and methodological approaches to such phenomena as peasants in revolution, millenarianism, "banditry," refugee movements, and transnational migration. TH 3:30–5:20

HIST 809b, Portugal and Its Empire, 1415–1825 Stuart Schwartz

Portugal created Europe's first and longest-lasting overseas empire. The course introduces students to the basic texts and historians of this empire with attention to the concept of empire and to the indigenous peoples within it. M 1:30–3:20

HIST 829a/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 834a, 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 839a/AFST 839a, Environmental History of Africa Robert Harms

An examination of the interaction between people and their environment in Africa, and the ways in which this interaction has affected or shaped the course of African history. W 3:30-5:20

HIST 840b/AFST 840b, Colonialism in Africa Robert Harms

Discussion of the theory and practices of colonialism in Africa. Topics include the motives for European expansion, the scramble for Africa, early colonialism, direct and indirect rule, "colonization of the mind," the colonial state, the developmental state, late colonialism, and paths to decolonization. W 3:30–5:20

HIST 854b/CHNS 833b, Chinese Biographical Writings Annping Chin

The course examines the biographies of Chinese men and women written in both China and the West. We consider how biographers handled their sources and how they chose to tell their stories. Readings in English focus on the roots of this genre and on examples from the seventeenth to the twentieth century, which include the lives of the powerful and the powerless, poets and scholars, aesthetes and assassins, rebels and reformers. Open to advanced undergraduates (juniors and seniors) with permission of the instructor. TH 3:30–5:20

HIST 861a, Issues in Tang, Song, and Yuan History 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. W 3:30–5:20

HIST 877b, Readings in Modern Chinese History Peter C. Perdue

Reading of major monographs in English on modern Chinese history, Qing and Republican periods. Intended for students preparing for orals, but open to other qualified students. w 3:30–5:20

HIST 881b^U/HSHM 68ob^U, History of Chinese Science William Summers

A study of the major themes in Chinese scientific thinking from antiquity to the twentieth century. Emphasis on non-Western concepts of nature and the development of science in China, East-West scientific exchanges, and China's role in modern science. M 1:30–3:20

HIST 883a, Demographic History: Methods and Debates Fabian Drixler

Basic demographic measures; approaches to the demography of prehistory; Malthus and his critics; the urban graveyard effect; the demography of war; theories of famine; contraception, abortion, infanticide, and foundlings; fertility and mortality transitions in different parts of the world; population policy; family reconstitution from parish registers; survival analysis; the Own Children Method and other back-projection techniques for census data. Depending on their interests, students have the opportunity to work with real datasets. The course is global in scope, with particular attention to Europe, Japan, and China. No prior training in demography or specific software packages is assumed. M 3:30–5:20

HIST 888a, Readings in Japanese History, 1500–1900 Daniel Botsman

A critical introduction to the historiography of the Tokugawa and Meiji periods, covering landmark studies of the post-WWII era as well as more recent work. Readings are in English, but depending on student interest supplemental material may also be assigned in Japanese. W 1:30–3:20

HIST 889b, Research in Japanese History Daniel Botsman

After a general introduction to the broad array of sources and reference materials available for conducting research related to the history of Japan since ca. 1600, students prepare original research papers on topics of their own choosing in a collaborative workshop environment. Prerequisite: reading knowledge of Japanese. TH 1:30–3:20

HIST 903a/HSHM 728a, The Global Challenge of Malaria Frank Snowden

The global challenge of malaria examined in comparative and historical context. The mosquito theory of transmission and other developments in scientific understanding of the disease; World Health Organization strategies to eradicate malaria since 1955; the development of tools such as insecticides, medication, and bed nets; the attempt to create an effective vaccine. T 1:30-3:20

HIST 906b^U/HSHM 647b^U, Medicine and Public Health in Latin America,

1820–2000 Mariola Espinosa

Survey of the history of medicine in Latin America from Independence to the present, focusing on the relationships of disease and public health with the construction of state and nation in the countries of the region. Themes include medicine's role in the production and reproduction of race and ethnicity, the treatment of indigenous medical traditions, the sources and consequences of international disease-control efforts, and persisting inequalities in health and health care. TTH 10:30–11:20

HIST 907a/HSHM 721a, Readings in the History of Science and Medicine in Latin America Mariola Espinosa

A close look at recent literature on the history of science and medicine in a Latin American geographical framework. We explore current trends in the history of Latin America including topics such as early exploration, colonial administration, state formation, race relations, economic and social interactions, transnational relations, gender issues, and nationalism, among others. M 9:25–11:15

HIST 914a^U/AMST 879a^U/HSHM 634a^U, Media and Medicine in Modern America

John Harley Warner, Gretchen Berland

An exploration of the relationships among medicine, health, and the media in the United States from 1880 through the present. Focus on newspapers, magazines, professional journals, advertising, exhibitions, radio, film, television, and the Internet; and on interactions among researchers, health professions, medical and public health institutions, journalists, advocacy organizations, the state, industry, and the public. Topics include the changing role of the media in shaping conceptions of the body; creating new diseases; influencing health and health policy; crafting the image of the medical profession; informing expectations of medicine and constructions of citizenship; and the medicalization of American life. TTH 10:30–11:20

HIST 916a^U/HSHM 633a^U, Introduction to the History of Math: Certainty,

Uncertainty, and the Infinite William Summers

The history of several mathematical topics from antiquity until the present time. Not a mathematics course, but instead an illustration of mathematics as a series of intellectual problems rather than technical accomplishments. TH 1:30–3:20

HIST 922a/HSHM 706a, Collecting Nature Bruno Strasser

The course focuses on the role of collections and collectors in the production of natural knowledge between the sixteenth century and the present. From wonder cabinets to electronic databases, collections of natural objects and facts of nature have been crucial to the development of science, medicine, and the state. The course explores court patronage and colonial power, amateur collections and national museums, gift exchange and commodity trade, individual property and collective authorship, secrecy regimes and public disclosures. TH 1:30–3:20

HIST 930a/AMST 878a/HSHM 701a, Problems in the History of Medicine and Public Health John Harley Warner

An examination of the variety of approaches to the social, cultural, and intellectual history of medicine, focusing on the United States. Reading and discussion of the recent scholarly literature on medical cultures, public health, and illness experiences from the early national period through the present. Topics include the role of gender, class, ethnicity, race, religion, and region in the experience of health care and sickness and in the construction of medical knowledge; the interplay between lay and professional understandings of the body; the role of the marketplace in shaping professional identities and patient expectations; citizenship, nationalism, and imperialism; and the visual culture of medicine. M 1:30–3:20

HIST 933a^U/HSHM 640a^U, Molecules, Life, and Disease in the Twentieth Century Bruno Strasser

The course explores the transformation of the life sciences in the twentieth century. It focuses on the rise of molecular biology and its understanding of life and disease. It shows how and why the molecular vision of life has achieved such a high level of scientific authority and social legitimacy. It emphasizes the relationship of this transformation to broader intellectual, social, cultural, and political change. TTH 11:35–12:25

HIST 938a/HSHM 676a/LAW 20332, The Engineering and Ownership of Life

Daniel Kevles

The seminar explores the history of intellectual innovation and intellectual property protection in living matter. Focusing on the United States in world context, it examines arrangements outside the patent system as well as within it. Topics include agriculture, medicine, biotechnology, and law. May be taken as a reading or research course. Open to undergraduates with permission of the instructor. W 1:30–3:20

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 colonialism and prostitution; repression and regulation of birth control; the teaching of sex education; the public celebration and denial of sexual difference; politics of sexually transmitted diseases, including HIV/ AIDS; public health and legal efforts to define and restrict abortion; the pathologizing and identity politics of transgendered people; and the development and regulation of artificial insemination and other methods of reproductive technology. W 1:30–3:20

HIST 951a^U/JDST 793a^U/RLST 799a^U, Introduction to Modern Jewish Thought

Eliyahu Stern

An overview of modern Jewish philosophical trends, movements, and thinkers from the seventeenth to the twenty-first century. Subject matter addressed: enlightenment, historicism, socialism, secularism, religious radicalism, and Zionism. MW 11:35–12:50

HIST 952b^U/JDST 784b^U/RLST 762b^U, Memory, Memoirs, and Modern Jewish

History Paula Hyman

Exploration of how memoir writers from the seventeenth century to the twentieth understand their own experience against the backdrop of modern Jewish history. Focus on the construction of identity and the relation of personal and collective memory, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. TH 1:30–3:20

HIST 953a^U/JDST 795a^U/RLST 750a^U, Religion, Ethnicity, and Identity in American Jewish History Paula Hyman

An exploration of how Jews in America negotiated, and renegotiated, religion and ethnicity to forge a hyphenated American identity. Topics include the impact of Protestant domination, immigrant experiences and legacies, the role of discrimination, and selfpresentation and representation by others. M 1:30-3:20

HIST 965a/ANTH 541a/F&ES 836a/PLSC 779a, Agrarian Societies: Culture, Society, History, and Development Michael McGovern, James Scott, Elisabeth Wood

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. TH 1:30–5:20

HIST 979a^U/JDST 788a^U/RLST 768a^U, The Holocaust in Historical Perspective Paula Hyman

A survey of the major historical issues raised by the Holocaust, including the roots of Nazism; different theoretical perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. MW 10:30–11:20, 1 HTBA

HIST 984a/HSHM 743a, Shell Shock to PTSD: The History of Wartime Mental

Illness Bruno Cabanes, Deane Aikins

This research seminar explores the evolving historical consequences of exposure to extreme combat stress, from World War I to the present, and the medical and psychiatric treatments and policies created as a response. Class format includes weekly lectures as well as presentations from historians, care providers, policy makers, and veterans. We encourage interdisciplinary approaches and enrollments. W 9:25–11:15

HIST 985b/MGT 984b/PLSC 715b, Studies in Grand Strategies, Part I

John Gaddis, Paul Kennedy, 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 www.yale.edu/iss/gs for application information. M 3:30–5:20

HIST 985a/MGT 984a/PLSC 716a, Studies in Grand Strategies, Part II

Paul Kennedy, Charles Hill

Part II of the two-term linked seminar offered during the calendar year 2010. Research seminar. M 3:30-5:20

HIST 994a/b, Oral Exam Tutorial Graded Sat/Unsat.

HIST 995a/b, Prospectus Tutorial Graded Sat/Unsat.

HIST 998a/b, Directed Readings

Offered by permission of the instructor and DGS to meet special requirements not covered by regular courses. Graded Sat/Unsat.

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 www.yale.edu/arthistory M.A., M.Phil., Ph.D.

Chair

Alexander Nemerov (Loria 656, 203.432.8442, alexander.nemerov@yale.edu)

Director of Graduate Studies

Timothy Barringer (Loria 657, 203.432.2680, timothy.barringer@yale.edu

Professors Brian Allen (*Adjunct*), Carol Armstrong (*on leave* [Sp]), Timothy Barringer, Edward Cooke, Jr., David Joselit, Diana Kleiner, Amy Meyers (*Adjunct*), Mary Miller, Robert Nelson (*on leave* [Sp]), Alexander Nemerov, Jock Reynolds (*Adjunct*), Vincent Scully (*Emeritus*), Robert Thompson (*on leave*), Christopher Wood, Mimi Hall Yiengpruksawan (*on leave* [F])

Associate Professor Lillian Tseng

Assistant Professors John Conner (*on leave*), Milette Gaifman, Jacqueline Jung, Kishwar Rizvi (*on leave*), Tamara Sears, Sebastian Zeidler

Lecturers Cassandra Albinson, Martina Droth, Theresa Fairbanks, Karen Foster, Ian McClure, Margaret Olin, Andrea Rager

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 thirteen term courses. Normally by January 20 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 pre-dissertation 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. They receive a total of one course credit as teaching fellows when they lead a discussion section. 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 STUDIES

The Department of the History of Art offers, in conjunction with the Film Studies Program, a combined Ph.D. in the History of Art and Film 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 Studies. For further details, see Film 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 one year of course work (six term courses) and after evidence of proficiency in one required foreign language. The student normally petitions for the degree at the time of registration in the fall of the second year.

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, Critical Approaches to the History of Art Sebastian Zeidler

An introduction to the foundations of modern art-historical method: formalism, connoisseurship, iconology, social history, visual culture. Readings include Wölfflin, Riegl, Friedländer, Warburg, Kubler, Foucault, Crary, among others. TH 3:30–5:20

HSAR 506a or b, The Teaching of the History of Art

By arrangement with faculty. History of Art graduate students only.

HSAR 512a or b, Directed Research

By arrangement with faculty.

HSAR 514a or b, Graduate Research Assistantship

HSAR 561b/CLSS 805b, The Aesthetics of the Divine Image in Greek Antiquity

Milette Gaifman

An exploration of the complex and problematic relationship between imagined divinities and visual representations in Greek antiquity, an area that has received much scholarly attention in recent years. Topics include the range of visual strategies for the demarcation of divine presence from aniconism to naturalism, the nature of Greek anthropomorphism, the variety of functions of images of gods both inside and outside the cultic sphere, and the relationship between artistic representations and epiphanic experience. In addition to the analysis of ancient monuments and primary texts (e.g., Herodotos, Plato) the course treats modern theoretical discussions on the role of art in bridging the gap between human and divine by rendering the invisible gods into visible entities. W 3:30–5:20

HSAR 577b, Sculpture: Matter, Process, Object Martina Droth

What do we mean by "sculpture"? As an object and as a practice, the boundaries by which sculpture is defined are extremely elastic. At what point does an object cease to be perceived as a work of sculpture (when does a statuette become labeled "bibelot," "ornament," or "souvenir"), and, conversely, what are the qualities that allow certain kinds of

crafted object to become part of the history of sculpture? The moment at which sculpture seems to lose its coherence often remains tacit; yet it is in this margin of ambiguity that debates about sculpture have played out in some of the most interesting and challenging ways, driving both its development and reception. The seminar is underpinned by questions that interrogate sculpture's inherent instability. It is thematic in approach, rather than chronological, focusing on a range of issues and problems that are specifically relevant to our engagement with sculpture. It examines historical objects side by side with contemporary ones in order to encourage a questioning approach toward some of the assumptions and clichés about what constitutes "tradition" and "modernity." Two field trips are planned; some sessions are located in the collections of the YCBA and YUAG. Requirements include a presentation and a term paper. T 2:30–4:20

HSAR 581a/CLSS 890a, Roman Painting: Achievement and Legacy Diana Kleiner Roman mural painting in all its aspects and innovations. Individual scenes and complete ensembles in palaces, villas, and houses in Rome and Pompeii are explored, along with their rediscovery and revival in the Renaissance and Neoclassical period. Special attention is paid to the four architectural styles; history and mythological painting; the impact of the theater; the part played by landscape, genre, and still life; the accidental survival of painted portraiture; and the discovery and rejection of trompe l'oeil illusionism and linear perspective. T 1:30–3:20

HSAR 583b, Studies in Medieval Sculpture 900-1500 Jacqueline Jung

For much of the period known as the Middle Ages, figural sculpture - both monumental works affixed to buildings and independent pieces displayed on altars and shrineswas the artistic medium most familiar, accessible, and powerful to men and women of all social stations and ranks. Likewise, medieval figural sculpture was long the field on which the greatest practitioners of the discipline of art history, from Panofsky to Shapiro to Baxandall, trained their sights. Yet over the past twenty years, in the wake of the impact of iconographical and social historical methods of inquiry and the turn toward "visual studies" (which has typically privileged manuscript painting), medieval sculpture has largely faded from view in North American art history. Through a series of case studies of important sculptural objects and monuments, principally from France, Germany, and Italy-including reliquary statues, tomb effigies, crucifixes, altarpieces, and the great sculpture programs of Romanesque and Gothic buildings - the seminar seeks to reexamine the place of medieval sculpture in our discipline. Although we pay close attention to the formal and iconographical peculiarities of the works, special emphasis is placed on their mediating function for distinct audiences and their shifting conditions of production and reception. Readings include classic texts by Michael Baxandall, Michael Camille, Ilene Forsyth, Émile Mâle, Erwin Panosfsky, Meyer Schapiro, and Wilhelm Vöge, as well as more recent literature. Reading knowledge of French and German is strongly recommended. T 1:30-3:20

HSAR 599a, Light in the Middle Ages Robert Nelson

Symbolic and actual light are the twin concerns of this course, which looks at the Christian symbolism of light and its instantiation in ecclesiastical architecture and art of the Middle Ages. Topics to be surveyed include medieval theories of light and vision, religious meanings of light, natural light in architecture and artificial lighting devices, and various artistic media that make conscious use of light from mosaics to stained glass. W 3:30–5:20

HSAR 601a, Replication Technology and Renaissance Art Christopher Wood The seminar works mainly with primary materials at the YUAG and Beinecke. The topic is the woodcut, engraving, and etching, and the illustrated book, in northern Europe and in Italy from 1400 to 1550. These technologies are placed in the wider historical context of the mechanical replication of texts and images, by both analog and digital means, involving movable type, bronze casting, stamping and molding of coins and medals, terra-cotta sculpture, tapestry, and mass production of paintings. The seminar addresses the impact of the replication technologies on the history of art. W 1:30–3:20

HSAR 639b, Mimesis/Magic/Art Christopher Wood

The seminar deals with the myth of the motivated sign. Cultic, magical, and aesthetic practices have always been structured around the promise of a symbol that really connects with its object. Art in particular is both tempted and troubled by the power—imagined or real?—of the indexical sign, the relic, the talisman, the icon, the emotive gesture, mimicry, pure color or sound. The discourse of art has reflected on this power by imagining the origins of art; by comparing artwork to cult image; and through versions of primitivism. The seminar brings anthropological, philosophical, and art-historical thinking to bear on this problem. Readings from Benjamin, Adorno, Mauss, Leroi-Gourhan, Caillois, Bataille, Lévi-Strauss, Boas, Taussig, Warburg, Didi-Huberman. TH 1:30–3:20

HSAR 683a, Manet and Cézanne Carol Armstrong

The seminar raises the question of what more can be said about the two French painters of the nineteenth century, Édouard Manet and Paul Cézanne, who have been understood as the forefathers of abstraction, the founders of modernist painting, and "gateways" to twentieth-century art. The following questions are addressed, among others. What was the changing definition of modernism as it was applied to the oeuvres of these two artists? How were their reputations consolidated? What was their relationship to Impressionism, and to each other? How did they each redefine the medium and task of painting, the relationship of facture to subject, and the hierarchy of genres inherited from the seventeenth century? How have they concentrated art-critical and art-historical debates of the nineteenth and twentieth centuries, up to the present? And how has the lineage of modern painting and the teleology of abstraction been described and redescribed in relation to these two points of origin? The seminar may ultimately result in an exhibition of one or both artists' works on paper at the YUAG. A reading knowledge of French is desirable, but not required. M 3:30–5:20

HSAR 685b, Portraiture Timothy Barringer, Cassandra Albinson

The seminar examines portraiture as a visual and social practice from early modern Europe to the present and opens with a close examination of the foundational arthistorical literature – including discussions by Alois Riegl and Edgar Wind – as well as recent interventions in this field. Central to each session is the detailed analysis of works in Yale collections and in the major loan exhibition *Thomas Lawrence*, curated by Cassandra Albinson and colleagues from the National Portrait Gallery, London. Themes under discussion include self-fashioning; portraiture and the construction of gender, class, and ethnic identities; portraiture and genealogy; the conversation piece and multi-figure portraits; studio practices and portraiture; portraiture and modernism; spaces of portrayal; the collecting and display of portraits; portraiture, photography, and digital media. W 3:30-5:20

HSAR 688b, Soviet Constructivism Sebastian Zeidler

A research seminar that explores the full range of Soviet Constructivist avant-garde art circa 1915 through 1930 from a variety of theoretical perspectives: painting, objects, architecture, stage and exhibition design, photography. No knowledge of Russian necessary. TH 3:30–5:20

HSAR 704a, History and Theory of Contemporary Architecture David Joselit The seminar surveys the history of European and American architecture during the period initiated by the publication in 1972 of *Learning from Las Vegas* by Robert Venturi, Denise Scott Brown, and Steven Izenour, and continuing to the present. Major attention is paid to the rise and fall of postmodernism in architecture; the emergence of deconstruction in the work of Peter Eisenman and others; architecture's "organic turn" beginning with the so-called Blob architecture of Greg Lynn and continuing through a new emphasis on ecological sustainability and landscape; the new monumentalism of sculptural buildings or architects such as Frank Gehry and Zaha Hadid; and finally the sociological or informational turn in architecture evidenced in the dual practice of consulting and design pioneered by Rem Koolhaas. Special use is made of the James Stirling exhibition at the YCBA. M 1:30–3:20

HSAR 710b/FILM 841b, Art, Media, and Space David Joselit, Frank Casetti The prevalence of site-specific artworks (ranging from performance to sculpture) has arisen alongside a dramatic expansion of media in urban environments, making space a newly relevant "medium." Like any experience, aesthetic and communicative images are not only embedded in a cultural context, nor only embodied in a social subject; they are also grounded as individual enunciations in a particular time and place. Art and media *take place* in the double sense of happening as an event and of seizing – or taking – space. The seminar explores the subtle relations between images – both artworks and media – and their surroundings, the capacity of images to become environments in themselves, the transitions from a space to another, and the effects of these dynamics on the symbolic economy and regimes of discipline. Readings include texts by Henri Lefebvre, Michel de Certeau, Michel Foucault, and Arjun Appadurai. Artists and filmmakers under consideration range from Woody Allen to Harun Farocki. W 1:30–3:20

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. W 1:30–3:20

HSAR 720a/AMST 805a/REL 966a/WGSS 779a, Sensational Materialities: Sensory Cultures of Religion in History, Theory, and Method Sally Promey

This interdisciplinary seminar explores the process and practice of researching and writing sensory and material histories of religious images, objects, buildings, and performances. While the instructor's training and research concern American things and religions, the course considers broader geographical and categorical parameters in its readings so as to invite intellectual engagement with the most challenging and decisive developments in relevant fields. The goal is to study not only the *visual* cultures of religions but also to investigate possibilities for scholarly examination of a more robust human sensorium of sound, taste, touch, scent, and sight, the points where the senses meet material things (and vice versa) in religious life and practice. Topics for consideration include the cultural construction of the senses and sensory hierarchies; the course invites thinking beyond the "Western" five senses to other locations and historical possibilities for identifying the dynamics of sensing human bodies in (trans)national religious practices, experience, and ideas. Prerequisite: permission of the instructor. T 1:30–3:20

HSAR 726a/CPLT 903a/FILM 625a^U, Media and the Logic of Repetition

Francesco Casetti

By its very name, "media" seldom connotes originality, yet cultures grow in new ways through media. New stories or topics most often are variations on original texts or ideas. The seminar confronts this conundrum by analyzing a set of textual practices that are all defined by the presence of a repetition: a text retakes, borrows, copies, or extends a previous text. Repetition functions in parallel with other media practices: technical reproduction (which eliminates the idea of "original"); the extension of narrative (which blurs the boundary of a text); the emphasis given genre and formula (which strengthens the role of text-type); or intermediality itself (which dismantles the idea of a homogeneous discursive field). The course focuses on how repetition works in media, where it is rooted, and what concepts it is connected to. Repetition is analyzed from the point of view of semiotics, cultural history, and philosophy (with reference to scholars such as Barthes, Eco, Benjamin, Deleuze, but also to debates on film and adaptation, film genres, etc.). TH 1:30–3:20

HSAR 727b/AMST 728b/ARCG 772b, The American Interior Edward Cooke, Jr. The course historicizes and theorizes the furnishing and cultural function of American domestic space from the colonial period to the present. It charts developments over time with an eye toward themes such as gendered consumption, accumulated possessions, en suite decoration, separation of public and private space, identity formation, interest in domesticating cultural tourism, professionalization of the interior designer or architect, desire to reshape domesticity, rise of interior decorators, and impact of technology. The course also makes use of collections at Yale. W 9:25–11:15

HSAR 730b/JDST 716b/REL 955b/RLST 794b, Jewish Space Margaret Olin The seminar examines modern concepts of Jewish space, concentrating on how people have imagined, constructed, or enacted space in Jewish life from the nineteenth century to the present. The course is structured around three themes: the characteristic blend of the secular and sacred; the relation between space and time; and the relation between Jews and others. The types of spaces considered range from the secular to the ritual, memorial, and spiritual. Thus ways in which spaces are constructed or conceived to include or exclude Jews are considered, as are spaces where people mingle with one another in imagination or reality. The themes overlap, particularly in cases in which concepts of time merge with concepts of space, as in spaces, such as the Eruv, that are activated only at certain times. Examples of spaces treated include synagogues (modern buildings and ancient objects of modern scholarship), Eruvim, prison (or concentration) camps, baseball fields, Jewish museums, and Eretz Israel. Readings include theorists of space such as Henri Lefebvre and Michel de Certeau as well as writers associated (as primary or secondary sources) with the particular case studies. Students make presentations and submit papers on topics of their choosing in consultation with the instructor. A major aim of the seminar is a better understanding of the role of space in concepts of Jewish identity, as conceived by Jews and others. Qualified undergraduates are welcome. T 1:30-3:20

HSAR 732a, American Vernacular Architecture Edward Cooke, Jr.

Through readings, field exercises, and research, the course grounds the student in the theories and methodologies of vernacular architecture. Drawing theories and methodologies from a wide variety of disciplines such as architectural history, cultural geography, art history, folklore, social history, and anthropology, the scope of vernacular architecture has grown far beyond a consideration of traditional but less competent folk building to encompass an approach to the study of structures and their environments. W 3:30–5:20

HSAR 733a/AMST 804a, The American Civil War: A Visual and Literary History

Alexander Nemerov

A close consideration of paintings, photographs, poems, and stories of the Civil War, made during and after the conflict (up until the 1890s). Figures to be studied include Herman Melville, Julia Ward Howe, Emily Dickinson, Abraham Lincoln, Winslow Homer, Alexander Gardner, Timothy O'Sullivan, Ambrose Bierce, and Stephen Crane. In addition to developing techniques of close analysis of pictures and literature, we consider questions of place, of being on the spot where a historical event happened, and how awareness of these issues might affect the historian's responsibilities and tasks. With that emphasis in mind, the seminar reconvenes at the end of the academic year, in May 2011, for a field trip to Gettysburg, Washington, D.C., and northern Virginia. T 1:30–3:20

HSAR 791a, History, Memory, and Media in Chinese Art Lillian Tseng The seminar explores how art objects shape memory and intervene in history in China. It first focuses on bronze vessels and stone steles, investigating how media, intention, and reception influence the operation of commemorative art. It then tackles painting and calligraphy, discussing how the fusion of personal memory and collective memory transforms the tangle of the past and the present. Chinese is not required. TH 3:30–5:20

HSAR 803b, Iconicity, Iconology, and Iconopraxis in Indian Art Tamara Sears Icons of divinity have taken on many different forms in South Asian history. A temple or shrine might contain a rock naturally formed in a river bed as a "self-born" emergence of Shiva or Vishnu, next to an elaborately painted plaster sculpture of the goddess Durga. Focusing primarily on medieval-era icons (and their modern remakings and reuses), the course examines the varied ways in which divinity has been made materially present and visually accessible. Questions include: What is the relationship among iconicity, iconology, iconopraxis, and iconoplasty? What are the boundaries between notions of embodiment and modes of representation? Can we perceive, in icons from a premodern past, residues of the cultural practices and ritual actions that brought particular forms into being? How do "ways of seeing" affect (or conversely become produced by) processes of making? What are the connections between modes of visual perception and systems of embedding meaning? What are the social, historical, and institutional processes through which meanings become transformed over time? What does it mean to destroy an icon, and in what ways is the rhetoric of iconoclasm deployed? How do acts of replication and circulation reduce or enhance the power of religious icons? Readings include excerpts from primary textual sources published in English translation; classic essays by Stella Kramrisch, Ananda Coomaraswamy, and Irwin Panofsky; more recent considerations by Michael Meister, Doris Srinivasan, T. S. Maxwell, Padma Kaimal, and Richard Davis; and comparative methodological and theoretical works by W. J. T. Mitchell, Hans Belting, Irene Winter, Bernard Faure, Susan Blier, and Barry Flood. м 3:30-5:20

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 www.info.med.yale.edu/hshm M.A., M.Phil., Ph.D.

Chair Frank Snowden

Director of Graduate Studies William Summers

Faculty Paola Bertucci (History), Mariola Espinosa (History of Medicine), Daniel Kevles (History), David Musto (Child Study Center), Naomi Rogers (History of Medicine; Women's, Gender & Sexuality Studies), Frank Snowden (History; History of Medicine), Bruno Strasser (History of Medicine), William Summers (Molecular Biophysics & Biochemistry), Frank Turner (History), John Harley Warner (History of Medicine; History)

Affiliated Faculty Toby Appel (Librarian for Medical History), Robert Gordon (Geology & Geophysics; Applied Mechanics), Veronika Grimm (Classics), Dimitri Gutas (Near Eastern Languages & Civilizations), Ann Hanson (Classics), Bettyann Kevles (History), Jennifer Klein (History), Michael McBride (Chemistry), Joanne Meyerowitz (History), Jill North (Philosophy), Sherwin Nuland (Surgery), Kevin Repp (Curator, Modern European Books & Manuscripts, Beinecke Library), Cynthia Russett (History), Gordon Shepherd (Neuroscience), Rebecca Tannenbaum (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.

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://info.med.yale.edu/mdphd) and from the Web site of the Section of the History of Medicine (www.med.yale.edu/histmed).

Master's Degrees

M.Phil. and M.A. (en route to the Ph.D.) See Degree Requirements under Policies and Regulations.

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, to fulfill one foreign language requirement, 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 www.info.med.yale.edu/hshm and www.yale.edu/ graduateschool/admissions; or contact Barbara McKay (barbara.mckay@yale.edu).

Courses

[HSHM 631b^U, The Cultures of Western Medicine: A Historical Introduction]

HSHM 633a^U/HIST 916a^U, Introduction to the History of Math: Certainty,

Uncertainty, and the Infinite William Summers

The history of several mathematical topics from antiquity until the present time. Not a mathematics course, but instead an illustration of mathematics as a series of intellectual problems rather than technical accomplishments. TH 1:30–3:20

HSHM 634a^U/AMST 879a^U/HIST 914a^U, Media and Medicine in Modern America

John Harley Warner, Gretchen Berland

An exploration of the relationships among medicine, health, and the media in the United States from 1870 through the present. Focus on newspapers, magazines, professional journals, advertising, exhibitions, radio, film, television, and the Internet; and on interactions among researchers, health professions, medical and public health institutions, journalists, advocacy organizations, the state, industry, and the public. Topics include the changing role of the media in shaping conceptions of the body; creating new diseases; influencing health and health policy; crafting the image of the medical profession; informing expectations of medicine and constructions of citizenship; and the medicalization of American life. TTH 10:30–11:20

[HSHM 639a^U, American Medicine and the Cold War]

HSHM 640a^U/HIST 933a^U, Molecules, Life, and Disease in the Twentieth Century Bruno Strasser

The course explores the transformation of the life sciences in the twentieth century. It focuses on the rise of molecular biology and its understanding of life and disease. It shows how and why the molecular vision of life has achieved such a high level of scientific authority and social legitimacy. It emphasizes the relationship of this transformation to broader intellectual, social, cultural, and political change. TTH 11:35–12:25

HSHM 647b^U/HIST 906b^U, Medicine and Public Health in Latin America,

1820–2000 Mariola Espinosa

Survey of the history of medicine in Latin America from Independence to the present, focusing on the relationships of disease and public health with the construction of state and nation in the countries of the region. Themes include medicine's role in the production and reproduction of race and ethnicity, the treatment of indigenous medical traditions, the sources and consequences of international disease-control efforts, and persisting inequalities in health and health care. TTH 10:30–11:20

[HSHM 670b^U, Magic Bullets and Wonder Pills]

HSHM 676a/HIST 938a/LAW 20332, The Engineering and Ownership of Life

Daniel Kevles

The seminar explores the history of intellectual innovation and intellectual property protection in living matter. Focusing on the United States in world context, it examines arrangements outside the patent system as well as within it. Topics include agriculture, medicine, biotechnology, and law. May be taken as a reading or research course. Open to undergraduates with permission of the instructor. W 1:30–3:20

[HSHM 677b^U, Genetics, Reproduction, and Society]

HSHM 68ob^u/HIST 881b^u, History of Chinese Science William Summers A study of the major themes in Chinese scientific thinking from antiquity to the twentieth century. Emphasis on non-Western concepts of nature and the development of science in China, East-West scientific exchanges, and China's role in modern science. M 1:30–3:20

HSHM 701a/AMST 878a/HIST 930a, Problems in the History of Medicine and Public Health John Harley Warner

An examination of the variety of approaches to the social, cultural, and intellectual history of medicine, focusing on the United States. Reading and discussion of the recent scholarly literature on medical cultures, public health, and illness experiences from the early national period through the present. Topics include the role of gender, class, ethnicity, race, religion, and region in the experience of health care and sickness and in the construction of medical knowledge; the interplay between lay and professional understandings of the body; the role of the marketplace in shaping professional identities and patient expectations; citizenship, nationalism, and imperialism; and the visual culture of medicine. M 1:30–3:20

[HSHM 702b, Problems in the History of Science]

HSHM 706a/HIST 922a, Collecting Nature Bruno Strasser

The course focuses on the role of collections and collectors in the production of natural knowledge between the sixteenth century and the present. From wonder cabinets to electronic databases, collections of natural objects and facts of nature have been crucial to the development of science, medicine, and the state. The course explores court patronage and colonial power, amateur collections and national museums, gift exchange and commodity trade, individual property and collective authorship, secrecy regimes and public disclosures. TH 1:30–3:20

[HSHM 710a, Methods for the Social Studies of Science, Technology, and Medicine]

HSHM 721a/HIST 907a, Readings in the History of Science and Medicine in Latin America Mariola Espinosa

A close look at recent literature on the history of science and medicine in a Latin American geographical framework. We explore current trends in the history of Latin America including topics such as early exploration, colonial administration, state formation, race relations, economic and social interactions, transnational relations, gender issues, and nationalism, among others. M 9:25–11:15

HSHM 728a/HIST 903a, The Global Challenge of Malaria Frank Snowden

The global challenge of malaria examined in comparative and historical context. The mosquito theory of transmission and other developments in scientific understanding of the disease; World Health Organization strategies to eradicate malaria since 1955; the development of tools such as insecticides, medication, and bed nets; the attempt to create an effective vaccine. T 1:30-3:20

[HSHM 730a, Disease and Medicine in the Caribbean, 1492-2000]

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 colonialism and prostitution; repression and regulation of birth control; the teaching of sex education; the public celebration and denial of sexual difference; politics of sexually transmitted diseases, including HIV/ AIDS; public health and legal efforts to define and restrict abortion; the pathologizing and identity politics of transgendered people; and the development and regulation of artificial insemination and other methods of reproductive technology. W 1:30–3:20

[HSHM 740b, The Cultures of American Medicine]

HSHM 743a/HIST 984a, Shell Shock to PTSD: The History of Wartime Mental

Illness Bruno Cabanes, Deane Aikins

This research seminar explores the evolving historical consequences of exposure to extreme combat stress, from World War I to the present, and the medical and psychiatric treatments and policies created as a response. Class format includes weekly lectures as well as presentations from historians, care providers, policy makers, and veterans. We encourage interdisciplinary approaches and enrollments. W 9:25–11:15

HSHM 914a or b, Research Tutorial I By arrangement with faculty.

HSHM 915a or b, Research Tutorial II By arrangement with faculty.

[HSHM 919b/WGSS 732b, Research in Twentieth-Century U.S. Health, Medicine, and the Body]

HSHM 920a or b, Independent Reading By arrangement with faculty.

HSHM 930a or b, Independent Research

By arrangement with faculty.

IMMUNOBIOLOGY

Anlyan Center (TAC) S555, 203.785.3857 http://info.med.yale.edu/immuno Ph.D. (M.S., M.Phil. en route)

Chair Richard Flavell

Director of Graduate Studies Alfred Bothwell (TAC S641B, 203.785.4020, alfred.bothwell@yale.edu)

Director of Graduate Admissions

Susan Kaech (TAC 641B, 203.737.2423, susan.kaech@yale.edu; *please contact Barbara Giamattei with questions*)

Student Services Officer

Barbara Giamattei (TAC S555, 203.785.3857, barbara.giamattei@yale.edu)

Professors Jeffrey Bender (Internal Medicine), Alfred Bothwell, Joseph Craft (Internal Medicine), Peter Cresswell, Madhav Dhodapkar (Internal Medicine), Jack Elias (Internal Medicine), Richard Flavell, David Hafler (Neurology), Kevan Herold, Paula Kavathas (Laboratory Medicine), Ruslan Medzhitov, Eric Meffre, Jordan Pober, Nancy Ruddle (Epidemiology & Public Health), David Schatz, Mark Shlomchik (Laboratory Medicine), Robert Tigelaar (Dermatology)

Associate Professors Tian Chi, Akiko Iwasaki, Susan Kaech, Warren Shlomchik (Internal Medicine), Bing Su

Assistant Professors Eric Meffre, 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 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 new 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 pneumophilia* 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), and four faculty are funded by the Howard Hughes Medical Institute. The Department of Immunobiology provides one of the largest, highest-ranked integrated 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 eight tracks, encourages individualized attention to maximize scientific interactions. There is complete freedom to work with any of the 260 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 Translational Immunology (HTI) is a new program administered by the Immunobiology department and located at 10 Amistad 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 seven courses for a grade in the Yale Graduate School.

Required graded courses for first- and second-year students are:

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.)

IBIO 531b, Advanced Immunology

Two Immunobiology seminar courses are also required for second-year students and beyond. They are listed under the following numbers: IBIO 536, IBIO 537, IBIO 538, IBIO 539. Immunobiology seminars can be audited if a student has grades in seven other science courses and has taken an IBIO seminar course for a grade. To accommodate the growth of the graduate program, we have expanded the number of Immunology seminar courses offered from one course per year to three courses every two years.

All first- and second-year BBS Immunology students must take: IBIO 600a, Introduction to Research, *taught every fall, credit-only course* IBIO 601b, Fundamentals of Research, *taught every other spring, credit-only course*

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.

Responsible Conduct in Research Training In addition to all other requirements, students must successfully complete IBIO 601b, Fundamentals of Research, by the end of their first year of study.

Teaching Students are required to serve as TA (teaching assistant) for two terms before the end of their sixth term.

Early in their fourth term, students make a thirty-minute presentation to the section 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 months, 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.

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). All students are required to have two meetings with their thesis committee annually, to provide an update on progress and an opportunity for the committee to provide feedback and suggestions.

M.D./Ph.D. Students Majoring in Immunobiology

Required Seven courses for a grade. Out of the seven 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: IBIO 536a, 537a, 538a, 539a (Seminars can be audited if a student has grades in seven other courses and has taken one seminar course already.)

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.

M.D./Ph.D. students are not required to take IBIO 600a, Introduction to Research, but may if they wish.

IBIO 601b, Fundamentals of Research [Ethics]. 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 IBIO 601b, Fundamentals of Research, or its equivalent in the School of Medicine. *Include dates, titles, and faculty.* If the student has not taken 601b or the equivalent, then registration in this class is required.

Biannual committee meetings Each student is required by the Immunobiology section to have a committee meeting every six months. Departmental Research in Progress talks can count. The committee supervisor will then prepare a letter to the DGS summarizing the student's progress.

Master's Degrees

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 Section of Immunobiology faculty may petition for the award of the M.S. degree. At the present time

"satisfactory" is defined as having completed five graduate courses with an average grade of High Pass. Students must petition through the Registrar's Office of the Graduate School.

M.Phil. (en route to the Ph.D.) Following successful completion of the prospectus examination, the student will be entitled to the M.Phil. degree. Once all course work and departmental requirements have been met, the student will advance to candidacy and be A.B.D. ("all but dissertation"). At that point the student will normally focus on research and the writing of the dissertation.

The Web site at http://info.med.yale.edu/bbs offers complete information on the Biological and Biomedical Sciences Program (BBS) and the more than 200 participating faculty.

Courses

For a complete listing of immunology-related courses, see http://info.med.yale.edu/bbs.

IBIO 530a/MCDB 530a^U, Biology of the Immune System Akiko Iwasaki,

Peter Cresswell, Kevan Herold, Susan Kaech, Ruslan Medzhitov, Carla Rothlin, 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, immunodeficiency, HIV/AIDS. MWF 9:25–10:15

IBIO 531b, Advanced Immunology Tian Chi and staff

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 536b, Advanced Immunology Seminar: Human Clinical Immunology

Eric Meffre, Madhav Dhodapkar, Kevan Herold

TH 4

IBIO 539a, Advanced Immunology Seminar: Innate Immunity Ruslan Medzhitov,

Carla Rothlin, Bing Su

TH 4

IBIO 600a, Introduction to Research Alfred Bothwell and staff

Introduction to the research interests of the faculty. Required for all first-year Immunology students. Pass/Fail. TH 5

IBIO 601b, Fundamentals of Research Alfred Bothwell and staff

Seminar discussing proper conduct of research. Required for first-year Immunobiology students and training grant-funded postdocs. TH 4:30

IBIO 603b/GENE 603b, Teaching in the Science Education Outreach Program (SEOP) Paula Kavathas

TAs, along with volunteers, teach three projects in genetics to seventh-graders in two or three New Haven schools. In addition, TAs take a short course on teaching and serve as science judges. Dates and times to be determined. For more details visit www.seop.yale. edu. For teaching credit. Contact Paula Kavathas.

INTERNATIONAL AND DEVELOPMENT ECONOMICS

Economic Growth Center 27 Hillhouse Avenue, 203.432.3610 www.yale.edu/ide M.A.

Director

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. A few have gone on to further academic work such as law school and to Ph.D. programs in economics, environmental sciences, and political science. 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 term courses, five of which make up the core elements of the IDE program and are required; the remaining three are graduate electives. The required courses are Microeconomics; Macroeconomics; Econometrics; International Economics; and Development Economics. These required courses are designed to provide a rigorous understanding of the economic theory necessary for economic policy analysis.

An option of a second year of nondegree elective study is available to qualified students. The Development Studies Certificate offered through the MacMillan Center, for example, could be completed during this time.

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.

INTERNATIONAL RELATIONS

The MacMillan Center Jackson Institute for Global Affairs 136 Rosenkranz Hall, 203.432.3418 http://jackson.yale.edu M.A.

Director

James Levinsohn

Director of Graduate Studies

Cheryl Doss (139 RKZ, 203.432.9395, cheryl.doss@yale.edu)

Professors Julia Adams (Sociology), Abbas Amanat (History), Ivo Banac (History), Michele Barry (Medicine), Seyla Benhabib (Political Science), Frank Bia (Medicine), David Blight (History), Paul Bracken (Management), Elizabeth Bradley (Public Health), Garry Brewer (Forestry & Environmental Studies; School of Management), William Burch, Jr. (Forestry & Environmental Studies), Paul Bushkovitch (History), David Cameron (Political Science), Amy Chua (Law), Deborah Davis (Sociology), Michael Dove (Forestry & Environmental Studies; Anthropology), Keller Easterling (Architecture), Eduardo Engel (Economics), Laura Engelstein (History), J. Joseph Errington (Anthropology), Daniel Esty (Forestry & Environmental Studies; Law), Robert Evenson (Emeritus, Economics), Owen Fiss (Law), Paul Freedman (History), John Gaddis (History), Jeffrey Garten (School of Management), Timothy Guinnane (Economics), Koichi Hamada (Economics), Valerie Hansen (History), Robert Harms (History), Paula Hyman (History), Gilbert Joseph (History), Donald Kagan (History), Stathis Kalyvas (Political Science), Dean Karlan (Economics), Stephen Kellert (Forestry & Environmental Studies), William Kelly (Anthropology), Paul Kennedy (History), Daniel Kevles (History), Benedict Kiernan (History), Harold Koh (Law), Theodore Marmor (Management), Enrique Mayer (Anthropology), Robert Mendelsohn (Forestry & Environmental Studies), John Merriman (History), William Nordhaus (Economics), Sharon Oster (Management), Catherine Panter-Brick (Global Affairs; Anthropology), Thomas Pogge (Philosophy), Sally Promey (ISM; American Studies; Religious Studies), Douglas Rae (School of Management; Political Science), Gustav Ranis (Emeritus, Economics), W. Michael Reisman (Law), John Roemer (Political Science), Susan Rose-Ackerman (Political Science; Law), Frances McCall Rosenbluth (Political Science), K. Geert Rouwenhorst (Management), Bruce Russett (Political Science), Nicholas Sambanis (Political Science), Lamin Sanneh (Divinity; History), Kenneth Scheve (Political Science), T. Paul Schultz (Economics), Stuart Schwartz (History), James Scott (Political Science), Martin Shubik (Management), Helen Siu (Anthropology), Stephen Skowronek (Political Science), Frank Snowden (History), Timothy Snyder (History), Jonathan Spence (History), T. N. Srinivasan (Economics), Peter Swenson (Political Science), Ivan Szelenyi (Sociology), Adam Tooze (History), Frank Turner (History), Christopher Udry (Economics), John Wargo (Forestry & Environmental Studies), Laura Wexler (American Studies; Women's, Gender & Sexuality Studies), Jay Winter (History)

Associate Professors Marian Chertow (Forestry & Environmental Studies), Thad Dunning (Political Science), Ellen Lust (Political Science), Jennifer Prah Ruger (Epidemiology & Public Health), Steven Stoll (History)

Assistant Professors Christopher Blattman (Political Science), Patrick Cohrs (History), Keith Darden (Political Science), Beverly Gage (History), Michael Gasper (History), Susan Hyde (Political Science), Kaveh Khoshnood (Epidemiology & Public Health), Nikolay Marinov (Political Science), Michael McGovern (Anthropology), Hala Nassar (Near Eastern Languages & Civilizations), Mridu Rai (History), Vivek Sharma (Political Science)

Senior Lecturers Cheryl Doss (Global Affairs; Economics), Charles Hill (International Security Studies), Stephen Latham (Political Science; Management), John Negroponte (International Security Studies; Global Affairs)

Lecturers Tassos Belessiotis (Global Affairs), Michael Boozer (Economics), Pia Rebello Britto (Global Affairs; Child Study Center), Becky Conekin (History; Global Affairs), Leslie Curry (Epidemiology & Public Health), Stuart Gottlieb (Global Affairs), Lloyd Grieger (Global Affairs), Ben Herzog (Global Affairs), Debbie Humphries (Epidemiology & Public Health), Teresa Janevic (Global Affairs; Global Health), Ratna Kapur (Law), Matthew Kocher (Political Science), Jean Krasno (Political Science), Alice Miller (Law), Beth Daponte Osborne (Management), Aunchalee Palmquist (Global Affairs; Global Health), Mikaela Rogozen-Soltar (Anthropology; Middle East Studies), Nancy Ruther (Political Science), Jonathan Schell (Global Affairs), Michael Skonieczny (Epidemiology & Public Health), Kristina Talbert-Slagle (Global Affairs; Global Health), Weitse Tol (Global Affairs; Global Health), Nils Weidmann (Global Affairs)

Adjunct Professor Patricia Pessar (Anthropology; American Studies)

Visiting Professors Jolyon Howorth (*Political Science; Global Affairs*), John Kane (*Global Affairs*), Nicoli Nattrass (*Global Affairs*), Jeremy Seekings (*Global Affairs*)

Senior Fellows Linda Jewell (*Global Affairs*), Flynt Leverett (*Global Affairs*), Hillary Leverett (*Global Affairs*), Rakesh Mohan (*Global Affairs*; *Management*), Marwan Muasher (*Global Affairs*), Stephen Roach (*Global Affairs*)

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 Master's Degree in International Relations. The fifty to sixty students in this program combine fundamental training in core disciplines of international relations with an individualized concentration that has relevance to current international issues.

Fields of Study

The two-year program is designed to combine breadth of knowledge of the basic disciplines of international relations with depth of specialization in a particular academic discipline, geographic area, specialized functional issue, and/or professional field. It is designed primarily for students seeking an M.A. degree before beginning a career in global affairs but also supports students interested in going on for a Ph.D. in economics, history, or political science. Joint degrees are offered with the School of Forestry & Environmental Studies, the Law School, the School of Management, and the School of Public Health.

Special Admissions Requirements

Applicants 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, 253 on the computer-based test, or 102 on the Internet-based test. Entering students must have taken introductory courses in microeconomics and macroeconomics prior to matriculation.

Special Requirements for the Master's Degree

The M.A. in International Relations requires two years of graduate study at Yale. To complete the degree, students must take sixteen courses that fulfill the core and concentration requirements, demonstrate proficiency in a modern language, satisfy a research requirement, complete a summer internship or project, and maintain the grade average specified below.

CORE

The substantive core consists of seven graduate-level courses: two history courses (one regional and one comparative international); two in political science (one in comparative politics and one in international relations theory); two in economics (one economic analysis and one international economic analysis); and the foundations course in international relations (see course description below for INRL 700a, required in the first term). Each term, a list of courses meeting these requirements is available from the International Relations registrar.

CONCENTRATION

Beyond the core courses, 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). The concentrations require a minimum of eight courses in the fields selected. Some of the courses may be cross-listed in two or more departments. 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 International Relations Web site.

LANGUAGE REQUIREMENT

Three years of college-level language study or its equivalent in language mastery is required to graduate. This competence must be demonstrated through successful completion of course work or by passing a proficiency examination. 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; a maximum of two of the sixteen course credits for the two-year program may be in languages. Students pursuing joint-degree programs are encouraged to fulfill all language requirements before beginning the program; they cannot count language courses toward their degree requirements.

SUMMER INTERNSHIP REQUIREMENT

All students enrolled in the International Relations 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 employment or an 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 DGS before June 1 stating the nature of his or her summer internship or approved alternative.

RESEARCH REQUIREMENT

Students are required to demonstrate that they have completed a major research paper, either through their course work or an independent study project. Students must submit the paper to the DGS for final approval.

EXPECTATION OF ACADEMIC PERFORMANCE

M.A. candidates are required to achieve at least two grades of Honors, and their remaining grades must average to at least High Pass. (To have a High Pass average, any grade of Pass must be offset with an additional grade of Honors beyond the required two.) Students are expected to complete eight graduate term courses in their first year, earning at least one Honors, with a High Pass average in the remaining courses. At the end of the first year, students who do not have at least a High Pass average in eight graduate term courses will not be allowed to continue in the program.

Special Requirements for the 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 candidates are required to fulfill the core and concentration requirements of the International Relations program. An overlap of two courses is allowed between the core and concentration, with a maximum of two additional courses credited toward both degrees. 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. Under no circumstances will students be allowed an International Relations 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 International Relations 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.

Graduate Certificates of Concentration

For information on the Certificate of Concentration in Development Studies, the Certificate of Concentration in International Security Studies, or the Certificate of Concentration in Global Health, see the section on the Jackson Institute for Global Affairs under Non-Degree-Granting Programs, Councils, and Research Institutes in this bulletin.

For more information, visit http://jackson.yale.edu, e-mail international.relations@yale. edu, write to International Relations, Yale University, PO Box 208206, New Haven CT 06520-8206, or call 203.432.3418.

Courses

INRL 507b^U, Contemporary Arab Political Reform Marwan Muasher

The pace of political reform in the Arab world. Causes of political stagnation; the influence of Arab nationalism and Islamic political forces on the process of reform; the knowledge, freedom, and gender gaps that separate the Arab region from the rest of the world; recent efforts by government and nongovernment actors to push reform forward; whether Arab regimes are capable of reforming themselves; what role outside players should have in the reform process. M 9:25–11:15

INRL 514a^U/ARCH 4216a^U, Globalization Space: Global Infrastructure and Extrastatecraft Keller Easterling

Global infrastructures and spatial products as a medium of transnational politics. Case studies travel around the world to, for instance, a resort in the DPRK, golf courses in China, IT campuses in South Asia, high-speed rail in Saudi Arabia, cable/satellite networks in Africa, and automated ports. As materializations of capital these spaces index labor and resources while also possessing cunning political dispositions and parastate functions. MW 10:30–11:20, 1 HTBA

INRL 524a/HPA 599a/LAW 20576/PHIL 709a/PLSC 594a, Global Health Ethics,

Politics, and Economics Thomas Pogge, Jennifer Prah Ruger

Billions lack access to basic medical care, and global health inequalities are wide and growing. Such radical disparities cast doubt on the justice of supranational institutional arrangements (such as the TRIPS Agreement) and also pose ethical challenges for the global health community, especially international and domestic health and development institutions. Seeking to illuminate the normative issues involved, the course features a series of distinguished visitors, including academics as well as a few important representatives of international organizations, politics, foundations, NGOs, and relevant industries. Follows Law School academic calendar. T 10:10–12

INRL 525a^U, Global Health Research: Methodological and Ethical Considerations

Kaveh Khoshnood

Recognizing the political, economic, social, and cultural factors that influence health, this course is designed to prepare graduate and advanced undergraduate students to develop

their own short-term global health research proposals to be conducted in resourceconstrained settings. Quantitative, qualitative, and mixed-method approaches, the ethical aspects of conducting research in resource-constrained settings, and the process of obtaining human subjects' approval are among topics discussed. Designed for those with little or no prior independent research experience and those who have not previously taken a course on research methods. Prerequisite: a course on statistics (may be taken concurrently) or permission of the instructor. F 9:25–11:15

INRL 527a^U, Comparative and International Bioethics Stephen Latham

Approaches in different countries, both developed and developing, to a number of core issues in biomedical ethics: organ transplants, end-of-life care, human-subject research, and access to health care. Readings in primary and secondary sources, including international treaties and standards. TTH 9–10:15, 1 HTBA

INRL 528b^U/HPA 592b, Strategic Thinking in Global Health Elizabeth Bradley,

Leslie Curry, Michael Skonieczny

The course defines and applies a set of core principles regarding development and implementation of grand strategy and problem solving in global health. Students understand and apply principles of grand strategy and strategic problem solving, which are taught at both a conceptual and a practical level as applied to common problems in global health. Students develop expertise in political and policy analysis as well as organizational theory and leadership skills that are central to addressing global health issues in low-and middle-income countries. M 3:30-5:30, 2 HTBA

INRL 549b/E&RS 652b, The European Union's Contemporary Challenges

Tassos Belessiotis

Each year, the course addresses a different set of issues facing the EU. Recent issues have included trade policy, regulation policy, building European monetary power, international trade policy and the WTO, and science, precaution, and policy making. The course is taught by the EU fellow visiting the MacMillan Center. HTBA

INRL 559a^U, Evolution of Central Banking and Financial Regulation

Rakesh Mohan

The conduct of monetary policy and of financial regulation is integral to the economy as a whole. The course explores theoretical and policy perspectives as well as empirical debates in central banking since the turn of the twentieth century. At the course's conclusion, students should appreciate the practice of central banking as it has evolved and better understand the ongoing global economic and financial crisis. Prerequisite: intermediate macroeconomics. TH 1:30–3:20

INRL 560a/ECON 544a, Economic Analysis Cheryl Doss

Introduces International Relations students to more advanced concepts in economics. Course emphasizes reading and evaluating the economic content of articles on a wide range of topics, including consumer behavior, firm behavior, comparisons of welfare, labor markets, capital markets, and public goods. These articles represent research from both developed and developing economies. Prerequisite: microeconomics. MW 9–10:15
INRL 561b/ECON 708b, International Economic Analysis Cheryl Doss

A continuation of INRL 560a. Extends the use of economic analysis to international economic issues with a focus on international trade and growth and development. In addition, emphasis is placed on quantitative tools and analysis of data to address international economic issues and evaluate policies. The second half of the course focuses on readings of current issues and debates on international economic issues, including relationships among trade liberalization, poverty and inequality, economic growth, and globalization. W 1:30–3:20

INRL 566a^U/AFST 766a, Comparative Welfare Policy in Developing Countries

Jeremy Seekings

Examination of public and private welfare systems in the developing world. Analysis of the evolving relationships between kin or community and states and market. Particular attention is paid to the politics of contemporary reforms. W 2:30-4:20

INRL 572b^U, **U.S. Public Diplomacy in the Twenty-First Century** Linda Jewell Practices, institutions, and critical issues in public diplomacy explored from the perspective of a diplomatic practitioner. Media relations, cultural diplomacy, and international broadcasting; the role of government agencies beyond the State Department in formulating and carrying out public diplomacy; the impact of the information revolution on traditional diplomacy. T 1:30–3:20

INRL 574a^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

INRL 585a/NELC 507a^U, Modern Arab Thought Hala Nassar

Major trends of twentieth-century Arab thought critically examined through readings in translation from a wide range of thinkers. Issues are analyzed in the context of the historical-colonial, postcolonial, and neocolonial background from which they emerged. TH 3:30–5:20

INRL 592a/PLSC 662a^U/MGT 586a, Strategy, Technology, and War Paul Bracken The interrelationship of strategy, foreign policy, and technology has shaped international relations from Napoleon to the global information grid. Transformations arise from political change and technological advance. Topics include the role of "big" military organizations in the United States, Europe, and Asia; organizing for defense and intelligence; arms control; and the challenge of a second nuclear age. HTBA

INRL 597b^U, Democrats at War John Kane

Democracies are generally supposed to be peaceful by nature, fearing war as dangerous to the survival of popular government because of the consequent militarization and centralization of power. Democratic peace theory, moreover, states that democracies do not go to war with one another. Nevertheless, democracies have not infrequently conducted wars, large and small, with other states or peoples. The class explores the kinds of reasons that democracies enter wars, the ways they conduct them, and how they exit from them, as well as the effects that such wars have on the democratic polity itself. HTBA

INRL 610b, Topics in Modern Middle East Studies Mikaela Rogozen-Soltar The course is intended for students who plan to obtain the Graduate Certificate of Concentration in Modern Middle East Studies. A major requirement of the course is attendance at weekly brown bag seminars hosted by the Council on Middle East Studies, which include speakers from a variety of academic disciplines and other backgrounds addressing political, economic, social, cultural, and historical issues across the Middle East/North Africa region. Students attend the presentations and separate discussion sections, and fulfill writing assignments. W 12–1:20, 1 HTBA

INRL 611b, Globalization and Grand Strategy: The United States, Rising Asia, and the Persian Gulf in the Twenty-First Century Flynt Leverett

The course examines two related sets of issues that will substantially influence the structure of international relations in the twenty-first century. First, the course looks at the Persian Gulf as one of the world's most important emerging "nodes" of economic globalization – in energy, finance, and the distribution of global production in a growing number of business sectors. Second, the course explores the intensifying competition for strategic influence in the Gulf between the United States, the established regional "hegemon," and Asian economic powers – especially China, the preeminent "rising" power. M 1:30–3:20

INRL 619a, U.S.-Iranian Diplomacy Hillary Leverett

The course explores specific episodes of U.S.-Iranian diplomatic engagement since the Iranian revolution and the establishment of the Islamic Republic of Iran in 1979. The course also includes a detailed diplomatic "war game" that provides hands-on exposure to the domestic and international dynamics that will shape possibilities for U.S.-Iranian engagement in the future. M 1:30-3:20

INRL 620a, Research Seminar in Medical Anthropology and Global Health

Aunchalee Palmquist

нтва

INRL 622a/HIST 718a, Social Movements in Comparative Perspective

Becky Conekin

In this seminar we explore post-WWII social movements and their legacies across Western Europe and the United States. 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 Western Europe and North America. In addition, if students have specific interests in Eastern European and/or Latin American countries, they may bring these into the discussion and write on them in a comparative perspective in their final paper. 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 brief look at the social movements that developed out of the 1960s. T 9:25-11:15

INRL 623b, Food, Health, and Society in Global Perspective Aunchalee Palmquist HTBA

INRL 624b, The Role of Water in Infectious Disease Kristina Talbert-Slagle

Water is fundamental to life. We cannot survive without it, and yet unsafe water threatens the health of people around the world. The course focuses on the role of water in infectious disease, with emphasis on the myriad ways that water affects the spread of disease, how poor sanitation contributes to unsafe water, and the different interventions that may improve water quality – and therefore, health – of people around the world. HTBA

INRL 627b/HPA 531b, Health in Societies in Transition: Eastern Europe and Former Soviet Union Teresa Janevic

The collapse of the socialist regimes of Eastern Europe and the former Soviet Union (EE/FSU) following 1989 has had a profound effect on both health care systems and population health in Eastern Europe and Central Asia. The unique social and economic transition this region has experienced has resulted in public health challenges distinct from those of many low-income and high-income countries, along with some marked successes. The course critically reviews these issues, using a multilevel conceptual framework of the determinants of health that incorporates macro-level factors (e.g., public policy, conflict, and political economy); community-level factors (e.g., social cohesion and stress); and individual-level factors (e.g., health behavior). While each session is designed to explore a particular topic in depth, a number of crosscutting issues are addressed throughout the term: for example, human rights, inequalities in health, health and development, political and economic transition and health, demographic transition and health, and health system decentralization. A multidisciplinary perspective is welcomed in class discussion and class assignments. T 3:30–5:20

INRL 634b, Citizenship in Transatlantic Perspective Ben Herzog

For centuries now, many citizens and thinkers have assumed that four major institutions largely overlap: the state, the nation, society, and a geographically bounded (national) economy. "Nation" has provided a potent political formula for organizing the world in this image. The seminar examines the concept of national citizenship, contrasting it to the alternative idea, and emergent practice, of multiple political allegiances. We analyze the different citizenship regimes in the Western world: civic (France), ethnic (Germany), federal (United States), multitiered (Switzerland), and postnational (European Union). HTBA

INRL 640a, Democracy Promotion: Theory and Practice Susan Hyde

Why has democracy promotion become a major component of foreign policy? Do attempts to promote democracy by states and international organizations have the intended effects? Most developed democracies and international organizations such as the European Union, the United Nations, and the Organization of American States now actively promote the development of democratic political institutions in other states. The course examines the methods used to promote democracy, justifications for the use of

democracy promotion as foreign policy, the variety of actors who engage in democracy promotion, and the relationship between domestic and international actors in democratization, and it concludes with practical evaluation of the effectiveness of various efforts to promote democracy. Students write a proposal to encourage or strengthen democracy in a specific country, taking into account the state of the art in democracy promotion as well as the major challenges presented by the social, economic, and historical characteristics of the country. M 3:30–5:20

INRL 650b, Non-State Actors in World Politics Susan Hyde

International relations is traditionally studied as interaction between nation-states. However, the role of non-state actors such as international organizations, transnational advocacy networks, multinational corporations, and terrorist networks has become an important element of world politics. After reviewing types of non-state actors and how non-state actors fit into international relations theory, the course focuses on the extent to which non-state actors are important in the international politics of specific issue areas such as human rights, terrorism, globalization, and international environmental politics. T 3:30-5:20

INRL 654b, 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. W 1:30–3:20

INRL 657a/HIST 759a, One World? International History, 1914–1991

Patrick Cohrs

This research seminar pursues both a historical and a theoretical reexamination of the modern international system in the "short" twentieth century, analyzing why it was so profoundly transformed between the era of imperialism preceding World War I and the end of the Cold War. Main themes include the origins of international conflicts from the Great War and the Great Depression to the U.S.-Soviet antagonism; the peace settlements after the world wars (or absence thereof); American postwar policies and their significance for European integration and the reconstruction of Japan; changing regional configurations in East Asia, Latin America, Africa, and the Middle East; and the question why the Cold War ended as it did. Particular attention to the changing premises and constraints of international politics that influence the making and unmaking of legitimate international orders in the twentieth century. T 3:30–5:20

INRL 658b/HIST 802b, Classic and New Approaches to International History

Patrick Cohrs

This graduate 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 in which trends may have had the opposite effect. On this basis, the seminar seeks to explore what are the new frontiers of scholarship. T 3:30–5:20

INRL 66ob/PLSC 693b, International Political Economy Kenneth Scheve

The course examines how domestic and international politics influence the economic relations between states. It addresses the major theoretical debates in the field and introduces the chief methodological approaches used in contemporary analyses. We focus on four types of cross-border flows and the policies and international institutions that regulate them: the flow of goods (trade policy), the flow of capital (financial and exchange rate policy), the flow and location of production (foreign investment policy), and the flow of people (immigration policy). T 9:25–11:15

INRL 686a/LAW 20568, Sexual Rights: Perspectives from International and Comparative Law Alice Miller

The seminar explores the legal and political aspects of sexual rights claims in contemporary international, regional, and selected national forums. The term "sexual rights" has been increasingly used in national and international settings to encompass an expanding universe of claims relating to sexuality; these include freedom and equality of sexual orientations and behaviors, freedom from sexual violence, conditions for sexual health, rights to sexual expression and association, rights to marry and form families, as well as rights to sexual relationships without marriage, and freedom to determine the relation between sexuality and reproduction. These claims are grounded in legal guarantees that are found in many different legal instruments, such as those relating to privacy, health, nondiscrimination, information, expression, association, and freedom from torture and arbitrary detention. Judicial, activist, and scholarly arguments for sexual rights (particularly those outside the United States) often borrow heavily across borders, invoking international, regional, and comparative standards. The status of sexual rights claims varies widely in national and regional courts, however, and political and doctrinal approaches are often inconsistent or inapplicable across claimants. Complications in building national and transnational coherence stem from cross- and intracultural differences of gender, racial and age-based social organization and norms, as well as the diversity of national legal doctrines and advocates' interests. Key questions guiding the seminar include: How does sexual rights advocacy fit with other justice claims in debates about globalization and justice? What role does sexual rights claiming and attendant legal challenges play in national and global politics? What are the tensions between the push for transnational rights advocacy and local specificity? What impact does the turn to law have on these debates? HTBA

INRL 688a/LAW 20555, Comparative Feminisms and Law Ratna Kapur

What is feminism and how does it relate to feminist struggles for social change? How can feminist legal thinking advance understandings of feminist engagements with law?

In this seminar, we explore the various ways in which gender has been addressed in different feminist approaches to law and how these different approaches impact on women's rights, especially in different cultural, historical, and political contexts. The seminar engages with fundamental questions that confront feminists globally, in particular: What happens to feminist engagements with law when gender is no longer the lynchpin for political action? Can a women-centered approach survive the politics of diversity and historicity? Does diversity or an anti-essentialist position enable or disable feminist engagements with law? What do the critiques reveal about the mechanics of law and its role in women's empowerment? Paper required. Enrollment limited to sixteen. HTBA

INRL 691b, Sites of Global Leadership John Kane

The class asks what, in this globalizing world, are the sites and centers of leadership that might address common problems and issues or, alternately, that might positively hinder them (on the premise that al Qaeda, for example, also exerts effective leadership). It looks at leadership roles in such sites as the UN, World Bank, WTO, various NGOs, business organizations, religious establishments, individual nations, and so on. HTBA

INRL 692a/LAW 20559, Human Rights and Difference Ratna Kapur

The course focuses on how and why the relationship between human rights and its "Others" has been highly fraught and replete with tensions. Gender and cultural difference are the primary focus for exploring and unpacking two central claims on which human rights law is based: first, that human rights are universal; and second, that human rights are an optimistic, progressive, and emancipatory pursuit. These claims are interrogated through the course materials focusing on themes such as the treatment of difference and how the "Other" has been addressed in human rights law. The readings expose students to some of the challenges posed by those who argue that human rights are culturally specific to the West, and therefore inappropriate in non-Western cultural contexts; or that they are a ruse for pursuing neo-imperial or neoliberal agendas; or that they are exclusive and available to some subjects, not all subjects. Paper required. Enrollment limited to sixteen. HTBA

INRL 695b, Strategies of World Order Charles Hill

Tracking and evaluating major intellectual conceptions on which today's international politics, wars, revolutions, diplomacy, and structures for peace and security are grounded. The continuing influence of ideas from the works of Thucydides, Plato, Aristotle, Tacitus, Augustine, Aquinas, Machiavelli, Hobbes, Locke, Rousseau, Kant, Burke, Marx, Tocqueville, and contemporary thinkers is examined in the context of how strategic thought has developed in response to big societal transformations. Weekly sessions combine presentations, mini-lectures, and seminar discussions. A substantial paper and a final examination. F 1:30–3:20

INRL 700a, The Foundations and Evolution of the International System

Jolyon Howorth

Study of core concepts in the international system including theories and traditions; systemic structures; actors in international politics; anarchy, conflict, and cooperation; deterrence, coercion, and war; and emphasis on case studies viewed from the perspective

of the policy maker. The course focuses on alternative approaches to each topic and case study and aims to enhance skills in research, writing, and presentation. For first-year International Relations M.A. candidates only. M 1:30–3:20

INRL 711b/MGT 585b, Washington and Wall Street: Markets, Policy, and Politics Stephen Roach, Jeffrey Garten

The purpose of the course is to give students a sense of how the financial center of the United States relates to the political center, and vice versa. It focuses on the intersection of markets, policy, and politics in the United States, with considerable attention as well to the global implications. There is a historical dimension to the class, looking at other periods of history when the balance between private and public power was in great transition, and examining some of the individuals who were at the center of these shifts. As the United States digs its way out of the current financial crisis, the course evaluates what the future of financial institutions, financial innovation, and financial regulation might look like, and what the implications are for both economics and politics in the years ahead. Prerequisite: permission of the instructors. HTBA

INRL 713b, Critical Issues in Development Policy Pia Rebello Britto

The focus of the course is on national policy development. Students are exposed to the relationship among international agencies, international development frameworks, human rights instruments, and national governments in formulating national social and public policies with respect to economic and social development. The course uses early childhood, an epoch of human development, as an example to study national policy making. A policy laboratory methodology is employed to demonstrate application of policy development knowledge learned in class to a real-world setting. Selected students are offered the opportunity to travel, during spring break, to a developing country to observe and participate in policy development meetings with high-level policy makers and international development partners. TH 3:30–5:20

INRL 720a, Central Issues in American Foreign Policy Stuart Gottlieb

Examination of the sources, substance, and enduring themes of American foreign policy. Overview of America's rise to global power in the nineteenth and twentieth centuries, and American foreign policy decision making during the Cold War and the post-Cold War era. Special focus on the most current challenges in American foreign policy, including the war on terrorism, the proliferation of weapons of mass destruction, the conflict in Iraq, and America's role in global institutions and the world economy. Attendance at INTS 376a lectures required. W 3:30–5:20

INRL 725b, Terrorism and Counterterrorism Stuart Gottlieb

Examination of the origins and evolution of modern terrorism, and strategies employed to confront and combat terrorism. Assessment of a wide variety of terrorist organizations and the multidimensional causes of terrorist violence past and present. Analysis of the strengths and weaknesses of various counterterrorism strategies from the point of view of efficacy as well as ethics, with a particular focus on ways in which the threat of global terrorism might impact the healthy functioning of democratic states. Attendance at INTS 373b lectures required. W 3:30–5:20

INRL 730a^U, The United Nations and the Maintenance of International Security Jean Krasno

Consideration of the role of the U.N. in preventive diplomacy, using force for peacekeeping, peace enforcement, and peace building, with consideration of the evolution of the U.N. and its role in a post-Cold War international system. For International Relations students and IS/PLSC undergraduates only. W 1:30–3:20

INRL 760a, Policy Workshop Stuart Gottlieb

One-term workshop in which small teams choose (with instructor approval) a specific global policy issue/challenge to be analyzed from a variety of perspectives (government, NGO, private sector) and levels (national, regional, international) showing all sides of the policy-making and implementation process. What are the best policy options? How were they determined? What are the obstacles to their implementation? What more can be done to help develop realistic solutions? Teams ultimately address these and other questions in a policy white paper, and a "brown bag" oral presentation offered through the Jackson Institute. Designed for second-year International Relations M.A. students. Other students may be admitted with instructor approval. w 1:30–3:20

INRL 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

INRL 771a, 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 4-5:15, 1 HTBA

INRL 900a or b, Directed Reading

By arrangement with faculty.

INVESTIGATIVE MEDICINE

Office of Financial Operations 100 Church Street South, Suite 100, 203.785.6842 http://info.med.yale.edu/invmed Ph.D.

Director of Graduate Studies Joseph Craft (invmed@info.med.yale.edu)

Deputy Director

Eugene Shapiro

Professors Karen Anderson (*Pharmacology*), Henry Binder (*Internal Medicine; Cellular* & Molecular Physiology), Joseph Craft (*Internal Medicine; Immunobiology*), David Fiellin (*Internal Medicine; Investigative Medicine*), Thomas Gill (*Internal Medicine; Epidemiology; Investigative Medicine*), Fred Gorelick (*Internal Medicine; Cell Biology*), Jeffrey Gruen (*Pediatrics; Genetics; Investigative Medicine*), Harlan Krumholz (*Internal Medicine; Epidemiology; Investigative Medicine*), Eugene Shapiro (*Pediatrics; Epidemiology; Investigative Medicine*), Eugene Shapiro (*Pediatrics; Epidemiology; Investigative Medicine*), George Tellides (*Surgery; Investigative Medicine*), Mary Tinetti (*Internal Medicine; Epidemiology; Investigative Medicine*)

Fields of Study

The Investigative Medicine program offers a special 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 diseaseoriented 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:

- 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 and be eligible to practice in the United States. 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 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.

Special Requirements for the Ph.D. Degree

The minimum overall course requirements for the doctorate program are nine (9) courses. Full-time 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 and Practical Issues in Clinical Investigation. 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 required curriculum for each program of study is as follows:

COURSE REQUIREMENTS FOR LABORATORY-BASED PATIENT-ORIENTED RESEARCH

IMED 625, Principles of Clinical Research
IMED 630, Ethical and Practical Issues in Clinical Investigation
IMED 635, Directed Reading in Investigative Medicine
IMED 645, Introduction to Biostatistics in Clinical Investigation
IMED 655, Writing Your First Grant Proposal
IMED 680, Topics in Human Investigation
CBIO 601, Molecular and Cellular Basis of Human Disease (spring and fall)
CB&B 740, Clinical and Translational Informatics
Elective (1)

COURSE REQUIREMENTS FOR CLINICALLY BASED PATIENT-ORIENTED RESEARCH

IMED 630, Ethical and Practical Issues in Clinical Investigation
IMED 635, Directed Reading in Investigative Medicine
IMED 655, Writing Your First Grant
IMED 660, Methods in Clinical Research (summer)
IMED 661, Methods in Clinical Research (fall)
IMED 662, Methods in Clinical Research (spring)
IMED 680, 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 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 26–August 6, 2010. MTWTHF 2–4

IMED 630A, Ethical and Practical Issues in Clinical Investigation Henry Binder This termlong course addresses topics that are central to the conduct of clinical investigation, including ethics of clinical investigation, scientific fraud, technology transfer, and interfacing with the pharmaceutical industry. Practical sessions include scientific presentations and teaching, NIH peer review process, journal peer review process, and career development models of academia. The course provides guidelines and a framework for the clinical investigator to obtain funding for, conduct, and present a clinical study. Format consists of didactic 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. Six sessions are required; dates/times by arrangement. Consent of instructor required.

IMED 645a, Introduction to Biostatistics in Clinical Investigation Henry Binder 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 12–23, 2010. MTWTHF 8:30–11:15

IMED 650a, Seminars in Clinical Investigation Eugene Shapiro

In this termlong course a range of topics is covered in the format of an interactive seminar. Topics include detailed evaluation of study designs (cohort studies, case-control studies, and clinical trials), development and validation of indices, review of approaches to methodology and issues related to implementation of the methodology (assuring quality of the data, qualitative research methods, estimation of sample size and statistical power), and introduction to finding sources to fund grant proposals. The format for most of the seminars consists of a didactic presentation followed by intensive discussion of research articles and research protocols. Students lead the discussion in the critical analysis and evaluation of the articles. Attendance and active participation are required. Consent of instructor required. W 2-4

IMED 655b, Writing Your First Grant Proposal Eugene Shapiro

In this termlong 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 either a K-23 or a K-08 grant). 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 research, and health policy. Consent of instructor required.

IMED 68ob, 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 provide 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 www.yale.edu/italian M.A., M.Phil., Ph.D.

Chair Giuseppe Mazzotta

Director of Graduate Studies

Giuseppe Mazzotta [F] (82-90 Wall St., Rm. 404, 203.432.0598) Millicent Marcus [Sp] (82-90 Wall St., Rm. 426, 203.432.0599)

Professors Millicent Marcus, Giuseppe Mazzotta

Assistant Professors Angela Capodivacca, David Lummus

Senior Lector II and Language Program Director Risa Sodi

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 STUDIES

The Department of Italian also offers, in conjunction with the Film Studies Program, a joint Ph.D. in Italian and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film 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 596b/FILM 635b, New Italian Cinema Millicent Marcus

The course is dedicated to an examination, at once panoramic and detailed, of Italian filmmaking since the year 2000. Despite dire predictions of the medium's decline, new developments and emerging talents have contributed to a revival of the cinematic art within the context of a constantly changing cultural environment. The course is organized around a series of case studies that reveal the rise of new auteurs, the formation of generic trends, and the updating of the traditions and conventions that typified an earlier age. Of special interest is the "postmodernization" of filmic language and its problematic relationship to the tradition of realism, with its imperative to civic "reference." Technological issues, above all the shift from analog to digital filmmaking, are among our concerns in the course. We screen a film each week and devote the seminar to a close interpretation of the work, making extensive use of video clips, and relating our analysis to the theoretical and critical issues that necessarily arise. A tentative list of the films includes *I cento passi; La finestra di fronte; Il Divo; Gomorra; Il vento fa il suo giro; Buongiorno, notte; Romanzo criminale; Fame chimica;* and, in a flashback to the 1990s, *Caro diario.* W 3:30–5:20, screenings SU 7:30–10

ITAL 642a, Curiosity and the Trials of Early Modern Imagination

Angela Capodivacca

Contemporary scholarship has identified a drastic change in the imagery of curiosity between the thirteenth and the seventeenth centuries, and connected it to Humanism, the discovery of the New World, and the founding of a modern scientific method. In this course we read a host of Renaissance texts focusing on their different portrayals of curiosity given by Petrarch (*Familiares*), Politian (*Lamia*), Machiavelli (*Asino, Belfagor*), Gianfrancesco Pico della Mirandola (*Strix*), Teofilo Folengo (*Chaos*), Veronica Franco (*Terze rime*), Moderata Fonte (*Floridoro, Merito delle donne*), and Tasso (*Gerusalemme liberata*). M 7–8:50

ITAL 644b, Renaissance Drama Angela Capodivacca

The course is designed to introduce students to the tradition of Renaissance drama through the examination of the metatheatrical strategies and features employed to both comment and direct the role of modern theater. We read plays by Politian (Orfeo), gli Intronati (Ingannati), Ariosto (I suppositi, Lena), Machiavelli (Andria, Mandragola, Clizia), Aretino (Cortigiana, Marescalco), Ruzzante (Moscheta), Tasso (Aminta, Re Torrismondo), Anonimo (Venexiana), Andreini (Mirtilla), Bruno (Il candelaio), and Bernini (L'impresario), setting them in the context of High Renaissance and Baroque culture to explore how they reflect the profound political-social crisis of the period as well as the classical literary tradition, which they both imitated and transformed. Through close readings of metatheatrical features, the course explores the social, political, and aesthetic role played by the theater of the Italian Renaissance with attention to the role of comedy; the influence of Humanism; the development of secular drama; the reawakening of classic texts; the ways in which drama reflected and influenced Renaissance society. Special attention is dedicated to how subjectivity and gender are "performed" in the early modern period and how their performance onstage is construed. We consider topics such as crossdressing, the emergence of the role of the female actress, the dynamics of spectatorship,

the development of perspective in painting and theater, and the staging of court power relations. Students are encouraged to pursue their specific interests within the context of the course. In Italian. TH 2:30-4:20

ITAL 691a/b, Directed Reading Giuseppe Mazzotta

ITAL 701a, Romantic Quarrels Giuseppe Mazzotta

The course examines the extraordinary intellectual and political feverishness that characterizes Italian history between the time of the French Revolution and the achievement of the national unity of the country (1861). Radical literary theories, terrorist political practices, epoch-making literary works, and passionate debates about aesthetics mark this period. Its vitality and contradictions emerge from a reading of selected works by Cuoco, Alfieri, Foscolo, Leopardi, Mazzini, Manzoni, Rosmini, and De Sanctis. They all in varying degrees explore the nexus between the idea of a "country," the sense of secret revolutionary action (the so-called Risorgimento), the value of the classical heritage, and the need for the emergence of a new sense of history and a new philosophical discourse that would be addressed also for Europe. In Italian. T 3:30–5:20

ITAL 702b, Theory of the New from Petrarch to Vico Giuseppe Mazzotta

The course studies the unfolding of the consciousness of modernity in Italian literary and intellectual tradition over just about four centuries from the perspective of Vico's *New Science*. It maps the value and weight of antiquity and the tangle of fascination, sense of inevitability, and fear that the "new" arouses in some of the central figures of the Renaissance. Special attention is paid to the deliberate quest for the "new" (especially in Alberti, Valla, and the scientific discoveries of Columbus and Vespucci). But the political complexities and fears that new events represent (Machiavelli), and the theological arguments over scientific and philosophical novelties (Galileo, Bellarmine, Bruno, and Campanella) are also examined. T 3:30-5:20

LINGUISTICS

370 Temple Street, Rm. 204, 203.432.2450 www.ling.yale.edu M.A., M.Phil., Ph.D.

Chair

Stephen Anderson [F] Robert Frank [Sp]

Director of Graduate Studies

Maria Piñango (370 Temple, 203.432.4145, maria.pinango@yale.edu)

Professors Stephen Anderson, Robert Frank, Roberta Frank (*English*), Laurence Horn, Stanley Insler, Frank Keil (*Psychology*), Zoltán Szabó (*Philosophy*), Raffaella Zanuttini

Associate Professors Ann Biersteker (*African Language Program*), Claire Bowern, Darya Kavitskaya, Maria Piñango, Kenneth Pugh

Assistant Professors Ashwini Deo, Gaja Jarosz, Jelena Krivokapić

Lecturers Timothy Hunter, Einar Mencl, Erich Round, Tamina Stephenson, Matthew Wolf

Supporting faculty in other departments J. Joseph Errington (*Anthropology*), William Hallo (*Near Eastern Languages & Civilizations*)

Fields of Study

Fields include phonetics, phonology, morphology, syntax, semantics, pragmatics, neuroand psycholinguistics, computational linguistics, historical linguistics, and descriptive study in 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 make up 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 requirements 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 to which students are exposed. The course work requirements are designed to accomplish these dual goals.

Years one and two. During their first four terms, students must complete a minimum of fourteen term courses at the graduate level. These courses must include an eight-course core, together with a set of three courses exposing students to a range of methodologies in linguistic research.

The core consists of the following courses:

LING 512, Historical Linguistics	LING 553, Syntax 1
LING 520, Phonetics	LING 580, Morphology
LING 532, Phonology 1	LING 654, Syntax 2
LING 535, Phonology 2	LING 663, Semantics

For the methodology requirement, students must take at least three of the following set of courses:

LING 541, Language and Computation LING 601, Experimental Linguistics LING 624, Formal Foundations for Linguistic Theory LING 641, Field Methods

Students will typically enroll in these courses even if they have had similar course work elsewhere. During these initial two years of course work, students must receive at least three grades of H (Honors). Three or more grades of P or F (Pass or Fail) during this period are grounds for dismissal from the Ph.D. program.

Years three and four. During the third and fourth years, 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.

PROGRAM REQUIREMENTS

In addition to course work, students will also focus on the creative side of academic life by undertaking independent research. This work serves the multiple functions of promoting students' intellectual growth, strengthening their working relationships with faculty members, and providing a yardstick by which progress toward the degree can be measured.

 Portfolio and special field exam. During the first two years of the graduate program, students must complete a portfolio of three research papers, one each in the areas of syntax, phonology, and either semantics or historical linguistics. These papers, which should demonstrate a student's ability to conduct independent research in linguistics, will typically consist of revised versions of term papers students have written. The first two of these must be submitted by September 15 of the student's second year. It is the expectation of the faculty that students will make any necessary revisions of papers written during the first year during the summer between the first and second years in the program, so as to prepare two of these for submission by this deadline. The third paper must be submitted no later than the end of the first week of May in the second year. The entire departmental faculty will evaluate these papers soon after they are submitted. They may be approved or rejected, or the student may be asked to carry out further revisions prior to resubmission.

During the second year, students will, in consultation with their advisers, choose a subfield of linguistics of particular interest to them and prepare an annotated bibliography approximately twenty pages in length. After completing that bibliography, the student will complete an essay exam composed by his or her adviser and returned by the student two days later. The deadline for completion of this special field exam is the end of the first week of May in the second year. The special field exam, like the portfolio papers, will be read and evaluated by the entire departmental faculty.

At the conclusion of the second year, the director of graduate studies (DGS) will transmit an assessment of each student's progress as determined by the faculty on the basis of performance in class work, the portfolio papers, and the special field exam.

- 2. *Qualifying papers*. By the end of the third year of graduate study, students will present two substantial research papers of publishable quality in different areas of linguistics. Satisfaction of this requirement includes the submission of a written version of the paper to be followed by an oral presentation to the department (typically at a Friday Linguist Lunch). Alternatively, one of the two papers can be presented at a professional conference, provided at least one member of the department faculty is in attendance.
- 3. *Prospectus*. By the end of the seventh term, students will present a dissertation prospectus to the faculty. The prospectus should lay out clearly the student's proposed dissertation topic. It should stress 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 document should be ten to twenty pages (single spaced) 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.
- 4. Dissertation. By the end of the eighth term, students must complete and have approved by their committee a chapter of the dissertation, together with a detailed outline of the dissertation and a comprehensive bibliography. Once this requirement is completed, 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 in front of the dissertation committee consisting of at least three faculty members, two of whom must be members of the Linguistics department. Committee members must be given the completed dissertation no less than two weeks prior to the date of the defense.

LANGUAGE REQUIREMENT

Students who do not take LING 641, Field Methods must pursue the study of at least one language as approved by the DGS outside of the Germanic, Romance, Balto-Slavic, and

Greek branches of the Indo-European family, either through a course on the structure of the language or through three terms of language study at Yale or elsewhere.

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:

- 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. See Degree Requirements under Policies and Regulations.

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 upon request to the Department of Linguistics, Yale University, PO Box 208366, New Haven CT 06520-8366.

Courses

[INDC 771b, Middle Indic: Pali and Prakrit]

[INDC 772, Research in Old Indian Epics]

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 poems: *Caedmon's Hymn, The Dream of the Rood, The Battle of Maldon, The Wife's Lament, The Wanderer,* and *The Seafarer.* MW 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 510b^U, Introduction to Linguistics Darya Kaviskaya

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 Bowen

Types of change that a language undergoes in the course of time: sound change, analogy, syntactic and semantic change, borrowing. Techniques for recovering earlier linguistic stages: philology, internal reconstruction, the comparative method. Language change and linguistic theory. The role of language contact in language change. MW 1–2:15

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 to 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 11:35–12:50

LING 520a^U, General Phonetics Jelena Krivokapić

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. TTH 9–10:15

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 530a^U, Evolution of Language Stephen Anderson

The origin and evolution of human language from an interdisciplinary perspective. Topics include the design features of language, the structure of evolutionary theory, elementary molecular genetics and genetic evidence for language evolution, cognitive continuity and discontinuity with other species, hominid evolutionary history, domain specificity and generality of the language faculty, and evidence for evolutionary shaping of physical and cognitive structures. TTH 2:30–3:45

LING 532a^u, Introduction to Phonological Analysis Darya Kavitskaya

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 510b or 520b. TTH 11:35–12:50

LING 535b^u, Phonological Theory Gaja Jarosz

Topics in the architecture of a theory of sound structure. Levels of representation; classical phonological rules and their interaction. Ordering paradoxes; cyclicity and Lexical Phonology. Motivations for replacing a system of rules with a system of constraints. Optimality theory: constraint types and their interactions. Correspondence theory. Opacity and stratal OT. Prerequisite: LING 532a or permission of the instructor. MW 1–2:15

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 *Bhagavadgita*. Prerequisite: LING 525b or equivalent. MTWTHF 10:30–11:20

[LING 540b^U/PSYC 506b, Computational Models in Cognitive Science]

LING 541a^U, Language and Computation Gaja Jarosz

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. MW 2:30–3:45

[LING 546b^U, Language, Sex, and Gender]

LING 547b⁰, **The Indigenous Languages of Australia** Claire Bowern, Erich Round A general introduction to the indigenous languages of Australia. Issues in phonology, morphology, syntax, sociolinguistics, prehistory (e.g., theories of colonization and spread), and language endangerment and revitalization. Prerequisite: a class in the Linguistics department (for example, 510b, 512a, or 517a). TH 9:25–11:15

LING 548b^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 553a^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. TTH 1-2:15

LING 569a^U, Meaning Laurence Horn

Approaches to truth-conditional and lexical semantics of natural language. Survey of propositional and predicate logic. Compositional theories of sense, reference, and belief contexts; entailment, presupposition, and implicature. The relations between semantics and pragmatics. MW 11:35–12:50

LING 580b^u, Morphology Darya Kavitskaya

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 532a and 553a, or permission of the instructor. MW 11:35–12:50

[LING 590a^U, Topics in the History of Linguistics: The Linguistic Wars]

[LING 593a^U, Historical Morphology]

LING 600b^U, **Experimentation in Linguistics** Jelena Krivokapić, Maria Piñango The principles of sound experimental design and techniques for conducting experimental research in linguistics. Linguistic theory as the basis for framing experimental questions. Specific topics: the development of theoretically informed hypotheses, the notions of control and confounds, human subject research, statistical analysis, data reporting, and dissemination. By the end of the course, students will have designed, conducted, and written up an experiment. Prerequisite: LING 510b, LING 517a, LING 520b, or permission of the instructor. W 9:25–11:15

LING 612b^U, Linguistic Change Ashwini Deo

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 512a, 532a, and 553a. MW 9–10:15

[LING 614b^U, Structure of Yorùbá]

LING 621b^U, Topics in Phonetics: Intonation Jelena Krivokapić

We examine a phonological model of intonation for English and learn a standard system for transcribing intonation contours and prosodic structure. The extension of the model to other languages is discussed. Each class combines lecture and lab exercise. Prerequisite: LING 520b or permission of the instructor. TTH 4–5:15

LING 624a^U, Formal Foundations of Linguistic Theories I Gaja Jarosz

Mathematical methods in linguistics. Topics include set theory, logic and formal systems, model theory, lambda calculus, formal language theory, elementary statistics, and probability. No prerequisites. MW 11:35–12:50

LING 626b^U, Formal Foundations of Linguistic Theories II Robert Frank

A study of frameworks for the representation of linguistic knowledge, focusing on the issues of expressiveness (generative capacity) and computational complexity. Constrained grammar formalisms (tree-adjoining grammars, categorial grammars, dependency grammars, minimalist grammars), model-theoretic approaches to grammatical representation, probabilistic and optimization-based grammars (optimality theory, harmonic grammars, MaxEnt, stochastic grammars). TTH 9–10:15

LING 630b^U, Techniques in Neurolinguistics Einar Mencl

The first section of this course is focused on obtaining a basic understanding of neuroimaging data acquisition and analysis techniques, primarily MRI, with application to the study of language. Technique subareas include MRI acquisition; preprocessing; singleand multi-subject data analysis; visualization; and network analysis. Classes pair lecture presentation and in-class interactive demonstrations with relevant datasets. The second section focuses on selected readings in the study of language using these techniques. Topic areas include speech production and perception, reading, and dyslexia. Readings are primarily drawn from journal articles in the field in general, but also from within Haskins Laboratories, allowing access and hands-on analysis and exploration of existing datasets. Prerequisite: LING 510b. T 9:25–11:15

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 11:35–12:50

[LING 632a^U, Universals of Language]

LING 636b^u, Articulatory Phonology Jelena Krivokapić

Introduction to phonology as a system for combining units of speech (constriction gestures of the vocal organs) into larger structures. Analysis of articulatory movement data; modeling using techniques of dynamical systems. Emphasis on universal vs. languageparticular aspects of gestural combination and coordination. Prerequisite: LING 520a or permission of the instructor. F 9:25–11:15

LING 64ob^U, Topics in Phonology: Crossing the Phonology/Morphology Interface Matthew Wolf

Examination of proposed cases of phonologically conditioned morphological patterns (allomorph selection, deponency, affix order, paradigm gaps) and morphologically conditioned phonological patterns (process morphology, exceptions/lexically specific alternations). Consideration of how tightly or loosely phonology and morphology are connected, and what information can and cannot cross the interface between them. TH 2:30–4:20

LING 641b^U, Field Methods Claire Bowern

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 2:30–3:45

LING 642a^U, Topics in Phonology: Harmonies Darya Kavitskaya

Vowel and consonant harmony in the world's languages. Typologies and theoretical models of local and nonlocal assimilation. Interaction of vowel harmony with vowel epenthesis and deletion. The relation of harmonies and morphology. Prerequisites: two term courses in phonology. TH 1:30–3:20

[LING 642b^U, Topics in Phonology: The Indigenous Languages of Australia]

LING 644a^U, Old Iranian: Avestan Stanley Insler

An introduction to the language and texts of the Avesta, the sacred writings of the Zoroastrians. Prerequisite: one year of an ancient Indo-European language (Latin, Greek, Sanskrit, etc.). TH 2:30–4:30

LING 646a^U, Vedic Poetry Stanley Insler

An introduction to the language and poetry of the Rigveda, the oldest and most important text of ancient India. Prerequisite: one year of Sanskrit. T 2:30–4:30

[LING 649b^U, Structures of Romance Languages: Rumantsch]

LING 651b^u, Learnability and Development Gaja Jarosz

An investigation of language learning from an integrated perspective of computational learning and language development. Topics include formal learning theory, formal and computational modeling of language acquisition, statistical learning in infants and machines, and nativism vs. empiricism. Development and learnability at various levels of linguistic structure. Prerequisite: LING 541a is required; a course in theoretical linguistics is recommended. W 3:30–5:20

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. TTH 1–2:15

[LING 655b^U, Subjects]

[LING 656a^U, Grammatical Relations]

LING 657a^u, Classic Readings in Syntax Raffaella Zanuttini

Seminal ideas in generative syntax on which the field has been building. How these ideas have evolved, how they are currently expressed, and how they fare in accounting for new patterns of data. Prerequisite: LING 553a. MW 1–2:15

LING 660a^U/**PSYC 650a**^U, **Topics in Syntax: The Mental Lexicon** Maria Piñango Definitions of lexical knowledge; views of the lexicon as a repository of information vs. a "generative" system; the case of idioms; the lexicon and the grammar-conceptual structure interface; acquisition of the lexicon. M 1:30–3:20

LING 661b^U, Topics in Syntax: Minimalist Grammars and the Syntax/Semantics Interface Timothy Hunter

Introduces the Minimalist Grammar formalism, a mathematically explicit formulation of some central ideas from the Minimalist Program in syntactic theory; and, in this setting, considers alternative conceptions of how syntactic structure relates to semantic composition, particularly of Davidsonian event-based logical forms. T 2:30–4:20

LING 663a^U, Semantics Ashwini Deo

Focus as the expression of information structural prominence in natural language discourse. Semantic and pragmatic properties of focus and its phonological, lexical, and word-order correlates. Treatment of focus-sensitive and scalar particles ("only," "even," "too," "almost," et al.) in dynamic models of meaning. Parallels with the semantics of questions. Prerequisite: a course in semantics or permission of the instructor. MW 2:30–3:20

[LING 664b^U, Semantic Theory]

LING 670a^U, Topics in Semantics: Modality Tamina Stephenson

The semantics of modal expressions such as "must" and "can." Emphasis on indicative and counterfactual conditional constructions. Prerequisite: LING 663a. W 1:30-3:20

[LING 671a^U, Topics in Semantics: Change in Tense-Aspect Categories]

[LING 675b^U, Pragmatics]

LING 676b^U, Implicature and Pragmatic Theory Laurence Horn

Diverse approaches to the characterization of what is said and what is meant. Pragmatic intrusion into truth-conditional meaning in neo-Gricean pragmatics and relevance theory; the problem of "embedded implicatures" and the grammatical view of scalar implicature. Experimental studies of implicature and the grammar/pragmatics interface. Prerequisite: one course in semantics or pragmatics, or permission of the instructor. W 1:30–3:20

LING 690a^U, Negation and Polarity Laurence Horn

Meaning and expression of negation and negative polarity. Asymmetry of negation vs. affirmation. Semantic and pragmatic factors in the meaning of negative sentences: contradictory vs. contrary opposition; metalinguistic vs. descriptive uses of negation. Cross-linguistic expression of affixal negation, negative polarity, and negative concord. The roles of configuration, scope, entailment, and implicature in the licensing of polarity items. Prerequisite: permission of the instructor. T 2:30-4:20

[LING 710b, Predication]

[LING 760b, Seminar in Information Structure]

LING 830a or b, Directed Research in Linguistics By arrangement with faculty.

LING 831a or b, Directed Research in Phonetics By arrangement with faculty.

LING 840a or b, Directed Research in Phonology By arrangement with faculty.

LING 850a or b, Directed Research in Grammar By arrangement with faculty.

LING 860a or b, Directed Research in Semantics By arrangement with faculty.

MANAGEMENT

135 Prospect Street, 203.432.5957 http://phd.som.yale.edu M.A., M.Phil., Ph.D.

Dean Sharon Oster

Director of Graduate Studies

Subrata Sen (52 Hillhouse, Rm. 221, 203.432.6028, subrata.sen@yale.edu)

Professors Rick Antle, Nicholas Barberis, James Baron, Paul Bracken, Garry Brewer, Zhiwu Chen, Judith Chevalier, Ravi Dhar, Jonathan Feinstein, William Goetzmann, Gary Gorton, Jonathan Ingersoll, Edward Kaplan, James Levinsohn, Lode Li, Andrew Metrick, Barry Nalebuff, Nathan Novemsky, Sharon Oster, Benjamin Polak, Douglas Rae, K. Geert Rouwenhorst, Peter Schott, Fiona Scott-Morton, Subrata Sen, Robert Shiller, Olav Sorenson, Matthew Spiegel, K. Sudhir, Shyam Sunder, Arthur Swersey, Jacob Thomas, Victor Vroom

Associate Professors Keith Chen, James Choi, Martijn Cremers, Shane Frederick, Dina Mayzlin, Jiwoong Shin, Heather Tookes, Amy Wrzesniewski, Hongjun Yan, X. Frank Zhang

Participating Faculty from the School of Management Constance Bagley, Victoria Brescoll, Daylian Cain, Arthur Campbell, Rodrigo Canales, Constanca Esteves-Sorenson, Frank Fabozzi, Stanley Garstka, Jeffrey Garten, Roger Ibbotson, Lisa Kahn, Ahmed Khwaja, Sang-Hyun Kim, Marissa King, Kalin Kolev, Donald Lee, Alina Lerman, Elisa Long, B. Cade Massey, Mushfiq Mobarak, Rakesh Mohan, Justin Murfin, Oliver Rutz, Joseph Simmons, Jeffrey Sonnenfeld

Fields of Study

Current fields include accounting, financial economics, and marketing. 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, and marketing.

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 fourth 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, Seminar in Accounting Research I Rick Antle, Jacob Thomas 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 Jacob Thomas, Rick Antle Study of empirical accounting research that covers topics such as relation between accounting information and stock prices, analyst forecasts, taxes, and incentives to manage accounting information.

MGMT 710a, Mathematical Models for Management Susana Mondschein Students learn how to formulate and solve optimization problems. Topics covered include linear and integer programming, nonlinear optimization, dynamic programming, and Markov processes. Many real problems from various areas in manufacturing, service operations, finance, marketing, and health care are covered.

MGMT 740a/ECON 670a, Financial Economics I Zhiwu Chen

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. T 2:30-5:20

MGMT 741b/ECON 671b, Financial Economics II Jonathan Ingersoll 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 and market microstructure. 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 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, information disclosure, and the optimal design of a stock exchange.

MGMT 745a/ECON 672a, 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). This is a research-oriented course aimed at Ph.D. students. Undergraduate students with outstanding academic records and prior experience of graduate courses may register with the instructor's permission. Grades are based on a small number of referee reports and a final exam.

MGMT 746b, **Topics in Financial Intermediation** Gary Gordon, Andrew Metrick An elective Ph.D. course covering theoretical and empirical research on the broad range of financial intermediation, including banks and banking, as well as other forms of intermediation, such as reinsurance, stock exchange specializations, securitization, and institutional investing. Topics covered include liquidity, the role of money markets, the effects of intermediation capital on asset pricing, financial crises, banking panics, delegated portfolio management, financial market regulation, central banking, and the role of financial intermediation in economic development. Prerequisites: MGMT 740a and 741b. Students should be third- or fourth-year graduate students, interested in financial economics, and capable of both theoretical and empirical work. Permission of the instructor required.

MGMT 750b, Seminar in Marketing I 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 752a and b, Marketing Workshop Jiwoong Shin

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 Nathan Novemsky,

Ravi Dhar, Joseph Simmons

The seminar examines research on the psychology of decision making, focusing on choice. Although the normative issue of how choice should be made is relevant, the descriptive issue of how choices are made is the main focus of the course. Topics of discussion include choice framing and mental accounting, prospect theory and loss aversion, context effects, task effects, goal-directed choice, preference reversals, intertemporal choice, and behavioral economics, among others. The goal of the seminar is threefold: to foster a critical appreciation of existing research in behavioral decision theory as applied to consumer choice, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that 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 758b, Foundations of Behavioral Economics Shane Frederick

We explore foundational topics in behavioral economics and discuss the dominant prescriptive models (which propose what decision makers should do) and descriptive models (which aim to describe what decision makers actually do). We incorporate perspectives from economics, psychology, philosophy, decision theory, and finance, and engage long-standing debates about rational choice.

MGMT 780a and b, Ph.D. Student Research Workshop Subrata Sen

MGMT 781a and b, Accounting/Finance Workshop Hongjun Yan

- MGMT 782-01a and b, Accounting Doctoral Student Pre-Workshop Seminar Subrata Sen
- MGMT 782-02a and b, Financial Economics Doctoral Student Pre-Workshop Seminar Subrata Sen
- MGMT 782-03a and b, Marketing Doctoral Student Pre-Workshop Seminar Subrata Sen

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 www.math.yale.edu M.S., M.Phil., Ph.D.

Chair Yair Minsky

Director of Graduate Studies Igor Frenkel

Professors Donald Brown (*Economics*), Andrew Casson, Ronald Coifman, Michael Frame (*Adjunct*), Igor Frenkel, Howard Garland, Alexander Goncharov, Roger Howe, Peter Jones, Ravindran Kannan (*Computer Science*), Mikhail Kapranov, Alexander Lubotzky (*Adjunct*), Gregory Margulis, Yair Minsky, Vincent Moncrief (*Physics*), Steven Orszag, David Pollard (*Statistics*), Vladimir Rokhlin (*Computer Science*), Gregg Zuckerman

Assistant Professors Amanda Folsom, Sam Payne

Gibbs Assistant Professors Yael Algom Kfir, Ian Biringer, Nicoleta Corina Calinescu, Matt Feiszli, Marketa Havlickova, Anna Lachowska, Jaejeong Lee, Garving Luli, Zhenqi Wang

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; representation theory; automorphic forms, L-functions; algebraic number theory and algebraic geometry; mathematical physics, 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) demonstrate a reading knowledge of two of the following languages: French, German, or Russian; (3) pass qualifying examinations on their general mathematical knowledge; (4) submit a dissertation prospectus; (5) participate in the instruction of undergraduates; (6) be in residence for at least three years; and (7) complete a dissertation that clearly advances understanding of the subject it considers. The normal time for completion of the Ph.D. program is four years. Requirement (1) normally includes basic courses in algebra, analysis, and topology; these should be taken during the first year. The first language examination must be completed by the beginning of the third year of study, the second no later than the end of that 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)-(6) 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.

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. A student must complete six term courses with at least one Honors grade, pass one language examination, perform adequately on the general qualifying examination, and be in residence at least one year.

Note that the M.Phil. and M.S. degrees are 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 Gregg Zuckerman MW 2:30-3:45

MATH 501b^U, Modern Algebra II Sam Payne TTH 2:30-3:45

MATH 515^b^U, Intermediate Complex Analysis Igor Frenkel MW 2:30-3:45

MATH 520a^U, Measure Theory and Integration Garving Luli TTH 1-2:15

MATH 525^b^U, Introduction to Functional Analysis Gregory Margulis MWF 11:35–12:25

MATH 544a, Introduction to Algebraic Topology I Yair Minsky TTH 2:30-3:45

MATH 545b, Introduction to Algebraic Topology II Staff

MATH 553a^U, Introduction to Representation Theory Anna Lachowska TTH 2:30–3:45

MATH 835b, Differential Geometry Andrew Casson TTH 9–10:15

MATH 845a^U, **Introduction to Algebraic Geometry** Tobias Dyckerhoff TTH 11:35–12:50

MATH 991a/CPSC 991a, Ethical Conduct of Research Vladimir Rokhlin HTBA

MECHANICAL ENGINEERING

Dunham Laboratory, 203.432.4250 M.S., M.Phil., Ph.D.

Chair Mitchell Smooke

Director of Graduate Studies Udo Schwarz (udo.schwarz@yale.edu)

Professors David Bercovici, Ira Bernstein (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Robert Gordon, Shun-Ichiro Karato, Amable Liñan-Martinez (*Adjunct*), Marshall Long, Daniel Rosner, Udo Schwarz, Ronald Smith, Mitchell Smooke, Forman Williams (*Adjunct*)

Associate Professors Corey O'Hern, Ainissa Ramirez, Jan Schroers

Assistant Professors Aaron Dollar, Eric Dufresne, John Morrell, Nicholas Ouellette, Hong Tang

Lecturers Beth Anne Bennett, Kailasnath Purushothaman

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.

Soft matter/complex fluids Jamming and slow dynamics in gels, glasses, and granular materials; mechanical properties of soft and biological materials; dynamics of macromolecules. Several faculty in Mechanical Engineering are also affiliated with the Integrated Graduate Program in Physical and Engineering Biology (http://www.peb.yale.edu).

Material science Characterization of crystallization and other phase transformations; studies of thin films; MEMS; smart materials such as shape memory alloys, amorphous metals, and nanomaterials including nanocomposites; NEMS; nano-imprinting; classical and quantum optomechanics; atomic-scale investigations of surface interactions and properties; classical and quantum nanomechanics; nanotribology.

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; 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 www.yale.edu/medieval M.A., M.Phil., Ph.D.

Chair and Director of Graduate Studies Robert Nelson [F] (robert.nelson@yale.edu)

Acting Chair and Director of Graduate Studies Bruce Gordon [Sp] (bruce.gordon@yale.edu)

Executive Committee R. Howard Bloch, Jessica Brantley, Roberta Frank, Paul Freedman, Dimitri Gutas, Ivan Marcus, Giuseppe Mazzotta, María Rosa Menocal, Alastair Minnis, Robert Nelson, Denys Turner, Anders Winroth

Faculty associated with the program R. Howard Bloch, Gerhard Böwering, Jessica Brantley, Walter Cahn (*Emeritus*), Ian Cornelius, Stephen Davis, Roberta Frank, Paul Freedman, Creighton Gilbert (*Emeritus*), Harvey Goldblatt, Frank Griffel, Beatrice Gruendler, Dimitri Gutas, Valerie Hansen, Jacqueline Jung, Traugott Lawler (*Emeritus*), Bentley Layton, David Lummus, Ivan Marcus, John Matthews, Giuseppe Mazzotta, María Rosa Menocal, Mary Miller, Alastair Minnis, Robert Nelson, Lee Patterson (*Emeritus*), Kevin Poole, Fred Robinson (*Emeritus*), Mary Sommar (*Visiting*), Denys Turner, Anders Winroth, Mimi Yiengpruksawan

Lecturers Adel Allouche, Marcia Colish, Walter Goffart, Susanne Roberts, Yechiel Schur, Barbara Shailor, William Whobrey

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 or Hebrew when appropriate. Proficiency in Latin, Arabic, and Hebrew is tested with an examination administered and evaluated by the department 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, 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) six courses in the medieval area from departments other than that in which the student is enrolled (two of these will normally be the Medieval Studies interdisciplinary seminar and either a course in research methodology [HIST 540 or NELC 850] or in Latin or Arabic Paleography); (2) proficiency in Latin, Arabic, or Hebrew as tested by an examination administered and evaluated by the department; and (3) an oral examination. These requirements are in addition to those in force in the student's home department. The M.Phil. in Medieval Studies thus requires a year of study in addition to the five years required by 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 the first year. Minimum requirements include a High Pass average in courses and passing the Latin examination.

Terminal Master's Degree Program For the terminal master's degree, students must take at least seven term courses with a general average of High Pass and with at least one term course of Honors. Two languages are required: Latin and either French or German. No thesis is required.

Courses

MDVL 550a or b, Directed Reading

By arrangement with faculty.

MDVL 558a/CPLT 578a/SPAN 526a, Love in the Western World

María Rosa Menocal

Readings in the formative period of the vernacular lyric in Europe, with special emphasis on the development of the poetic ideology long known as "courtly love." We read selections from the great variety of lyric languages involved at this turning point in European literary history: from the eleventh- and twelfth-century Occitan troubadours and their contemporaries writing in the Arabic and Hebrew of the Taifas of Islamic Spain and Norman Sicily, to the range of other medieval literary forms and languages that refined poetic expression and philosophies of love simultaneously (including, among others, the Anglo-Norman Tristan, the *scuola siciliana* and the *dolce stil nuovo*, the Galician-Portuguese *cantigas*). We also explore the central role that the study of these new poetic languages and ideologies played in the rise of the new philologies of the nineteenth century, the immediate ancestors of our own fields of national language and comparative literary studies. Conducted in English. TH 1:30–3:20

MICROBIOLOGY

Boyer Center for Molecular Medicine 336B, 203.737.2404 info.med.yale.edu/micropath/index.html M.Phil., Ph.D.

Director of Graduate Studies Craig Roy

Student Services Officer Darlene Smith

Professors Serap Aksoy (Epidemiology & Public Health), Susan Baserga (Therapeutic Radiology), Michael Cappello (Pediatrics), Yung-chi Cheng (Pharmacology), Daniel DiMaio (Genetics), Erol Fikrig (Internal Medicine), Durland Fish (Epidemiology & Public Health), Jorge Galán (Microbial Pathogenesis), Nigel Grindley (Molecular Biophysics & Biochemistry), Margaret Hostetter (Pediatrics), K. Brooks Low (Therapeutic Radiology), Diane McMahon-Pratt (Epidemiology & Public Health), I. George Miller (Pediatrics), John Rose (Pathology), Craig Roy (Microbial Pathogenesis), Nancy Ruddle (Epidemiology & Public Health), Clifford Slayman (Cellular & Molecular Physiology), Dieter Söll (Molecular Biophysics & Biochemistry), William Summers (Therapeutic Radiology), Joann Sweasy (Therapeutic Radiology), Peter Tattersall (Laboratory Medicine), Elisabetta Ullu (Internal Medicine), Sandra Wolin (Cell Biology; Molecular Biophysics & Biochemistry)

Associate Professors Choukri Ben Mamoun (Internal Medicine), Akiko Iwasaki (Epidemiology & Public Health), Christine Jacobs-Wagner (Molecular, Cellular & Developmental Biology), Susan Kaech (Immunobiology), Barbara Kazmierczak (Internal Medicine), Walther Mothes (Microbial Pathogenesis), Melinda Pettigrew (Epidemiology & Public Health), Richard Sutton (Internal Medicine), Christian Tschudi (Epidemiology & Public Health; Internal Medicine), Paul Turner (Ecology & Evolutionary Biology)

Assistant Professors Hervé Agaisse (Microbial Pathogenesis), Priti Kumar (Internal Medicine), Brett Lindenbach (Microbial Pathogenesis), John MacMicking (Microbial Pathogenesis), Robert Means (Pathology), Michael Robek (Pathology), Jeffrey Townsend (Ecology & Evolutionary Biology)

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 interdepartmental 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, genetics, ecology, vector biology, and statistics. The program also sponsors journal clubs and seminars in microbiology and related areas. All students participate in three laboratory rotations (MBIO 670a and b), 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 MB&B 676b, 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.

Master's Degree

M.Phil. See Degree Requirements under Policies and Regulations. Although the program does not formally offer a master's degree, students who have been admitted to candidacy qualify for an M.Phil.

Program materials are available upon request from Darlene Smith in the Microbiology Graduate Program, Section of Microbial Pathogenesis, BCMM 336B, Yale University, New Haven CT 06536.

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 goal of designing better and more efficacious vaccines. Vaccine-preventable diseases now include many infectious diseases as well as cancer. The course briefly reviews the immunological basis of immunity to infection and disease. It then explores the basic science underlying vaccine development, current vaccine-preventable diseases, as well as vaccines under development. Prerequisites: immunology and microbiology. MW 10–11:20

MBIO 670a, b, Laboratory Rotation Craig Roy

Rotation in three laboratories. Required for all first-year graduate students.

MBIO 680a/EMD 680a, Molecular and Cellular Processes of Parasitic Eukaryotes

Diane McMahon-Pratt, Christian Tschudi

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.

MBIO 685a, Molecular Mechanisms of Microbial Pathogenesis Hervé Agaisse,

Jorge Galán, Barbara Kazmierczak, Priti Kumar, Brett Lindenbach,

John MacMicking, Walther Mothes, Craig Roy

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 700a, Seminal Papers on the Foundations of Modern Microbiology

Peter Tattersall

A required course for Microbiology first- and second-year students; not for credit. Students present and discuss papers describing fundamental discoveries in areas related to microbiology. The goal is to familiarize students with the process of scientific discovery, and with the history of major developments in the field. Topics include important discoveries involving major human pathogens, fundamental processes in molecular biology, and the development of technology that had a major impact in current biomedical research. w 5–6:30

MBIO 701a,b, Research in Progress Craig Roy

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 Craig Roy

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 703b, Evasion of Host Defenses by Viruses, Bacteria, and Eukaryotic Parasites Peter Tattersall

The course represents the second half of MBIO 700a and is a noncredit course taken by first- and second-year Microbiology students. This course is also open to all interested members of the Yale community on a strictly participatory basis. The course is in seminar format, with one student presenting one or two papers each session, on topics chosen with the faculty mentor responsible for that session. The subject matter concerns the strategies employed by viruses, bacteria, or eukaryotic parasites to evade either cellintrinsic defenses, such as programmed cell death, or responses operating at the level of the organism, such as the adaptive immune response. W 5

MBIO 734a/MB&B 734a/GENE 734a, Molecular Biology of Animal Viruses

Robert Means, Daniel DiMaio, and staff

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions. MW 9-10:15

MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

301 Josiah Willard Gibbs Laboratories, 203.432.5662 www.mbb.yale.edu M.S., M.Phil., Ph.D.

Chair Patrick Sung

Director of Graduate Studies

Mark Solomon (301 JWG, 203.432.5662, nessie.stewart@yale.edu)

Professors Susan Baserga, Ronald Breaker (Molecular, Cellular & Developmental Biology), Gary Brudvig (Chemistry), Donald Crothers (Emeritus, Chemistry), Daniel DiMaio (Genetics; Therapeutic Radiology), Donald Engelman, Alan Garen, Mark Gerstein, Nigel Grindley, Mark Hochstrasser, William Konigsberg, Peter Lengyel (Emeritus), J. Patrick Loria (Chemistry), I. George Miller (Pediatric Infectious Diseases; Epidemiology & Public Health), Peter Moore (Chemistry), Thomas Pollard (Molecular, Cellular & Developmental Biology), Anna Pyle, Lynne Regan, David Schatz (Immunobiology), Robert Shulman (Emeritus), Dieter Söll, Mark Solomon, Joan Steitz, Thomas Steitz, Scott Strobel, William Summers (Therapeutic Radiology), Patrick Sung, Kenneth Williams (Adjunct; Research), Sandra Wolin (Cell Biology)

Associate Professors Thomas Biederer, Enrique De La Cruz, Michael Koelle, Anthony Koleske, Andrew Miranker, Yorgo Modis

Assistant Professors Elizabeth Rhoades, Christian Schlieker, Hongwei Wang, Yong Xiong

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.

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 the core graduate courses offered by the department in biochemistry, molecular genetics, and structural biology (MB&B 720a, 721b, 730a, 743b). Students without prior preparation in the area of prokaryotic molecular genetics should also take MB&B 705a. 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. 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 as a TF-2 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. With approval of the director of graduate studies (DGS), some courses taken toward the M.D. degree can be counted toward the seven courses required for the Ph.D. provided that the course carries a graduate course number, and that the student has registered for it as a graduate course. M.D./ Ph.D. students should still take MB&B 720a, 721b, 730a, and 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. May 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. 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 500a^U/MCDB 500a^U, Biochemistry L. Nicholas Ornston, Ronald Breaker, Donald Engelman

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. MWF 9:25–10:15

MB&B 517a2/ENAS 517a/PHYS 517a2, Methods and Logic in Interdisciplinary

Research Lynne Regan, Enrique De La Cruz, Eric Dufresne, Thierry Emonet, Paul Forscher, Christine Jacobs-Wagner, Michael Levene, Simon Mochrie,

Corey O'Hern, Elizabeth Rhoades, Corey Wilson

This half-term IGPPEB class is intended to introduce students to integrated approaches to research. Each 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. Required for students in IGPPEB. MW 5–7

MB&B 520a1, Boot Camp Biology Lynne Regan, Mark Hochstrasser,

Anthony Koleske, Christian Schlieker

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. Required for students in IGPPEB. HTBA

MB&B 523a/ENAS 541a/PHYS 523a, Biological Physics Eric Dufresne

An introduction to the physics of several important biological phenomena, including molecular motors, protein folding, bacterial locomotion, and allostery. The material and approach are positioned at the interface of the physical and biological sciences. TTH 2:30–3:45

MB&B 545b^U, Methods and Logic in Molecular Biology Anthony Koleske,

Nigel Grindley, Mark Hochstrasser, 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 591b/ENAS 991b/PHYS 991b, Integrated Workshop Simon Mochrie,

Eric Dufresne, Paul Forscher, Corey O'Hern, Lynne Regan

This required course for students in IGPPEB 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 are acquired, and students learn from each other. HTBA

MB&B 600a^U, **Principles of Biochemistry I** Michael Koelle, Donald Engelman 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 Joan Steitz, Christian Schlieker,

Patrick Sung

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,

Thomas Melia, Thomas Pollard, Michael Caplan, Craig Crews, Pietro De Camilli, Haifan Lin, Joseph Madri, Mark Mooseker, James Rothman

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, Michael Koelle, 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, Enrique De La Cruz, 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 MB&B graduate students. TTH 2:30–3:45

MB&B 635a^U/ENAS 518a, Mathematical Methods in Biophysics Elizabeth Rhoades, Yong Xiong, Corey O'Hern

Applied mathematical methods relevant to analysis and interpretation of biophysical and biochemical data, including statistics and error analysis, differential equations, linear algebra, and Fourier transforms. The class covers both analytical and numerical implementations of these topics. Prerequisites: MATH 120a or b and MB&B 600a or equivalents, or permission of the instructors. MWF 10:30–11:20

MB&B 650, Lab Rotation for First-Year Students Mark Solomon Required for all first-year MB&B graduate students. Credit for full year only.

MB&B 676b, Responsible Conduct of Research Dieter Söll 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 for all first-year MB&B graduate students. F 3

MB&B 705aU/GENE 705a/MCDB 505a, Molecular Genetics of Prokaryotes

Nigel Grindley

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Prerequisites: previous or concurrent introductory courses in genetics and biochemistry. MW 11:35–12:50

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

MB&B 720a^U, Macromolecular Structure and Biophysical Analysis

Andrew Miranker, Anna Pyle, 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 721b^U, Macromolecular Interactions and Dynamic Properties Anna Pyle,

Donald Engelman, Elizabeth Rhoades, Hongwei Wang

The course examines dynamic properties of macromolecules, their interactions, catalytic activities, and methods for analyzing their behavior. Topics include macromolecular

folding, binding interfaces, ligand interactions, and the properties of membrane proteins, enzymes, ribozymes, and molecular motors. These areas are presented together with modern methods for analysis of macromolecular associations and dynamic properties. Prerequisites: biochemistry, physical chemistry, and MB&B 720a or permission of the instructor. MW 11:35–12:50

MB&B 730a, Methods and Logic in Molecular Biology Mark Solomon,

Anthony Koleske, Lynne Regan

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 MB&B. TTH 5-8

MB&B 734a/MBIO 734a/GENE 734a, Molecular Biology of Animal Viruses

Robert Means, Daniel DiMaio, and staff

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and viral-host cell interactions. MW 9-10:15

MB&B 743b^U/GENE 743b/MCDB 743b, Advanced Eukaryotic Molecular Biology

Mark Hochstrasser, Anthony Koleske, Christian Schlieker, 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,

Mark Hochstrasser, I. George Miller, Lynne Regan, David Schatz, 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]

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 for data integration. Prerequisites: MB&B 301b and MATH 115a or b, or permission of the instructor. MW 1–2:15

MB&B 760b3, Principles of Macromolecular Crystallography Thomas Steitz 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 Yong Xiong and staff

This laboratory course provides hands-on training in the practical aspects of macromolecular structure determination by X-ray crystallography. Topics include data collection, data reduction, phasing by multi-wavelength anomalous diffraction and molecular replacement, solvent flattening, noncrystallographic symmetry averaging, electron density interpretation, model building, structure refinement, and structure validation. The course includes training in the use of computer programs used to perform these calculations. Counts as 0.5 credit toward MB&B graduate course requirements. Prerequisites: MB&B 760b3 and a working exposure to the Unix operating system. HTBA

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). M 11–1

MB&B 900a or 901b, Reading Course in Biophysics Mark Solomon

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 Mark Solomon 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 Mark Solomon

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.

The following course is for students in the joint B.S./M.S. program with Yale College:

MB&B 570a or MB&B 571b, Intensive Research for B.S./M.S. Candidates Michael Koelle, Mark Solomon

MOLECULAR, CELLULAR, AND DEVELOPMENTAL BIOLOGY

Kline Biology Tower, 203.432.3538 www.biology.yale.edu M.S., Ph.D.

Chair Ronald Breaker

Director of Graduate Studies

Frank Slack (936 KBT, 203.432.3492, frank.slack@yale.edu)

Professors Sidney Altman, Ronald Breaker, John Carlson, Lynn Cooley (*Genetics*), Craig Crews, Stephen Dellaporta, Xing-Wang Deng, Paul Forscher, Jo Handelsman, Mark Hochstrasser (*Molecular Biophysics & Biochemistry*), Vivian Irish, Douglas Kankel, Michael Kashgarian (*Pathology*), Haig Keshishian, Perry Miller (*Anesthesiology*), Mark Mooseker, Jon Morrow (*Pathology*), Timothy Nelson, L. Nicholas Ornston, Thomas Pollard, Shirleen Roeder, Joel Rosenbaum, Alanna Schepartz (*Chemistry*), Hugh Taylor (*Obstetrics/Gynecology*), Robert Wyman

Associate Professors Scott Holley, Akiko Iwasaki (*Immunobiology*), Christine Jacobs-Wagner, Frank Slack, Elke Stein, David Wells, Weimin Zhong

Assistant Professors Thierry Emonet, Martín García-Castro, Valerie Horsley, Matthew Rodeheffer (*Comparative Medicine*)

Fields of Study

Research in genetics and molecular biology encompasses studies of catalytic RNAs, cell cycle regulation, chromosome segregation, genetic recombination, mutation, transposons, and oncogenes. Research topics in cellular and developmental biology include structure of the cell cytoskeleton, molecular motors, chemical biology, cell surface receptors, protein transport, hormone action, mammalian transcription factors, microRNAs, and the regulation of cell proliferation and differentiation. Research in neurobiology focuses on sensory signal transduction, animal color vision, growth cone motility, neural differentiation, synaptogenesis, and the formation of topographic maps. A Special Program in Plant Sciences provides research and training in the molecular genetics of flowering, the developmental biology of leaves, the physiology of hormone action, sex determination, and the cellular and molecular biology of photomorphogenesis. 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.

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 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 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.

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 (info.med.yale.edu/bbs), MCGD Track.

Courses

MCDB 500a^U/MB&B 500a^U, Biochemistry L. Nicholas Ornston, Ronald Breaker, Donald Engelman

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. MWF 9:25–10:15

MCDB 505a/GENE 705a/MB&B 705a^U, Molecular Genetics of Prokaryotes

Nigel Grindley

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Prerequisites: previous or concurrent introductory courses in genetics and biochemistry. MW 11:35–12:50

MCDB 530a^U/IBIO 530a, Biology of the Immune System Akiko Iwasaki,

Peter Cresswell, Kevan Herold, Susan Kaech, Ruslan Medzhitov, Carla Rothlin, 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, immunodeficiency, HIV/AIDS. MWF 9:25–10:15

MCDB 550a^U/C&MP 550a^U/ENAS 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

[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^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

MCDB 561b^U/AMTH 665b^U/PHYS 529b, Systems Modeling in Biology

Thierry Emonet, Steven Kleinstein, Simon Mochrie, Xiao-Jing Wang, Steven Zucker

An introduction to the techniques of integrating knowledge from mathematics, physics, and engineering into the analysis of complex living systems. Use of these techniques to address key questions about the design principles of biological systems. Discussion of experiments and corresponding mathematical models. Reading of research papers from the literature. Students build their own models using MATLAB. TTH 2:30–3:45

MCDB 570b^U, Biotechnology Xing-Wang Deng, Kenneth Nelson, Joseph Wolenski, Ronald Breaker

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

Thomas Melia, Thomas Pollard, Michael Caplan, Craig Crews, Pietro De Camilli, Haifan Lin, Joseph Madri, Mark Mooseker, James Rothman

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 Sandra Wolin, Thomas Melia, Thomas Pollard, Michael Caplan, Craig Crews, Pietro De Camilli, Joseph Madri, Mark Mooseker, James Rothman

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 or previous 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, Michael Koelle, 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, Enrique De La Cruz, 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 670b, Advanced Seminar in Biochemistry and Genetics]

MCDB 677b/GENE 777**b**, **Mechanisms of Development** Valerie Reinke and staff An advanced course on mechanisms of animal and plant 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. M 9–10:15, F 2:30–3:45

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 1:30–6

MCDB 730bU/NSCI 502b, Cell Biology of the Neuron Elke Stein

A comprehensive course on neuronal cell biology. Basic principles of cell biology reviewed in the context of the developing and injured nervous system. Areas to be discussed include membrane trafficking, receptor signaling mechanisms, neurotrophin signaling, neuronal cytoskeleton, axon guidance, and synapse formation and maintenance. Prerequisite: one course in cell biology. HTBA

MCDB 735b/NSCI 504b, Seminar in Brain Development and Plasticity

Weimin Zhong, Elke Stein

Weekly seminars and discussion sessions to explore recent advances in our understanding of brain development and plasticity, including neuronal determination, axon guidance, synaptogenesis, and developmental plasticity. MW 2:30–3:45

MCDB 743b/GENE 743b/MB&B 743b^U, Advanced Eukaryotic Molecular Biology

Mark Hochstrasser, Anthony Koleske, Christian Schlieker, 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 750a/CB&B 750a, Core Topics in Biomedical Informatics Perry Miller and staff

Introduction to common unifying themes that serve as the foundation for different areas of biomedical informatics, including clinical, neuro-, and genome informatics. The course is designed for students with significant computer experience and course work who plan to build computational tools for use in bioscience research. Emphasis is on understanding basic principles underlying informatics approaches to biomedical data modeling, interoperation among biomedical databases and software tools, standardized biomedical vocabularies and ontologies, modeling of biological systems, and other topics of interest. The course involves lectures, class discussions, student presentations, and computer programming assignments. Prerequisites: previous computer programming experience and permission of the instructor. HTBA

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 for data integration. Prerequisites: MB&B 301b and MATH 115a or b, or permission of the instructor. MW 1–2:15

MCDB 861b^u, Global Problems of Population Growth Robert Wyman, Fabian Drixler The worldwide population explosion in its human, environmental, and economic dimensions. Sociobiological bases of reproductive behavior. Population history and the cause of demographic change. Interactions of population growth with economic development and environmental alteration. Political, religious, and ethical issues surrounding fertility; human rights; and the status of women. TTH 2:30–3:45

MCDB 900a/CBIO 900a/GENE 900a, First-Year Introduction to Research and

Rotations Frank Slack and faculty

Lab rotations and grant writing 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 Valerie Horsley

Lab rotations and ethics for Molecular Cell Biology, Genetics, and Development track students. TH $4-5{:}30$

MCDB 902a and 903b, Advanced Graduate Seminar Valerie Horsley,

Jo Handelsman

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 required 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 950a and 951b, Second-Year Research

By arrangement with faculty.

The following courses are required for students in the joint B.S./M.S. program with Yale College:

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.

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.

MUSIC

Stoeckel Hall, 203.432.2985 www.yale.edu/yalemus M.A., M.Phil., Ph.D.

Chair Daniel Harrison

Director of Graduate Studies

Gundula Kreuzer (Stoeckel, 203.432.2985, dgs.music@yale.edu)

Professors Kathryn Alexander (*Adjunct*), Richard Cohn, Michael Friedmann (*Adjunct*), Daniel Harrison, Paul Hawkshaw (*Adjunct*), James Hepokoski (*on leave* [F]), Richard Lalli (*Adjunct*), Robert Mealy (*Adjunct*), Patrick McCreless (*on leave* [Sp]), Ellen Rosand (*on leave* [Sp]), Gary Tomlinson (*Visiting*), Michael Veal, Craig Wright

Associate Professors Robert Holzer (*Adjunct*), Gundula Kreuzer, Ian Quinn (*on leave*), Markus Rathey (*Adjunct*), Sarah Weiss (*on leave*)

Assistant Professors Seth Brodsky, Brian Kane (on leave), Michael Klingbeil (Adjunct), Ève Poudrier

Fields of Study

Fields include music history, music theory, and ethnomusicology. (Students interested in performance 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. Eleven are graduate seminars within the Department of Music; one is Readings for Qualifying Examination, normally taken during the final term of course work. With DGS approval, the remaining two may be graduate seminars, or non-introductory undergraduate courses, in other departments or schools within the University. A student must receive four Honors grades in departmental seminars in order to proceed to the qualifying examination, administered at the beginning of the third year. Reading proficiency in two languages – German and either French or Italian – is demonstrated by examinations (with dictionary access) offered at the beginning of each term. Third-year students attend a weekly prospectus/dissertation seminar. 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. 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 eight courses, at least six of which are seminars given in the department, along with the passing of an examination in one foreign language. Of the six departmental seminars, at least two grades must be Honors; the remaining six 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 eight 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 705a, Nineteenth-Century Theory and Aesthetics Patrick McCreless

A study of the principal nineteenth-century writings in music theory (tonality, harmony, counterpoint, rhythmic theory, form, pedagogy of musical composition) and musical aesthetics (Hegel, Schopenhauer, Wagner, Hanslick). M 9:25–11:15

MUSI 807a, Madrigals of Monteverdi Ellen Rosand

The course considers Monteverdi's eight books of madrigals (1592–1638) within a number of overlapping contexts: as the culmination of a century-long fascination among generations of composers with the setting of Italian poetry; in relationship to the madrigals of some of his near contemporaries, such as Wert, Marenzio, and Luzzaschi, whose attitudes toward text expression, like Monteverdi's, could be characterized as exemplifying the so-called *seconda prattica;* and within the composer's own long career as a workshop for his evolution as an opera composer, first of *Orfeo* (1607), then of *Il ritorno d'Ulisse* (1640). TH 9:25–11:15

MUSI 814a, Directed Studies in the History of Music

By arrangement with faculty.

MUSI 814b, Directed Studies in the History of Music

By arrangement with faculty.

MUSI 828b, Late Beethoven James Hepokoski

Current discussions surrounding selected compositions from 1815 to 1827. While the seminar also revisits some classic approaches to Beethoven's late style (Rosen, Kerman, Solomon, Kinderman), its primary focus is on more recent interpretations, analyses, and challenges that have emerged within musicology and music theory in the past two decades (Hatten, Chua, Rumph, Spitzer, Taruskin, Mathew, and others), several of which involve responses to or extensions of late Beethoven commentaries by Adorno and Dahlhaus. W 1:30–3:20

MUSI 839b, Music and Psychoanalysis Seth Brodsky

An exploration of the figures music and psychoanalysis, focusing on their historical and theoretical entwinement. The seminar is divided into five sections: (1) primal scene: finde-siècle Vienna, Freud/Mahler/Schoenberg/Strauss; (2) synoptic review of history of psychoanalysis: theories and clinical practices; narratives and counter-narratives; "wars," "deaths," "resurrections"; (3) psychoanalysis of music: problematics of interpretation and biography; (4) music of psychoanalysis: music as talking cure, theories of listening subject, film music; (5) psychoanalysis and music analysis: perspectives on disciplinary disputes and critiques within music history and music theory. Readings from theoristpractitioners, critics, historians, philosophers, music historians, and theorists. Music of Amacher, Ashley, Berg, Brahms, Galás, Garland, Merzbow, Parker, Reich, Schnebel, Stravinsky, and others. T 9:25–11:15

MUSI 845b, Music Historiography in the New Century Gary Tomlinson

Most musicological and ethnomusicological studies over the last fifty years have arguably been instances of local studies, aiming to understand the workings of particular social and cultural practices of music, of particular societies and their music, or of specific musical genres, styles, and repertories themselves. This situation has begun to change over the last decade or two, with the elaboration of ever-broader music theory and music cognition studies, the tentative broaching of a sweeping neocomparativist musicology, and new explorations in the evolutionary emergence of music. How is historical musicology, after many decades of healthy, local growth, positioned to profit from these novel global strategies? How might historiography in general, conventionally defined by its specificities, be transformed by these new interactions? What might the interrelations of music come to look like in the wake of these changes? What conceptual or theoretical foundations, beyond musical ones, might help to answer such questions? M 1:30–3:20

MUSI 847a/GMAN 680a, Wagner in and on Production Gundula Kreuzer

An exploration of Wagner's ideas on staging and their role in the theory and history of opera since the mid-nineteenth century. The seminar contextualizes his attempts at creating a lasting, correct performance as well as their consequences for productions both historical and modern, with a special focus on *Tannhäuser*, the *Ring* cycle, and *Parsifal*. We broach such methodological issues as theories and analyses of performance, production, and multimedia; approaches to and reconstructions of historical stagings; and the increasing mediatization of opera. Ultimately, the seminar seeks to understand opera more broadly in its liminal state between fixity and ephemerality. T 2:30–4:20

MUSI 860a, Bach in the 1730s Markus Rathey

In the early 1730s Johann Sebastian Bach's understanding of his office in Leipzig underwent a significant change. He had grown increasingly disappointed with the limitations of his position at St. Thomas, and in 1729 he had taken over the Collegium Musicum, an ensemble of students from the university that performed in local coffeehouses. In 1730 he was also (unsuccessfully) seeking a position in Danzig, and between 1732 and 1736 he repeatedly contacted the Electoral Court in Dresden to award him the title of court composer. In this decade he almost completely abandoned the composition of cantatas for Sunday morning services and worked instead on such large-scale works as the Mass in B-Minor and the *Christmas Oratorio* as well as a number of secular cantatas for the Dresden court. He also targeted the music market more aggressively, publishing several editions of keyboard music. The seminar explores the reasons for this shift of interest and its compositional consequences. M 2:30-4:20

MUSI 909b, Arts of Fugue Daniel Harrison

The seminar examines theoretical and analytical issues associated with fugal procedures, ca. 1650–1950, with special focus on the work of J. S. Bach. Harmonic-contrapuntal (e.g., Schenker) and hermeneutical (e.g., rhetorical) explorations of individual works are examined and tested, supported by readings modeling both approaches. Work consists of background reading in analysis and history, structural analysis of individual works, and, optionally, the composition of a fugue a3 on a given subject. Prerequisite: previous study of tonal counterpoint. Experience in Schenkerian analysis is helpful but not required. M 9:25–11:15

MUSI 914a, Directed Studies in the Theory of Music

By arrangement with faculty.

MUSI 914b, Directed Studies in the Theory of Music

By arrangement with faculty.

MUSI 932a/AFAM 842a, Topics in Jazz Studies Michael Veal

A survey of the various approaches that academic scholars and other writers have used to explore the phenomenon of jazz throughout its 100-year history. Disciplinary perspectives are taken from musicology, ethnomusicology, jazz studies, "new" jazz studies, journalism, music theory, cultural anthropology, and literary criticism. Critical issues include the role of recordings in jazz history, constructions of the jazz canon, institutionalization of jazz, jazz as "America's indigenous classical music," and the varying equation of West African and Western European musical retentions. W 2:30–4:20

MUSI 949a, Music of Elliott Carter Ève Poudrier

The course offers a survey of Carter's compositional output through close study of representative works and music scholarship. We explore topics related to precompositional methods, modernist aesthetics and musical narrative, compositional techniques (harmonic, rhythmic, and formal processes), and issues of performance practice and reception, with a special emphasis on perception and cognition; students are encouraged to develop new analytical methodologies. F 9:25–11:15

MUSI 952b, Metric Spaces and Syntaxes Richard Cohn

Through a study of nineteenth- and twentieth-century concert music (Beethoven, Schumann, Brahms, Dvořák, Bartók, Reich), and musics of West Africa and the African diaspora (Collins Kwashie, Thelonious Monk, Eric Dolphy), the course explores ways of categorizing musical meter, relating those categories, representing those relations as a map, strategizing coherent paths on that map, and attributing "meanings" to those paths. TH 1:30–3:20

MUSI 997b, Readings for Qualifying Examination Gundula Kreuzer

MUSI 998a, Prospectus Workshop Gundula Kreuzer W 9:25-11:15

MUSI 999b, Dissertation Colloquium Gundula Kreuzer W 9:25-11:15

NEAR EASTERN LANGUAGES AND CIVILIZATIONS

314 Hall of Graduate Studies, 203.432.2944 www.yale.edu/nelc M.A., M.Phil., Ph.D.

Chair John Darnell

Director of Graduate Studies Eckart Frahm

Professors John Darnell, Benjamin Foster, Eckart Frahm, Beatrice Gruendler (*on leave*), Dimitri Gutas, Bentley Layton, Harvey Weiss (*on leave* [F])

Associate Professor Colleen Manassa

Assistant Professor Hala Nassar

Lecturers Adel Allouche, Karen Foster, Kathryn Slanski

Senior Lector II Ayala Dvoretzky

Senior Lectors Fereshteh Amanat-Kowssar, Shiri Goren

Lectors Sarab al-Ani, Muhammad Aziz, Aaron Butts, Etem Erol, Ghassan Husseinali, Shady Nasser, Dina Roginsky

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 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. 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).

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.

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, Greek and 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.

EXAMINATIONS AND THE DISSERTATION

The comprehensive examination is normally taken at the end of the third year of study or, where advanced standing has been granted, at the end of the second year, but in no case later than September of the academic year following the last year of the student's required course work. The scope of the examination will be determined by the DGS in consultation with the student and department member(s) in whose area the student's studies are concentrated. The examination will consist of written and oral portions and will cover no fewer than five and no more than six areas. 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. 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.

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. In addition to the Graduate School requirements, the dissertation prospectus must have been accepted.

Terminal M.A. 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.

Program materials are available upon request from the Director of Graduate Studies, Department of Near Eastern Languages and Civilizations, Yale University, PO Box 208236, New Haven CT 06520-8236.

Courses

AKKD 501^U, Elementary Akkadian Staff MWF 8:20-9:20

[AKKD 502b^U, Intermediate Akkadian]

[AKKD 503, Advanced Akkadian]

[AKKD 504b, Second-Millennium Legal and Archival Texts]

AKKD 505b, Historical and Archival Texts from First-Millennium Assyria

Eckart Frahm

Reading and discussion of inscriptions, letters, and documents pertaining to the history of the Assyrian empire. Prerequisite: knowledge of Akkadian. 2 HTBA

[AKKD 506b, Selected Mesopotamian Texts: Bilingual]

[AKKD 508b, Akkadian Literature: Atrahasis]

[AKKD 545a, Neo-Babylonian Texts: Administrative and Archival Records]

ARBC 501^U, Elementary Modern Standard Arabic Sarab al-Ani, Muhammad Aziz,

Ghassan Husseinali, Shady Nasser

Develops a basic knowledge of modern standard Arabic. Emphasis on grammatical analysis, vocabulary acquisition, and the development of reading and writing skills. MTWTHF 9:25–10:15, 1 HTBA (2 sections)

MTWTHF 10:30–11:20, 1 HTBA (3 sections)

MTWTHF 11:35–12:25, 1 HTBA (3 sections)

ARBC 502^U, Intermediate Modern Standard Arabic Sarab al-Ani, Muhammad Aziz, Ghassan Husseinali, Shady Nasser

Intensive review of grammar; readings from contemporary Arab authors with emphasis on serial reading of unvoweled Arabic texts, prose composition, and formal conversation. Prerequisite: ARBC 501.

MTWTHF 9:25–10:15 (2 sections) MTWTHF 10:30–11:20 (2 sections) MTWTHF 11:35–12:25 (2 sections)

ARBC 503^U, **Advanced Modern Standard Arabic** Sarab al-Ani, Muhammad Aziz Focus on improving the listening, writing, and speaking skills of students who already have a substantial background in the study of modern standard Arabic. Prerequisite: ARBC 502 or permission of the instructor. MWF 9–10:15, 1 HTBA (2 sections)

ARBC 507b^U, Modern Arabic Seminar Hala Nassar

Study and interpretation of modern Arabic prose and poetry for advanced students. Prerequisite: ARBC 502. T 1:30-3:20

ARBC 510^U, Intermediate Classical Arabic Matteo Di Giovanni

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 Shady Nasser

An advanced course on Arabic grammar and morphology through a close reading of the grammar manual of Ibn Malik (*The Alfiyyah*), in addition to advanced training in sentence structure through *i*'rab. MW 1–2:15

EGYP 501^U, Introduction to Classical Hieroglyphic Egyptian Julia Hsieh

An 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 510^U, Biblical Coptic: Elementary Course]

EGYP 512a/RLST 658a^U, Egyptian Monastic Literature in Coptic Bentley Layton Readings in the early Egyptian classics of Christian asceticism in Sahidic Coptic, including the desert Fathers and Shenoute. Prerequisite: EGYP 510b or equivalent. MW 9–10:15

[EGYP 513a/RLST 660a, Research Seminar on the Monastic Federation of Shenoute]

EGYP 514b^U/RLST 653b^U, Introduction to Gnostic Texts in Coptic Bentley Layton Extensive reading in Gnostic literature in various subdialects of Coptic, mainly from Nag Hammadi. Prerequisite: EGYP 510b or equivalent. MW 9–10:15

EGYP 531a^U, Intermediate Egyptian I: Texts Relating to Egypt and Nubia

Colleen Manassa

Examination of textual sources that relate to interactions between Egypt and Nubia from the late Old Kingdom through the New Kingdom. Monumental texts include the Semna

Stelae of Sesostris III, the Kurgus inscriptions of Thutmose I and Thutmose III, the Tombos inscription of Thutmose I, and the Buhen Stela of Akhenaton. The autobiography of Harkhuf, Middle Kingdom expedition inscriptions, and the Second Intermediate Period stela of Ka provide a private perspective, and the hieratic documents of the Semna dispatches illuminate the activities of the Middle Kingdom fortress system. TH 2:30–4:20

EGYP 533a^U, Intermediate Egyptian I: Literary Texts Colleen Manassa

Close reading of Middle Egyptian literary texts, and introduction to hieratic (cursive) Egyptian script. Readings include Middle Kingdom stories of *Sinuhe* and *The Eloquent Peasant* and excerpts from wisdom literature. Prerequisite: EGYP 501. T 2:30-4:20

EGYP 535^{b^U}, Intermediate Egyptian II: Late Egyptian Stories Colleen Manassa Narrative tales from the New Kingdom, including the *Tale of the Two Brothers*, the *Story of Apophis and Seqenenre*, the *Taking of Joppa*, the *Tale of Woe*, read primarily in the hieratic script. Introduction to the combination of Middle and Late Egyptian grammar that characterizes the literary production of the New Kingdom, with particular reference to Ramesside monumental inscriptions, including the papyrus versions of the Kadesh Battle texts. TH 2:30–4:20

[EGYP 536b, Egyptian Medical Texts]

[EGYP 537a, Egyptian Magical Texts]

[EGYP 540a, Ancient Egyptian Epistolography]

EGYP 550b^U, Introduction to Demotic John Darnell

Introduction to the script and grammar of demotic, including readings of the *Instruction of Onkhsheshonqy* and excerpts from the bilingual decrees. T 2:30–4:20

[EGYP 566a, Late Period Historical Texts: Napatan Historical Inscriptions]

EGYP 568b, Texts from the Amarna Period John Darnell, Colleen Manassa Close reading of texts from the reigns of Amunhotep III, Akhenaton, Tutankhamun, Aye, and Horemheb, with particular attention to the religious, social, and historical implications of the written record. Hieroglyphic texts include the jubilee scenes of Amunhotep III in the tomb of Kheruef, the boundary stelae of Akhenaton, the Great Hymn to the Aton, the Restoration Stela of Tutankhamun, and selections from the Decree of Horemheb. M 2:30–4:20

EGYP 577a^U, Egyptian Rock Inscriptions John Darnell M 2:30–4:20

[EGYP 578a, The Egyptian Netherworld Books]

[EGYP 590b, Coffin Texts]

EGYP 591a^U, Ancient Egyptian Love Poetry John Darnell

Egyptian love poetry, concentrating on the major documents. Most readings in hieratic, with discussions of the grammar of literary Late Egyptian, its relationship to nonliterary Late Egyptian and late Middle Egyptian. Readings in comparative texts and investigation of iconographic parallels. W 2:30–4:20

HEBR 501^U, Elementary Modern Hebrew Ayala Dvoretzky and staff

Introduction to the language of contemporary Israel, both spoken and written. Fundamentals of grammar; extensive practice in speaking, reading, and writing under the guidance of a native speaker. No previous knowledge required.

MTWTHF 9:25-10:15

MTWTHF 10:30-11:20

HEBR 502a^U and b^U, Intermediate Modern Hebrew Ayala Dvoretzky

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. Fall and spring. MW 1–2:15

HEBR 503a^U, Advanced Modern Hebrew Shiri Goren

An examination of themes in Israeli society. Materials include newspaper articles, online resources, films, and commercials. Advanced grammatical structures are introduced and practiced. Prerequisite: HEBR 502. TTH 4–5:15

[HEBR 503b, Advanced Modern Hebrew: Israeli Society]

HEBR 504b^u, Introduction to Modern Israeli Literature Ayala Dvoretzky Reading, discussion, and analysis of short stories, poetry, and magazine articles representative of contemporary Israeli culture, with attention to different styles. Conducted in Hebrew. Prerequisite: HEBR 502 or equivalent. MW 11:35–12:50

[HEBR 505b, 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 Mizrachi 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 2:30–3:45

[HEBR 507b, Medieval Commentaries on the Pentateuch]

[HEBR 508a, Reading Medieval Hebrew Texts]

[HEBR 509b, Reading Academic Texts in Modern Hebrew]

HEBR 510b^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 11:35–12:50

[HEBR 514b, Commentaries on the Song of Songs]

[HEBR 515b, Medieval Hebrew Texts]

MESO 531, Beginning Sumerian Eckart Frahm

Introduction to Sumerian, the oldest recorded language, and its cuneiform writing system, with exercises in reading and translation. 3 HTBA

MESO 533, Advanced Sumerian Benjamin Foster W 2:30-4:30

[MESO 543a, Neo-Assyrian History]

[MESO 544b, Mesopotamian Scholarly Texts]

MESO 559a or b, Directed Readings: Assyriology

MESO 560a, Historical Horizons in Ancient Mesopotamia Eckart Frahm The course investigates how Babylonians and Assyrians of different time periods conceived of their past. Prerequisite: knowledge of Akkadian. 2 HTBA

[MESO 572a or b, Prophecy in Mesopotamia]

NELC 501b, Mesopotamian History of the Late Period Benjamin Foster M 2:30-4:30

NELC 502a, Mesopotamian History of the First Millennium B.C. Benjamin Foster M 2:30–4:30

[NELC 502b^U, World of Homer]

[NELC 503a^U, Art of Ancient Palaces]

NELC 504b^U, Art of the Ancient Near East and Aegean Karen Foster Introduction to the art and architecture of Mesopotamia, Egypt, and the Aegean, with attention to cultural and historical contexts. MW 2:30-3:45

NELC 505a^U, Arabic Seminar Dimitri Gutas

Study and interpretation of classical Arabic texts for advanced students. Prerequisite: ARBC 503 or permission of the instructor. T 3:30–5:20

[NELC 506, History of Assyria]

NELC 507a^U/INRL 585a, Modern Arab Thought Hala Nassar

Major trends of twentieth-century Arab thought critically examined through readings in translation from a wide range of thinkers. Issues are analyzed in the context of the historical-colonial, postcolonial, and neocolonial background from which they emerged. TH 3:30–5:20

NELC 508a, Ancient Painting and Mosaics Karen Foster

Study of the major developments in wall painting, vase painting, and mosaics as seen in ancient Egypt, the Aegean Bronze Age, and the Greek, Etruscan, and Roman world. MW 2:30-3:45

NELC 509b^U/ARCG 744b^U, The Age of Akhenaton John Darnell, Colleen Manassa, Karen Foster

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. TTH 1–2:15

[NELC 513a, Readings in Egyptian History]

[NELC 514a, Buried Cities: Thera, Pompeii, and Herculaneum]

[NELC 515b, The Bible in Its Ancient Near Eastern Setting]

[NELC 516b^U, Mythology of the Ancient Near East]

[NELC 517b, Ancient Polytheisms]

[NELC 519a^U, Religion and Politics in the Ancient Near East]

[NELC 524b^U, Egyptian Literature through the Ages]

[NELC 527^U, Structure of Modern Turkish]

NELC 534b^U/HIST 531b^U/RLST 659b^U, Seminar: The Making of Monasticism Bentley Layton

The social and intellectual history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity and the early Middle Ages, as seen in classic texts of monastic literature and in monastic archaeology. Readings are studied in translation. Prerequisite: permission of the instructor. T 3:30–5:20

[NELC 551b^U, East Meets West: Drama and Theater in the Arab World]

[NELC 552a^U, Gender and Nationalism in Arab Women's Writing]

[NELC 553b^U, Introducing Palestine: Literary Survey]

NELC 554a^U, **Israeli Identity and Culture: 1948 to the Present** Shiri Goren Introduction to contemporary culture and representations of Israeli society. Themes of national and personal identity formation, gender, Zionism and post-Zionism, Israeli-Palestinian relations, Russian immigrants, and Jews of North African origin. Conducted in English. Prerequisite: permission of the instructor. TTH 11:35–12:50

[NELC 555a, Classical Arabic Literature in Translation]

[NELC 556a, Classics: The Arabic-Islamic World]

NELC 557b^u, Israeli Narratives (Seminar) 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, Grossmann, Matalon, Castel-Bloom, Shalev, and Kashua. TH 2:30–4:20

[NELC 563b, From Pictograph to Pixel: Changing Ways of Human Communication]

[NELC 566b, Prehistory of Nubia]

[NELC 580a, Settlement Archaeology in Egypt]

[NELC 587b^U, Environmental History of the Near East]

NELC 588b^U/**ANTH** 773**b**^U/**ARCG** 773**b**^U, **Civilizations and 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 politico-economic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, "barbarian" incursions, or class conflict. TH 2:30–4:20

[NELC 589b^U/ANTH 763b^U/ARCG 763b^U, Archaeologies of Empire]

[NELC 590b^U, Identity in Modern Turkey]

NELC 735a^U/**RLST 656a**^U, **Gnostic Religion and Literature** Bentley Layton The most notorious early Christian heresy, as seen in its scriptures and the words of its ancient opponents. Gnostic myth and dualism; Satan and demons as creators of the world; theories of salvation; Gnostic versions of the Bible; Gnostic Christianity and ancient philosophy. Readings are studied in translation. Prerequisite: permission of the

instructor. T 3:30-5:20

[NELC 736b, The Manichaean World Religion]

[NELC 829a, History of the Arabic Language]

NELC 830a/HIST 829a, 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 Dimitri Gutas

м 3:30-5:20

[NELC 844b, Arabic Textual Criticism and Editorial Technique]

[NELC 845a, Seminar in Arabic Philosophy: Plato's Laws in Arabic]

NELC 846b, Seminar in the Philosophy of Avicenna Dimitri Gutas T 3:30-5:20

NELC 849a or b, Directed Readings: Arabic Dimitri Gutas

NELC 850a, Introduction to Arabic and Islamic Studies Dimitri Gutas

Comprehensive survey of the various subjects treated in Arabic and Islamic studies, with representative readings from each. Detailed investigation into the methods and techniques of scholarship in the field, with emphasis on acquiring familiarity with the bibliographical and other research tools. W 2:30-4:20

NELC 851b, Introduction to Modern Middle Eastern Studies Hala Nassar

Survey of debates in the modern and contemporary Arab world concerning heritage, secularism, religion, language, gender equality, modernization, and tradition. Resources in translation include a cross-section of Arab and Western writings from the late nineteenth century to the present. Focus on gender identities in relation to nationalism, Islamism, and the "West," and how they are reflected in different genres. TH 3:30-5:20

PERS 501^U, Elementary Persian (Farsi) Fereshteh Amanat-Kowssar

An introduction to modern Persian, with emphasis on grammar and syntax as well as writing and reading simple prose. Both literary and classical Persian are taught in the second term. MTWTHF 9:25–10:15

PERS 502^U, Intermediate Persian (Farsi) Staff

Detailed analysis of Persian usage and syntax through the study of modern and classical texts in prose and poetry. Readings from newspapers, textbooks, historical writings, travelogues, classical and modern literature. MTWTHF 10:30–11:20

[PERS 503b, Persian Seminar: Identity and Change]

PERS 504b, Thematic Survey of Modern Persian Literature

Fereshteh Amanat-Kowssar MW 11:35–12:50

PERS 589a or b, Directed Readings: Persian Fereshteh Amanat-Kowssar

[SMTC 501a, Introduction to Comparative Semitics]

[SMTC 502a, Linguistic Topics in Akkadian]

[SMTC 520b, Introduction to Ugaritic]

SMTC 521, Elementary Syriac Aaron Butts

A two-term introduction to the Syriac language. The first term is devoted to acquiring the essentials of Syriac grammar and vocabulary. The second focuses on reading and analysis of Syriac texts from various genres and time periods. HTBA

[SMTC 523a, Intermediate Syriac: Prose Texts]

[SMTC 524b, Intermediate Syriac: Poetic Texts]

SMTC 531a, Aramaic I Aaron Butts

An introduction to the Aramaic language. The first part of the course is devoted to acquiring the essentials of Aramaic grammar and vocabulary. The second focuses on reading and analysis of texts in Old Aramaic (ca. 900–ca. 600 B.C.E.) and Imperial Aramaic (ca. 600–ca. 200 B.C.E.). Prerequisite: knowledge of Hebrew or another Semitic language. HTBA

SMTC 532b, Aramaic II Aaron Butts

A continuation of Aramaic I. Reading and analysis of texts in Middle Aramaic (ca. 200 B.C.E.–ca. 200 C.E.) and Late Aramaic (ca. 200–ca. 1200 C.E.). Prerequisite: SMTC 531a or SMTC 521 or knowledge of Aramaic. HTBA

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. 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. Prerequisite: TKSH 501 or permission of the instructor. TTH 11:35–12:50

[TKSH 505a^U, Structure of Modern Turkish]

Additional Course of Interest

LING 644a^U, Old Iranian: Avestan Stanley Insler

An introduction to the language and texts of the Avesta, the sacred writings of the Zoroastrians. Prerequisite: one year of an ancient Indo-European language (Latin, Greek, Sanskrit, etc.). TH 2:30–4:30
NEUROBIOLOGY

C303 Sterling Hall of Medicine, 203.785.4323 http://info.med.yale.edu/neurobio M.S., M.Phil., Ph.D.

Chair Pasko Rakic

Director of Graduate Studies Michael Crair (SHM B301, 203.785.5768, michael.crair@yale.edu)

Director of Medical Studies

Michael Schwartz (SHM C327B, 203.785.4324, michael.schwartz@yale.edu)

Professors Amy Arnsten, Marvin Chun, Pietro De Camilli, Nihal de Lanerolle, Ronald Duman, Joel Gelernter, Charles Greer, Tamas Horvath, Jeffery Kocsis, Robert LaMotte, Csaba Leranth, Paul Lombroso, David McCormick, Godfrey Pearlson, Marina Picciotto, Pasko Rakic, Joseph Santos-Sacchi, Gordon Shepherd, Stephen Strittmatter, Xiao-Jing Wang, Stephen Waxman

Associate Professors Meenakshi Alreja, Hal Blumenfeld, Charles Bruce, Michael Crair, Sabrina Diano, Ralph DiLeone, Murat Gunel, Elizabeth Jonas, Anthony Koleske, Mark Laubach, Daeyeol Lee, Vincent Pieribone, Marc Potenza, Michael Schwartz, Nenad Sestan, Ning Tian, Flora Vaccarino, Christopher van Dyck, Mark Yeckel

Assistant Professors Jessica Cardin, Stacy Castner, Michael Higley, Ifat Levy, Chiangshan Ray Li, Angeliki Louvi, James Mazer, Justus Verhagen, Graham Williams

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. Required courses are Principles of Neuroscience (NBIO 501a), Neurobiology (NBIO 720a), and Structural and Functional Organization of the Human Nervous System (NBIO 500b). Three more elective graduate-level courses are required. In addition to all other requirements, students must successfully complete NSCI 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.

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 before the end of their second year as a graduate student. The student must choose four faculty members to read with; it is strongly encouraged that these faculty represent interests spanning from molecular to systems/cognitive neuroscience. 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 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.

PROSPECTUS

Ph.D. students must complete and submit their dissertation prospectus (also called thesis proposal) by the end of the third year as a graduate student. The guidelines are as follows:

 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.

- 2. The student should write a proposal of approximately ten pages (similar to an NRSA application). This should include (a) the hypothesis to be addressed, (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 several days 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. 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 outside the Neurobiology department. 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.
- 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 and send it to the Graduate School. As this must be completed before September 1, students should convene the thesis committee meetings prior to August 1.

The student is required to meet with his/her thesis committee on a yearly basis to update progress and problems. A one-page summary of this meeting, written by the mentor and signed by the student, the chair of the thesis committee, and the DGS, should also be given to the business office to reside in the student's file.

ADMISSION TO CANDIDACY

Ph.D. students are required to have been admitted to candidacy by the end of the third year as a graduate student. Generally, the submission of the thesis prospectus is the final requirement for admission to candidacy, and paperwork for both is submitted to the Graduate School at the same time.

OTHER REQUIREMENTS

All graduate students who are admitted to candidacy are required to have an annual thesis committee meeting. 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 thesis document to the thesis committee with sufficient time for them to read this large document. (2) The student defends the thesis in front of the thesis committee. It is expected that small changes will be made before submitting the final document to the Graduate School. If substantial changes are needed, the public defense must be delayed. (3) The student gives the public defense, a one-hour seminar summarizing the research and open to the community. The seminar follows successful defense before the committee. These can be several days apart, but should not be more than a week apart without permission of 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, MB&B 800a, Physiology 500. 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.

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.

OTHER REQUIREMENTS

All graduate students who are admitted to candidacy are required to have an annual thesis committee meeting. 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.

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.

Terminal 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 courses, including two Honors grades, and two successful laboratory rotations). 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 devoted to neuroanatomy in which students dissect the human brain and examine histological sections 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 Mark Yeckel

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 502a, Structure and Function of Neocortex Faculty

The course covers anatomical, biochemical, and physiological organization of selected sensory, motor, and association regions of cortex. Sample topics discussed include development, evolution of multiple representations, columnar organization, and plasticity of neocortex. Hours arranged with individual instructors.

[NBIO 507b/NSCI 507b, Cellular and Molecular Mechanisms of Neurological Disease Next offered spring 2012]

NBIO 509b/NSCI 539b, Synaptic Organization of the Nervous System

Gordon Shepherd, Anne Williamson, Michael Hines

An integrative introduction to the principles underlying the organization of neural systems. The focus is on the best-understood systems, including spinal cord, olfactory bulb, retina, cerebellum, thalamus, basal ganglia, and cerebral cortex. Students integrate experimental findings from anatomy, electrophysiology, and neuropharmacology with computational models at the cellular and circuit level to understand the neural basis of behavior.

NBIO 510a, Introduction to Methods in Cellular and Molecular Neurobiology

Faculty

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 recombined 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 Faculty

Includes 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 524a/NSCI 514a, Neurodevelopment and Neuropsychiatric Disorders

Flora Vaccarino, Michael Crair

The course discusses basic concepts concerning the development of the central nervous system. We focus on the mechanisms that regulate progenitor cell proliferation, the acquisition of regional and cellular identity, neuronal migration, axon guidance, cell death, and activity-dependent mechanisms of neural circuit formation. Information drawn from these basic developmental mechanisms is used to discuss the newest emerging ideas about the pathogenesis of neuropsychiatric disorders such as autism, Tourette's syndrome, depression, and other affective disorders.

[NBIO 535b/NSCI 535b, History of Modern Neuroscience]

[NBIO 570a, Cellular and Network Dynamics of Sensory and Motor Functions]

[NBIO 590a, Sensory Neuroethology: Bats and Owls, Electric Fish, and Beyond]

[NBIO 595a/NSCI 595a, Seminar in Visuomotor Neurophysiology]

NBIO 596a/NSCI 596a, Seminar in Neurophysiology of Decision Making

Daeyeol Lee, James Mazer

The course involves the critical reading and discussion of both historical and contemporary papers on the neurobiology of decision making. Although it covers some key papers in behavioral economics, reinforcement learning, and neuroeconomics, the major emphasis is on the studies directed at understanding the mechanisms of decision making using neurobiological methods, including single-neuron recording and functional neuroimaging.

NBIO 602, 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. HTBA

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

L-200 Sterling Hall of Medicine, 203.785.5932 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 George Aghajanian (*Psychiatry*; *Pharmacology*), Amy Arnsten (Neurobiology; Psychology), John Carlson (Molecular, Cellular & Developmental Biology), Marvin Chun (Psychology), Lawrence Cohen (Cellular & Molecular Physiology), R. Todd Constable (Diagnostic Radiology; Biomedical Engineering; Neurosurgery), Pietro De Camilli (Cell Biology), Nihal de Lanerolle (Neurosurgery; Neurobiology), Ronald Duman (Psychiatry; Pharmacology), Barbara Ehrlich (Pharmacology; Cellular & Molecular Physiology), Paul Forscher (Molecular, Cellular & Developmental Biology), Charles Greer (Neurosurgery; Neurobiology), Tamas Horvath (Comparative Medicine; Neurobiology), James Howe (Pharmacology), Marcia Johnson (Psychology; Psychiatry), Leonard Kaczmarek (Pharmacology; Cellular & Molecular Physiology), Haig Keshishian (Molecular, Cellular & Developmental Biology), Kenneth Kidd (Genetics; Ecology & Evolutionary Biology; Psychiatry), Jeffery Kocsis (Neurology; Neurobiology), Robert LaMotte (Anesthesiology; 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 Picciotto (Psychiatry; Pharmacology; Neurobiology), Pasko Rakic (Neurobiology), George Richerson (Neurology; Cellular & Molecular Physiology), Robert Roth (Psychiatry; Pharmacology), Gary Rudnick (Pharmacology), W. Mark Saltzman (Chemical Engineering; Biomedical Engineering; Cellular & Molecular Physiology), Joseph Santos-Sacchi (Surgery; Neurobiology), Gordon Shepherd (Neurobiology), Robert Sherwin (Internal Medicine), Frederick Sigworth (Cellular & Molecular Physiology; Biomedical Engineering), Stephen Strittmatter (Neurology; Neurobiology), Christopher van Dyck (Psychiatry; Neurobiology), Allan Wagner (Psychology), Xiao-Jing Wang (Neurobiology), Stephen Waxman (Neurology; Pharmacology; Neurobiology), Robert Wyman (Molecular, Cellular & Developmental Biology), Tian Xu (Genetics), Steven Zucker (Computer Science; Electrical Engineering; Biomedical Engineering)

Associate Professors Meenakshi Alreja (Psychiatry; Neurobiology), Thomas Biederer (Molecular Biophysics & Biochemistry), Hilary Blumberg (Psychiatry; Diagnostic Radiology; Child Study Center), Hal Blumenfeld (Neurology; Neurobiology), Angélique Bordey (Neurosurgery; Cellular & Molecular Physiology), Charles Bruce (Neurobiology), Michael Crair (Neurobiology), Sabrina Diano (Obstetrics, Gynecology & Reproductive Services; Neurobiology), Ralph DiLeone (Psychiatry; Neurobiology), Karyn Frick (Psychology), Michael Koelle (Molecular Biophysics & Biochemistry), Anthony Koleske (Molecular Biophysics & Biochemistry; Neurobiology), Daeyeol Lee (Neurobiology), Kevin Pelphrey (Child Study Center), Vincent Pieribone (Cellular & Molecular Physiology, Neurobiology), Maria Mercedes Piñango (Linguistics), Michael Schwartz (Neurobiology), Nenad Sestan (Neurobiology), Dana Small (Psychiatry), Matthew State (Child Study Center; Genetics), Elke Stein (Molecular, Cellular & Developmental Biology; Cell Biology), Jane Taylor (Psychiatry; Psychology), Ning Tian (Ophthalmology & Visual Science; Neurobiology), Vinzenz Unger (Molecular Biophysics & Biochemistry), Flora Vaccarino (Child Study Center; Neurobiology), David Wells (Molecular, Cellular & Developmental Biology), Anne Williamson (Neurosurgery), Mark Yeckel (Neurobiology), David Zenisek (Cellular & Molecular Physiology), Weimin Zhong (Molecular, Cellular & Developmental Biology)

Assistant Professors Robert Beech (*Psychiatry*), Sreeganga Chandra (*Neurology*; *Molecular, Cellular & Developmental Biology*), Jeremy Gray (*Psychology*), Elizabeth Jonas (*Internal Medicine*; *Neurobiology*), Sven-Eric Jordt (*Pharmacology*), Hür Köser (*Electrical Engineering*), Mark Laubach (*Neurobiology*), Michael Levene (*Biomedical Engineering*), Chiang-Shan Ray Li (*Psychiatry, Neurobiology*), Angeliki Louvi (*Neurosurgery*; *Neurobiology*), James Mazer (*Neurobiology*), Rory McCrimmon (*Internal Medicine*), Dhasakumar Navaratnam (*Neurology*; *Neurobiology*), Michael Nitabach (*Cellular & Molecular Physiology*), Christopher Pittenger (*Psychiatry*), Laurie Santos (*Psychology*), Samuel Sathyanesan (*Psychiatry*), Glenn Schafe (*Psychology*), James Swain (*Child Study Center*), Susumu Tomita (*Cellular & Molecular Physiology*), Yufeng Zhou (*Cellular & Molecular Physiology*)

Research Scientists Joel Black (Neurology), Nicholas Carnevale (Psychology)

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 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 Neurosicence, prior to the end of their first year of study. Students are also required to complete at least three additional 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. A series of at least two laboratory rotations during the first year of the program also ensures 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.

Terminal 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. The minimum requirement for this is a passing grade in at least four courses, including two Honors grades, and two successful laboratory rotations. Students are not admitted for this degree.

Program materials are available upon request to the Director of Graduate Studies, Neuroscience, Yale University, PO Box 208074, New Haven CT 06520-8074.

Courses

NSCI 501a/NBIO 501a, Principles of Neuroscience Mark Yeckel

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 Elke Stein

A comprehensive course on neuronal cell biology. Basic principles of cell biology reviewed in the context of the developing and injured nervous system. Areas to be discussed include membrane trafficking, receptor signaling mechanisms, neurotrophin signaling, neuronal cytoskeleton, axon guidance, and synapse formation and maintenance. Prerequisite: one course in cell biology. HTBA

NSCI 504b/MCDB 735b, Seminar in Brain Development and Plasticity

Weimin Zhong, Elke Stein

Weekly seminars and discussion sessions to explore recent advances in our understanding of brain development and plasticity, including neuronal determination, axon guidance, synaptogenesis, and developmental plasticity. MW 2:30–3:45

[NSCI 507b/NBIO 507b, Cellular and Molecular Mechanisms of Neurological Disease Next offered spring 2012]

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 devoted to neuroanatomy in which students dissect the human brain and examine histological sections 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 514a/NBIO 524a, Neurodevelopment and Neuropsychiatric Disorders

Flora Vaccarino, Michael Crair

The course discusses basic concepts concerning the development of the central nervous system. We focus on the mechanisms that regulate progenitor cell proliferation, the acquisition of regional and cellular identity, neuronal migration, axon guidance, cell death, and activity-dependent mechanisms of neural circuit formation. Information drawn from these basic developmental mechanisms is used to discuss the newest emerging ideas about the pathogenesis of neuropsychiatric disorders such as autism, Tourette's syndrome, depression, and other affective disorders.

NSCI 519a/b, Tutorial

By arrangement with faculty and approval of DGS.

NSCI 521a/PHAR 521a, Neuroimaging in Neuropsychiatry I: Imaging Methods

Julie Staley, Kelly Cosgrove Neuroimaging methodologies including Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), Magnetic Resonance Imaging (MRI), functional Magnetic Resonance Imaging (fMRI), Magnetic Resonance Spectroscopy (MRS), and gene array imaging (GAI) 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 theory and current state of development of the different neuroimaging modalities. A second course, offered in the spring, focuses on applications. W 9–10:30

NSCI 521b/PHAR 521b, Neuroimaging in Neuropsychiatry II: Clinical Applications

Hilary Blumberg, Kelly Cosgrove, Julie Staley

Neuroimaging methodologies including Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), structural Magnetic Resonance Imaging (sMRI), functional Magnetic Resonance Imaging (fMRI), Diffusion Tensor Imaging (DTI), and Magnetic Resonance Spectroscopy (MRS) are rapidly evolving tools used to study the living human brain. Neuroimaging has unprecedented implications for assessment of drug efficacy, for determination of psychotropic drug occupancy, and for the study of pathophysiological mechanisms underlying neuropsychiatric disorders. The course is designed to provide an overview of the application of state-of-the-art neuroimaging methods to research in neuropsychiatric disorders. It is recommended for PGY I-VI, Child Psychiatry Fellows, Interdepartmental Neuroscience students, and trainees in pharmacology, neurology, neurosurgery, psychiatry, psychology, and radiology.

[NSCI 535b/NBIO 535b, History of Modern Neuroscience]

NSCI 539b/NBIO 509b, Synaptic Organization of the Nervous System

Gordon Shepherd, Anne Williamson, Michael Hines

An integrative introduction to the principles underlying the organization of neural systems. The focus is on the best-understood systems, including spinal cord, olfactory bulb, retina, cerebellum, thalamus, basal ganglia, and cerebral cortex. Students integrate experimental findings from anatomy, electrophysiology, and neuropharmacology with computational models at the cellular and circuit level to understand the neural basis of behavior.

NSCI 58ob, 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. TH 4-5:30

[NSCI 595a/NBIO 595a, Seminar in Visuomotor Neurophysiology]

NSCI 596a/NBIO 596a, Seminar in Neurophysiology of Decision Making

Daeyeol Lee, James Mazer

The course involves the critical reading and discussion of both historical and contemporary papers on the neurobiology of decision making. Although it covers some key papers in behavioral economics, reinforcement learning, and neuroeconomics, the major emphasis is on the studies directed at understanding the mechanisms of decision making using neurobiological methods, including single-neuron recording and functional neuroimaging.

NSCI 612b/ENAS 812b, Molecular Transport and Intervention in the Brain

Mark Saltzman, Richard Carson

A graduate-level seminar on mechanisms and rates of movement of molecules in the brain and the design of novel drug delivery systems. Topics include mathematical methods for modeling diffusion and flow processes, diffusion in the brain interstitium, fluid flows in the brain and spinal cord, the blood-brain barrier, microdialysis measurements, controlled release systems, microfluidic approaches for drug delivery. Weekly readings are assigned from neuroscience and engineering texts; current papers from the literature are used to guide discussion each week. HTBA

[NSCI 648b/PSYC 648b^U, Cellular Analysis of Learning and Memory: Vertebrate Model Systems]

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

The following course is also of particular value to students in Neuroscience:

MCDB 721La^U, Laboratory for Neurobiology Haig Keshishian, Robert Wyman

NURSING

100 Church Street South, 203.785.2393 http://nursing.yale.edu/Academics/PhD M.Phil., Ph.D.

Dean Margaret Grey

Director of Graduate Studies

Nancy Reynolds (203.737.2313, nancy.reynolds@yale.edu)

Professors Jane Dixon, Marjorie Funk, Margaret Grey, Holly Kennedy, M. Tish Knobf, Ruth McCorkle, Nancy Redeker, Nancy Reynolds, Lawrence Scahill, Ann Williams

Associate Professors Sally Cohen, Barbara Guthrie, Leslie Neal-Boylan, Lois Sadler, Allison Shorten, Sandra Talley, Robin Whittemore

Assistant Professors Angelina Chambers, Joanne Iennaco, Sheila Molony, Linda Pellico, Jacquelyn Taylor

Fields of Study

Fields include chronic illness (diabetes, cardiovascular disease, cancer, HIV/AIDS); selfand family management; maternal and child health; policy and politics of health care; health equity and care of vulnerable populations; acute and critical care; children with mental health disorders; end-of-life and palliative care; environmental 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 twelve core courses and six cognates in the student's area of specialization (including one advanced analysis course) is required.

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.

- 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. This written examination is taken over two consecutive days. 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. 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 Degrees

M.Phil. (en route to the Ph.D.) 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.

Terminal Master's Degree For information on the terminal master's degree offered by the Yale School of Nursing (Master of Science in Nursing), visit the School's Web site,

http://nursing.yale.edu, or contact Frank A. Grosso, Assistant Dean for Student Affairs and Registrar, Yale School of Nursing, at frank.grosso@yale.edu.

Courses

NURS 901a, Quantitative Methods for Nursing Research Jane Dixon

This advanced course in quantitative research methods provides an opportunity to evaluate various research designs used 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 the goal of understanding methods decisions that are made by researchers, and how these decisions influence study validity. Required for all Ph.D. students in nursing. Open to master's students with permission of the instructor. Three hours per week.

NURS 903a, Measurement of Health Variables Jane Dixon

The course focuses on theory of measurement and on reliability and validity of research instruments – with emphasis on interaction of conceptual, methodological, and pragmatic considerations. An integration of seminar and lecture modalities is employed. This course is required for all second-year Ph.D. students in nursing and is also open to advanced graduate students in other schools of the University. Three hours per week.

NURS 904a/b, Doctoral Independent Study Faculty

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 905b, Creating Method: Issues in Nursing Research]

NURS 907, Dissertation Seminar Nancy Redeker

The 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 fundamentals of scientific writing and criticism. Required for all Ph.D. students in nursing. 2.5 hours every other week for academic year.

NURS 909a, Philosophical Foundations of Inquiry Barbara Guthrie

The purpose of this course is to provide doctoral students with an overview and critical analysis of historical and contemporary views of knowledge development and of science, with particular emphasis on the ways these views influence approaches to nursing inquiry. Emphasis is on a critical examination of the underlying epistemological and ontological assumptions and their respective implications for diverse approaches to knowledge generation within the discipline. Required for all Ph.D. students in nursing. Three hours per week.

NURS 911, Doctoral Research Practicum Nancy Reynolds

The overall purpose of this seminar is to guide the student in acquiring an understanding of the role and responsibilities of the nurse researcher. Topics include scientific writing, peer review, components and development of a research plan, program of research and research career, funding and grantsmanship, presentation, publication, ethical considerations, collaboration, and interdisciplinary research. Required of all students for the first two years of doctoral study to coincide with their Graduate Research Assistant experience. One hour every other week.

NURS 913b, Theoretical Basis of Nursing Science Robin Whittemore

The course examines the nature of scientific knowledge and the development of the conceptual and theoretical underpinnings of nursing science. The contribution to nursing science of various approaches to knowledge synthesis and theory development is emphasized. Specific approaches to concept/theory development and analysis are examined. Students are expected to complete a formal analysis of a concept or theory of interest to them. Required for all Ph.D. students in nursing. Three hours per week.

NURS 917, Advanced Statistics for Nursing Research Kristopher Fennie,

Marjorie Funk

This yearlong 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 for all Ph.D. students in nursing and may be elected by M.S.N. students with permission of the instructors. Three hours per week for academic year.

NURS 921b, Seminar on Research in Care of Patients with Diabetes

Robin Whittemore

This seminar focuses on the current state of the science in research on care of patients with diabetes mellitus and builds on knowledge gained in clinical courses in diabetes management. Specific attention is paid to issues related to interventions with high-risk cultural and ethnic groups. Research from nursing, medicine, and the social sciences is discussed by leaders in the field. Prerequisites: NURS 769a and 901a, or the equivalent. Two hours per week. Offered every other year.

[NURS 923a, Current Issues in Cardiovascular Nursing Research]

NURS 925b, Qualitative Research in Nursing Holly Kennedy

The course introduces the student to major approaches to qualitative research. Selected topics related to the design, conduct, and reporting of qualitative research are addressed. Emphasis is placed on the appropriate use of qualitative methods and differences across qualitative approaches. The course includes firsthand experience with data collection and analysis. Required for all Ph.D. students in nursing. Three hours per week.

NURS 927b, Seminar on Research in Care of People with Cancer or at Risk for Cancer and Their Families Ruth McCorkle

This seminar focuses on current state-of-the-science research 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 (e.g., functional status, and affect) and high-risk groups (e.g., family history, ethnicity, and socioeconomic class). Research from nursing, medicine, and the social sciences is discussed. Two hours per week. One additional credit may be obtained by the submission of a publishable paper.

NURS 929b, Ethical Conduct of Clinical Research Ann Williams

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 for 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 for all Ph.D. students in nursing. Three hours per week.

NURS 943a, Self- and Family Management of Vulnerable Populations

Nancy Reynolds

The course examines major conceptualizations of health and illness, vulnerability, and self- and family management in the context of health disparities, and the research supporting these conceptualizations. Emphasis is placed on the link among illness self-management, vulnerability, and related concepts such as self-efficacy and coping and the contributions of risk and protective factors to self-management. These links and associations with self-management are considered from an individual, family, and health system perspective, and sociocultural influences on self-management are explored. Required for all Ph.D. students in nursing. Three hours per week.

NURS 943b, Methods of Intervention Development and Testing Margaret Grey The seminar focuses on the research methods necessary for the understanding, development, and testing of interventions in the management of health and illness by selfand family management. Content includes the use of qualitative, family, and survey approaches to understand the factors associated with management of health and illness and the application of these approaches to both the individual and the family as a unit of study. Prerequisite: NURS 943a. Required for all Ph.D. students in nursing. Open to others by consent of the instructor. Three hours per week.

[NURS 961b, Contemporary Issues in Health Policy and Politics]

PHARMACOLOGY

B-316 Sterling Hall of Medicine, 203.785.7469 http://info.med.yale.edu/pharm M.S., M.Phil., Ph.D.

Chair Joseph Schlessinger

Director of Graduate Studies Elias Lolis (SHM B345, 203.785.6721, elias.lolis@yale.edu)

Director of Medical Studies James Howe

Professors Karen Anderson, Yung-chi Cheng, Jack Cooper (*Emeritus*), Priscilla Dannies, Barbara Ehrlich, James Howe, Leonard Kaczmarek, William Prusoff (*Emeritus*), Gary Rudnick, Alan Sartorelli, Joseph Schlessinger, William Sessa, Dianging (Dan) Wu

Associate Professors Anton Bennett, David Calderwood, Ya Ha, Irit Lax, Elias Lolis

Assistant Professors Titus Boggon, Sven-Eric Jordt, 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.

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 pass a total of six courses. These must include the core graduate pharmacology course (PHAR 504a) and the two terms of the graduate seminar course (PHAR 502a/b). The other courses will be selected based on each student's background and must include at least two other requirements offered by the Pharmacology department. An Honors grade must be obtained in a minimum of two courses. In addition, students are required to do three research rotations and to pass the qualifying examination. A thesis prospectus must be submitted and accepted by the end of the third year. Admission to candidacy is usually achieved by the end of the third year. A doctoral dissertation based upon original research, with an oral presentation given to the pharmacology faculty and a thesis committee in defense of the dissertation, is required for the degree. The norm for completion of the Ph.D. program is about six years.

An important aspect of graduate training in pharmacology is the acquisition of teaching skills through the 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 expected to teach during their first year.

Prior to registering for a second year of study, students must successfully complete MB&B 676b, Responsible Conduct of Research.

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 six courses. Two of the courses must be Pharmacology I and II, and a grade of High Pass (or better) is required for each course. Two grades of Honors are required for any of the six courses.

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 502b, Seminar in Pharmacology and Molecular Medicine

Leonard Kaczmarek

Readings and discussion in topics relevant to cell biology, signal transduction, immunology, and molecular medicine. The overall theme of the papers discussed is pathogenesis of human infectious disease. The class emphasizes analysis of primary research literature and development of presentation skills. W 2–4

PHAR 504a, Pharmacology I: Interfering Selectively Elias Lolis and staff Lectures covering antibiotics, immunotherapy, and chemotherapy. MW 10:30–12

PHAR 506a and b, Methods in Pharmacological Research (Rotations) Elias Lolis Students work in laboratories of faculty of their choice. The period spent in each laboratory is one term.

PHAR 521a/NSCI 521a, Neuroimaging in Neuropsychiatry I: Imaging Methods

Julie Staley, Kelly Cosgrove

Neuroimaging methodologies including Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), Magnetic Resonance Imaging (MRI), functional Magnetic Resonance Imaging (fMRI), Magnetic Resonance Spectroscopy (MRS), and gene array imaging (GAI) 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 theory and current state of development of the different neuroimaging modalities. A second course, offered in the spring, focuses on applications. W 9-10:30

PHAR 521b/NSCI 521b, Neuroimaging in Neuropsychiatry II: Clinical Applications Hilary Blumberg, Kelly Cosgrove, Julie Staley

Neuroimaging methodologies including Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), structural Magnetic Resonance Imaging (sMRI), functional Magnetic Resonance Imaging (fMRI), Diffusion Tensor Imaging (DTI), and Magnetic Resonance Spectroscopy (MRS) are rapidly evolving tools used to study the living human brain. Neuroimaging has unprecedented implications for assessment of drug efficacy, for determination of psychotropic drug occupancy, and for the study of pathophysiological mechanisms underlying neuropsychiatric disorders. The course is designed to provide an overview of the application of state-of-the-art neuroimaging methods to research in neuropsychiatric disorders. It is recommended for PGY I-VI, Child Psychiatry Fellows, Interdepartmental Neuroscience students, and trainees in pharmacology, neurology, neurosurgery, psychiatry, psychology, and radiology.

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. TH 10:30–12

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 56ob^u/C&MP 56ob^u/ENAS 57ob^u/MCDB 56ob^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

PHILOSOPHY

Connecticut Hall, 203.432.1665 www.yale.edu/philos M.A., M.Phil., Ph.D.

Chair Tamar Gendler

Director of Graduate Studies

Sun-Joo Shin, Acting DGS [F] (205 C, 203.432.6971, sun-joo.shin@yale.edu) Keith DeRose (410 C, 203.432.1674, keith.derose@yale.edu)

Professors George Bealer, Seyla Benhabib, Susanne Bobzien, Jules Coleman, Stephen Darwall, Michael Della Rocca, Keith DeRose, Tamar Gendler, John Hare, Karsten Harries, Verity Harte, Laurence Horn, Shelly Kagan, Thomas Pogge, Scott Shapiro, Sun-Joo Shin, Steven Smith, Zoltán Szabó, Kenneth Winkler

Associate Professor Matthew Smith

Assistant Professors Jonathan Gilmore, Joshua Knobe, Jill North, Barbara Sattler, Bruno Whittle

Lecturers Facundo Alonso, Raul Saucedo, Tamina Stephenson

Fields of Study

Fields include most of the major areas of philosophy. Please see the Philosophy Web site (www.yale.edu/philos) for the departmental statement.

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 history, 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 competence in at least one of the following languages: French, German, Greek, or Latin, normally by the end of the second year. Students in Philosophy will teach in the third and fourth 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.

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 six term courses with an average grade of High Pass.

Please see the Philosophy Web site for information on the program (www.yale.edu/ philos).

Classics and Philosophy Joint Ph.D. Program

The Classics and Philosophy Program is a joint 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 joint program must satisfy the general requirements for admission to the Classics graduate program, in addition to the requirements of the Classics track of the joint 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 joint program must satisfy the general requirements for admission to the Philosophy graduate program, in addition to the requirements of the Philosophy track of the joint program. Details of the Philosophy track of the program are available online at www.yale.edu/philos/grad_classics.html.

The joint program is overseen by an interdepartmental committee currently consisting of Professors Susanne Bobzien, Verity Harte, and Barbara Sattler, together with the director of graduate studies for Classics and the director of graduate studies for Philosophy.

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 2:30–3:20

PHIL 600a^U/GREK 731a, Plato's Sophist Verity Harte, Barbara Sattler

A reading of the Greek text of Plato's *Sophist*, a work central to Plato's later philosophy and his engagement with Parmenides. Philosophical issues including the nature of sophistry; of being and not being; of language; and the possibility of falsehood in thought and speech. W 3:30–5:20

PHIL 601b^U/CLSS 808b, Theories of Emotion in Greco-Roman Antiquity

Verity Harte

Theories of emotion from Greco-Roman antiquity, particularly those of Plato, Aristotle, and the Stoics, considered with a view to exploring the nature of emotions and their role in human life and psychology. T 3:30–5:20

PHIL 606a^U, Locke and Berkeley Kenneth Winkler

A close study of Locke's *Essay concerning Human Understanding* and of several works by Berkeley, including his works on vision. Topics include innate ideas, abstraction, the association of ideas, primary and secondary qualities, substance and essence, causation, liberty, identity, linguistic signification, and skepticism. W 7–8:50

PHIL 607b, Rousseau at Three Hundred Steven Smith

The class is offered in anticipation of the tercentenary of the birth of Jean-Jacques Rousseau (1712–1778). It provides a sample of the many different faces of Rousseau from his major political works to selections from his education writings (*Émile*), his novel (*Julie*), his autobiographies (*Confessions, Rêveries*), and even his opera, *Le Devin du Village*. What were the various legacies of Rousseau in politics, culture, philosophy, and morality? T 1:30–3:20

PHIL 625b^U, Frege's Philosophy of Logic and Language Susanne Bobzien

Reading and evaluation of selected articles by Gottlob Frege, "On Sense and Reference," "Function and Concept," "Thought," and "Negation." Focus on Frege's contributions and relevance to modern philosophy of language and philosophical logic (as opposed to his contributions to the philosophy of mathematics). F 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 some of their main consequences in proof theory and model theory, such as Lob's theorem, Tarski's undefinability of truth, provability logic, and nonstandard models of arithmetic. W 1:30-3:20

PHIL 630b^U, Intention, Belief, and Rationality Facundo Alonso

Attitudes such as intention and belief are often thought to be subject to norms of consistency, coherence, stability, and so forth. In this course, we examine different attempts at explaining the nature and strength of such norms. We also explore what such attempts can tell us about the relation between practical and theoretical rationality. M 3:30–5:20

PHIL 631a^U, Topics in Semantics: Modality Tamina Stephenson

The semantics of modal expressions such as "must" and "can." Emphasis on the related area of indicative and counterfactual conditional constructions. W 1:30-3:20

PHIL 632a^U, Metaphysics: Universals and Particulars George Bealer

The development of category theory from Aristotle's *Categories* to the contemporary twocategory theory of particulars and universals. Arguments for and against the contemporary theory, and critical comparison with Aristotelian theory. W 3:30-5:20

PHIL 633b^U, **Philosophy of Mind: The Waning of Materialism** George Bealer Despite its hegemony in our universities, an ever-growing number of our best philosophers have come to reject materialism or to have serious specific doubts about its ultimate viability. We examine the reasons for this important turn of events. TH 1:30–3:20

PHIL 634b^U, Philosophical Logic George Bealer, Raul Saucedo

A study of formal and philosophical issues in the intersection of logic and ontology, with special attention to quantification, identity, and existence. Readings from Frege, Quine, Boolos, Fine, and Williamson, among others. W 3:30-5:20

PHIL 635a^U, Direction of Time Jill North

Attempts to explain the temporal asymmetries we experience at the macroscopic level – coffee cools and ice melts, we have memories of the past and not the future, and so on – given that the underlying laws of physics are symmetric in time. Questions include whether it is possible to have a unified explanation for the different asymmetries we experience and whether time itself has a direction. Consideration of how the probabilities required by the explanations should be understood metaphysically. M 1:30–3:20

PHIL 636b^U, Philosophy of Quantum Mechanics Jill North

Examination of a wide range of philosophical issues as informed by quantum mechanics. How to understand what the quantum mechanical formalism tells us about the world is still very controversial. We evaluate different interpretations of quantum mechanics, comparing their views of the world's ontology. Issues include the measurement problem, superposition, nonlocality, the wave function, configuration space, probability, compatibility with relativity. W 3:30–5:20

PHIL 650a^U, Hobbes and Kant on the Right Stephen Darwall

A close study of the philosophy of right, justice, and law of Thomas Hobbes and Immanuel Kant along with some contemporary philosophy influenced by Hobbes and Kant. W 7-8:50

PHIL 651b^U, Recent Work in Ethical Theory Stephen Darwall

A study of some recently published works on ethics and its foundations. Issues include the grounds of normativity and rightness, and the role of the virtues. W 7-8:50

PHIL 653b^U, Sidgwick's Methods of Ethics Shelly Kagan

Henry Sidgwick's *The Methods of Ethics* is one of the greatest works of moral philosophy of the nineteenth century. A systematic and careful study of three basic approaches to ethics – egoism, utilitarianism, and intuitionism (commonsense deontology) – the *Methods* is a masterpiece that is widely praised but less frequently read, since it is both long and demanding. TH 1:30–3:20

PHIL 654b^U/CPLT 703b/GMAN 651b/PLSC 583b^U, Contemporary Critical Theory: Habermas and Beyond Seyla Benhabib

Critical theory after Jürgen Habermas's "theory of communicative action" faces the challenges of a postnational society, the rise of a global worldwide net, increasing multiculturalism, the end of secularism, and a worldwide economic crisis. The course examines Habermas's response as well as that of the third generation of critical theorists to these issues. W 1:30–3:20

PHIL 655b^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). M 1:30–3:20

PHIL 700b/PLSC 605b, Rethinking Sovereignty: Human Rights and

Cosmopolitanism Seyla Benhabib

Recently the "crisis" of sovereignty and the "end" of sovereignty have been discussed in law, political science, and philosophy. Postnationalist, cosmopolitan, as well as neoliberal critics of sovereignty abound. The course discusses alternative models of sovereignty, ranging from democratic iterations to popular constitutionalism, and it considers the implications of these models for the definition and enforcement of rights. Readings include Hobbes, Bodin, Austin, Schmitt, Kelsen, Habermas, Waldron, Pogge, and Aleinikoff. TH 9:25–11:15

PHIL 701a/CPLT 702a, Schopenhauer, *The World as Will and Representation* Karsten Harries

A careful reading, with special emphasis on the reception of Schopenhauer's ideas. W 1:30–3:20

PHIL 702b, Nicholas of Cusa, On Learned Ignorance Karsten Harries TH 1:30-3:20

PHIL 704a, First-Year Seminar George Bealer, Jill North

Required for 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. TH 1:30–3:20

PHIL 705b, Work in Progress Barbara Sattler, Zoltán Szabó

In consultation with the instructors, each student presents a significant work in progress, for instance, 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. W 1:30–3:20

PHIL 707a, Context Zoltán Szabó

The problem of context-dependence in natural language. Topics include objective and subjective conceptions of context, types of context-sensitivity, vagueness and imprecision, compositionality and rule-following. T $7-8:\!50$

PHIL 708b/REL 929b, The Theology of Plato and Aristotle John E. Hare

The purpose of the class is to look at "the God of the philosophers" in the theology of Plato and Aristotle, looking for the agreements and disagreements of these two philosophers with each other and with their contemporaries. TTH 9:30–10:20

PHIL 709a/HPA 599a/INRL 524a/LAW 20576/PLSC 594a, Global Health Ethics,

Politics, and Economics Thomas Pogge, Jennifer Prah Ruger Billions lack access to basic medical care, and global health inequalities are wide and growing. Such radical disparities cast doubt on the justice of supranational institutional arrangements (such as the TRIPS Agreement) and also pose ethical challenges for the global health community, especially international and domestic health and development institutions. Seeking to illuminate the normative issues involved, the course features a series of distinguished visitors, including academics as well as a few important representatives of international organizations, politics, foundations, NGOs, and relevant industries. Follows Law School academic calendar. T 10:10–12

PHIL 750a or b, Tutorial

By arrangement with faculty.

PHYSICS

35 Sloane Physics Laboratory, 203.432.3607 www.yale.edu/physics M.S., M.Phil., Ph.D.

Chair C. Megan Urry

Director of Graduate Studies

Paul Tipton (JWG 520, 203.432.3375, 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, Richard Chang (Emeritus), Paolo Coppi (Astronomy), David DeMille, Michel Devoret (Applied Physics), Frank Firk (Emeritus), Paul Fleury (Applied Physics), Moshe Gai (Adjunct), Steven Girvin, Leonid Glazman, Robert Grober (Applied Physics), Martin Gutzwiller (Adjunct), John Harris, 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), William Marciano (Adjunct), Simon Mochrie, Vincent Moncrief, Priyamvada Natarajan (Astronomy), Peter Parker, Daniel Prober (Applied Physics), Nicholas Read, Vladimir Rokhlin (Computer Science; Mathematics), Jack Sandweiss, Robert Schoelkopf (Applied Physics), Ramamurti Shankar, 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 Jerzy Blawzdziewicz (Mechanical Engineering), Richard Easther, Bonnie Fleming, Jack Harris, Sohrab Ismaill-Beigi (Applied Physics), Karyn LeHur, Daniel McKinsey, Corey O'Hern (Mechanical Engineering), Witold Skiba

Assistant Professors Helen Caines, Sarah Demers, Eric Dufresne (Mechanical Engineering), Thierry Emonet (Molecular, Cellular & Developmental Biology), Walter Goldberger, Tobias Golling, Daisuke Nagai, Jill North (Philosophy), Nikhil Padmanabhan, A. Elizabeth Rhoades (Molecular Biophysics & Biochemistry), Volker Werner

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.

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, www.yale.edu/physics.

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 Vincent Moncrief

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 and staff

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 Francesco Iachello

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, enormalization group, irreversible processes, fluctuations. MW 9–10:15

PHYS 517a2/ENAS 517a/MB&B 517a2, Methods and Logic in Interdisciplinary

Research Enrique De La Cruz, Eric Dufresne, Thierry Emonet, Paul Forscher, Christine Jacobs-Wagner, Michael Levene, Simon Mochrie, Corey O'Hern, Lynne Regan, Elizabeth Rhoades, Corey Wilson

This half-term IGPPEB class is intended to introduce students to integrated approaches to research. Each 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. Required for students in IGPPEB. MW 5–7

[PHYS 522a, Introduction to Atomic Physics]

PHYS 523a/ENAS 541a/MB&B 523a, Biological Physics Eric Dufresne

An introduction to the physics of several important biological phenomena, including molecular motors, protein folding, bacterial locomotion, and allostery. The material and approach are positioned at the interface of the physical and biological sciences. TTH 2:30–3:45

PHYS 524a, Introduction to Nuclear Physics Volker Werner

Introduction to a wide variety of topics in nuclear structure, nuclear reactions, and the emerging new area in nuclear physics of exotic and weakly bound nuclei far from the valley of stability. A number of related nuclear models as well as experimental methods are discussed. The course also covers topics in nuclear astrophysics and in the use of relativistic heavy ion collisions to study quark-gluon interactions in high density. The aim is to give a broad perspective on the subject and to develop the key ideas in simple ways, with more weight on physics ideas than on mathematical formalism. The course assumes no prior knowledge of nuclear physics and only elementary quantum mechanics. It is accessible to advanced undergraduates. TTH 9–10:15

[PHYS 526b, Introduction to Elementary Particle Physics]

PHYS 529b/AMTH 665b^U/MCDB 561b^U, Systems Modeling in Biology

Thierry Emonet, Steven Kleinstein, Simon Mochrie, Xiao-Jing Wang, Steven Zucker

An introduction to the techniques of integrating knowledge from mathematics, physics, and engineering into the analysis of complex living systems. Use of these techniques to address key questions about the design principles of biological systems. Discussion of experiments and corresponding mathematical models. Reading of research papers from the literature. Students build their own models using MATLAB. TTH 2:30–3:45

PHYS 538a, Introduction to Relativistic Astrophysics and General Relativity Walter Goldberger

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. MW 9–10:15

PHYS 548a^u and 549b^u/APHY 548a^u and 549b^u/ENAS 850a^u and 851b^u, Solid State

Physics I and II Paul Fleury, Daniel Prober

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: TTH 1–2:15; Spring: TTH 2:30–3:45

[PHYS 561b^u, General Relativity, Astrophysics, and Cosmology]

[PHYS 570a/ASTR 570a, High-Energy Astrophysics]

PHYS 590b, Responsible Conduct in Research for Physical Scientists Staff Required seminar for all first-year students.

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

PHYS 608b, Quantum Mechanics II Thomas Appelquist

Approximation methods, scattering theory, and the role of symmetries. Relativistic wave equations. Second quantized treatment of identical particles. Elementary introduction to quantized fields. TTH 9–10:15

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

Second quantization, quantum statistical mechanics, Hartree-Fock approximation, linear response theory, random phase approximation, perturbation theory and Feynman diagrams, Landau theory of Fermi liquids, BCS theory, Hartree-Fock-Bogoliubov method. Applications to solids and finite-size systems such as quantum dots, nuclei, and nanoparticles. TTH 11:35–12:50

PHYS 628a, Statistical Physics II Leonid Glazman

An advanced course in statistical mechanics. Topics to be covered 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 and linear response theory; quantum phase transitions; superfluid and superconducting transitions; some cooperative phenomena in low-dimensional systems. TTH 2:30–3:45

PHYS 63ob, Relativistic Field Theory II Walter Goldberger

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. MW 11:35–12:50

[PHYS 633b/APHY 633b, Introduction to Superconductivity]

[PHYS 634a/APHY 634a, Mesoscopic Physics I]

Special Topics Courses

[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/APHY 675a, 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, and nanostructure physics. Topics include propagation of light, reflection and refraction, guiding light, polarization, interference, diffraction, scattering, and Fourier optics and optical coherence. TTH 11:35–12:50

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 679a/APHY 679a, Non-linear Optics and Lasers]

PHYS 990a and b, Special Investigations Faculty

Directed research by arrangement with individual faculty members and approved by the DGS.

PHYS 991b/ENAS 991b/MB&B 591b, Integrated Workshop Simon Mochrie,

Eric Dufresne, Paul Forscher, Corey O'Hern, Lynne Regan This required course for students in IGPPEB 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 are acquired, and students learn from each other. HTBA

POLITICAL SCIENCE

Rosenkranz Hall, 203.432.5241 www.yale.edu/polisci M.A., M.Phil., Ph.D.

Acting Chair Stephen Skowronek

Director of Graduate Studies Nicholas Sambanis

Professors Bruce Ackerman, Akhil Amar (*Law*), Seyla Benhabib, Paul Bracken (*Management*), David Cameron, Bryan Garsten, Alan Gerber, Donald Green, Jacob Hacker, Stathis Kalyvas, David Mayhew, Barry Nalebuff (*Management*), Douglas Rae, John Roemer, Susan Rose-Ackerman, Frances Rosenbluth, Bruce Russett, Nicholas Sambanis, Kenneth Scheve, James Scott, Ian Shapiro, Stephen Skowronek, Steven Smith, Susan Stokes, Alec Stone Sweet, Peter Swenson, Ivan Szelenyi (*Sociology*), John Wargo (*Forestry & Environmental Studies*), Steven Wilkinson, Elisabeth Wood

Associate Professors Keith Darden, Thad Dunning, Gregory Huber, Pierre Landry, Ellen Lust

Assistant Professors Khalilah Brown-Dean, Christopher Blattman, John Bullock, Daniel Butler, Seok-ju Cho, Alexandre Debs, Samuel DeCanio, Ana De La O Torres, Justin Fox, Susan Hyde, Sigrun Kahl, Hélène Landemore, Adria Lawrence, Jason Lyall, Karuna Mantena, Andrew March, Nikolay Marinov, Nuno Monteiro, Paulina Ochoa Espejo, Ato Kwanema Onoma, Eleanor Powell, Jun Saito, Vivek Sharma, Jessica Weiss

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 accompany an application.

Special Requirements for the Ph.D. Degree

Students are required to pass sixteen term courses before the end of their fifth term in the program and to receive a grade of Honors in at least two Political Science courses. The department regularly offers about sixty term courses for graduate students each year. (Yale has two terms each academic 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]). Students are normally expected to complete eight courses in the first year, including the required Introduction to the Study of Politics given in the fall term each year, which is graded on a Satisfactory/ Unsatisfactory basis.

As part of the second year of courses, all students are required to take the two-term course in Research and Writing, which is devoted to the preparation of a manuscript based on original research on a topic of the student's choice. The Research and Writing sequence will count as two of the sixteen credits needed to advance to candidacy. Conducted as a seminar, the course includes all second-year students and is directed by two members of the faculty.

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. 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.

In order to be admitted to candidacy for the Ph.D. degree, the student must have a prospectus approved by a dissertation director and two other members of the faculty. This must occur by no later than May 1 of the student's third year of study.

Students are admitted to candidacy by the end of the third year, but only after completion of all requirements, including the Introduction to the Study of Politics course, Research and Writing, the necessary field distributions and certifications, and approval of the dissertation prospectus.

Almost without exception, those who successfully complete the Ph.D. in Political Science will join the faculties of colleges and universities. For that reason, learning what is involved in teaching and gaining teaching experience are also essential and central 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.

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 publication. 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 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 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.

Program materials are available upon request to the Director of Graduate Studies, Department of Political Science, Yale University, PO Box 208301, New Haven CT 06520-8301.

Courses

EMPIRICAL ANALYSIS AND RESEARCH METHODOLOGY

PLSC 500a, Statistics Daniel Butler

The goal of the course is to introduce basic statistical theory and techniques for Political Science graduate students. The first part of the course covers probability theory, and the second part is devoted to estimation and inference, including an introduction to the classic multiple linear regression framework. Although emphasis is on the development of the relevant theory and statistical concepts, a series of applications and examples is considered on a variety of political science problems, such as turnout, crime, elections, party systems. MW 9–10:15

PLSC 503b, Quantitative Methods Ana De La O Torres

The course provides an extensive treatment of the linear regression model. It covers a wide array of regression techniques, including those that address problems of measurement error, reciprocal causation, and nonlinearities. Time series and pooled timeseries-cross-sectional models are also covered. The aim is to make students intelligent consumers of published quantitative research and to prepare them to conduct original research in political science. The course assumes that students have command of the material covered in PLSC 500a, including basic knowledge of probability and linear regression. Matrix algebra and calculus are helpful but not essential. MW 9–10:15

PLSC 504a, Advanced Quantitative Methods Kenneth Scheve

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. MW 9–10:15

PLSC 505b^U, Qualitative Field Research Adria Lawrence

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. Permission of the instructor required for undergraduates. T 3:30–5:20

PLSC 510a, Introduction to the Study of Politics Ana De La O Torres

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. TH 3:30–5:20

PLSC 512b^U, **Experimental Methods in Political Science** Donald Green, Alan Gerber An introduction to experimental methods as they can be used to study politics. Exploration of strengths and weaknesses of experimental and nonexperimental studies. Applications include the effects of television advertising, formation of political attitudes, and causes of voter turnout. Students participate in the design and implementation of an experiment. Knowledge of introductory statistics helpful but not required. M 3:30–5:20

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. TH 9:25–11:15

PLSC 518b, Fundamentals of Modeling II Seok-ju Cho

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. M 9:25–11:15

PLSC 520b^U, **Introduction to Game Theory with Political Applications** Justin Fox The course provides an overview of game theory and its applications to problems of a political nature. We start from the ground floor, assuming no prior exposure to game theory or mathematics beyond high school algebra. Students are introduced to the concepts of Nash equilibrium, time-consistency, signaling, and reputation formation. The applications covered depend in part on student interest. Possibilities include models of candidate competition, models of international conflict, models of ethnic conflict, etc. TTH 4–5:15

PLSC 525a/SOCY 551a, Comparative and Historical Methods Philip Gorski

The course provides a hands-on introduction to the craft of comparative and historical analysis. Through a series of small-scale, individual, and group projects, students learn how to frame researchable problems, how to use comparisons to address them, how to work with different types of primary sources, how to transform them into "data," and how to manage this data. In order to create a substantive focus for the course, and to exploit the strengths of Yale's libraries and archives, the readings and assignments are centered on English history and historiography. The course is designed for graduate students in history and the social sciences but is also open to undergraduates with a strong interest in research. M 1:30-3:20

PLSC 540a&b, Research and Writing Gregory Huber, Nicholas Sambanis

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. W 1:30–3:20

POLITICAL THEORY

PLSC 553b/LAW 21260, 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. Self-scheduled examination or paper option. HTBA

PLSC 574b^U, Topics in Democratic Theory Ian Shapiro

An examination of recent work in democratic theory. Particular attention to competing definitions of democracy; transitions to democracy; systems of democratic representation; tensions between democracy and other goods; and democracy and world politics. M3:30-5:20

PLSC 580a^U, Political Theory and Membership: Borders, Culture, and Citizenship Seyla Benhabib

Contemporary societies face changing patterns of migration, increasing demands for multicultural rights, and the transnational effects of globalization. These changes are altering the institution of citizenship in liberal democracies as well, shifting distinction among rights of citizenship, residency, and migration. Should long-term residents be allowed political participation rights? How much multiculturalism in the legal system is compatible with democracic citizenship? TTH 2:30–3:20

PLSC 583b^U/CPLT 703b/GMAN 651b/PHIL 654b^U, Contemporary Critical Theory: Habermas and Beyond Seyla Benhabib

Critical theory after Jürgen Habermas's "theory of communicative action" faces the challenges of a postnational society; the rise of a global worldwide net; increasing multiculturalism; the end of secularism; and a worldwide economic crisis. The course examines Habermas's response as well as that of the third generation of critical theorists to these issues. W 1:30-3:20

PLSC 589b^U, Islamic Law and Ethics Andrew March

The course is intended as an introduction to Islamic legal and ethical thought for advanced students of ethics, law, or political philosophy. The main aims of the course are to survey the history of (Sunni) Islamic jurisprudence and positive law, to cover the main doctrines and debates on the epistemic status of legal-ethical knowledge and the hermeneutical and analytic methods for deriving it, and then to study in relative depth a single substantive problem in Islamic legal and ethical thought. TH 9:25–11:15

PLSC 595a/ECON 791a, Theories of Distributive Justice John Roemer

We survey the main theories of distributive justice proposed by economists and political philosophers since 1950, critiquing each theory from both the economic and philosophical perspective. Topics covered include Arrow's impossibility theorem and its resolution, axiomatic bargaining theory (J. Nash and followers), utilitarianism according to J. Harsanyi and others, egalitarianism according to J. Rawls and A. Sen, the veil of ignorance as a thought experiment, neo-Lockeanism according to R. Nozick, resource egalitarianism according to R. Dworkin, and equality of opportunity according to R. Arneson, G.A. Cohen, and J. Roemer. The main text, *Theories of Distributive Justice* (J.E. Roemer, 1996), is supplemented with other readings. Prerequisite: PLSC 517a or equivalent sophistication in microeconomic modeling. W 9:25–11:15

PLSC 599b, Introduction to Political Theory Andrew March

This field seminar introduces graduate students to Part II of the Political Theory reading list. All mandatory (starred) authors are covered. The purpose of the seminar is to help students prepare for the Political Theory field exam. F 9:25-11:15

PLSC 605b/PHIL 700b, Rethinking Sovereignty: Human Rights and

Cosmopolitanism Seyla Benhabib

Recently the "crisis" of sovereignty and the "end" of sovereignty have been discussed in law, political science, and philosophy. Postnationalist, cosmopolitan, as well as neoliberal critics of sovereignty abound. The course discusses alternative models of sovereignty, ranging from democratic iterations to popular constitutionalism, and it considers the implications of these models for the definition and enforcement of rights. Readings include Hobbes, Bodin, Austin, Schmitt, Kelsen, Habermas, Waldron, Pogge, and Aleinikoff. TH 9:25–11:15

PLSC 617b, Democracy and Deliberation Hélène Landemore

The course examines the connection between the idea of democracy and the practice of deliberation. While deliberation is at the core of contemporary normative theories of "deliberative democracy," deliberation is not by itself democratic. One of the aims of the seminar is to clarify to what extent democracy needs to be deliberative and to what extent deliberation can be democratic. T 9:25–11:15

PLSC 623b^U, Borders Paulina Ochoa Espejo

What is a border in politics? Under what conditions are borders appropriate? What kinds of borders should we have (a sign, a line, barbed wire fences, walls)? Who governs borders? How should they be governed? The course examines the concept of borders by relating theoretical debates to historical and contemporary political problems. T 3:30-5:20

PLSC 625a^U, Means and Ends in Politics Karuna Mantena

The course considers the tension between principles of political action (means) and political ideals (ends). It asks how political theory ought to situate itself vis à vis the historical, sociological, and practical contexts of politics. Organized around tensions between idealism and realism, philosophy and politics, moral and political judgment, practical and theoretical reason, and moral intention and unintended consequences. Thinkers to be considered include Aristotle, Machiavelli, Burke, Weber, Arendt, and Gandhi. w 9:25–11:15

PLSC 626b^U, Rousseau at Three Hundred Steven Smith

The class is offered in anticipation of the tercentenary of the birth of Jean-Jacques Rousseau (1712–1778). It provides a sample of the many different faces of Rousseau from his major political works to selections from his educational writings (*Emile*), his novel (*Julie*), his autobiographies (*Confessions, Reveries*) and even his opera, *Le Devin du Village*. What were the various legacies of Rousseau on politics, culture, philosophy, and morality? T 1:30–3:20

PLSC 627b^U, Aristotle's Political Thought Bryan Garsten

A careful reading of Aristotle's *Nichomachean Ethics* and *Politics*, along with select debates in the secondary literature and consideration of Aristotle's place in recent political theory. T7-8:50

INTERNATIONAL RELATIONS

PLSC 594a/HPA 599a/INRL 524a/LAW 20576/PHIL 709a, Global Health Ethics,

Politics, and Economics Thomas Pogge, Jennifer Prah Ruger

Billions lack access to basic medical care, and global health inequalities are wide and growing. Such radical disparities cast doubt on the justice of supranational institutional arrangements (such as the TRIPS Agreement) and also pose ethical challenges for the global health community, especially international and domestic health and development institutions. Seeking to illuminate the normative issues involved, the course features a series of distinguished visitors, including academics as well as a few important representatives of international organizations, politics, foundations, NGOs, and relevant industries. Follows Law School academic calendar. T 10:10–12

PLSC 651b^U, The Balance of Power: Theory and Practice Nuno Monteiro

The seminar explores the role of the balance of power in the theory and practice of international relations. We cover the development of different theoretical views on the balance of power as well as the history of the international balance of power since the turn of the twentieth century. The emphasis is analytic rather than historical; we therefore focus on what the balance of power can highlight on recent, post-Cold War events and trends. By the end of the course, students should be conversant with the theoretical aspects of balance-of-power scholarship and also have a broad picture of the historical development of the rise and fall of great powers in the last hundred years. MW 4:30–5:20

PLSC 653a^U, **Anti-Americanism and Popular Protest in World Politics** Jessica Weiss Anti-Americanism and other varieties of anti-foreign sentiment in the developing world, with a focus on the international and domestic sources of anti-Americanism and implications for U.S. foreign policy. T 1:30-3:20

PLSC 658a^U, International Institutions Nikolay Marinov

The role of international institutions in structuring cooperation between nations. Emphasis is both theoretical – on the theory of cooperation – and empirical, with examples drawn from the post-WWII world order. M 1:30-3:20

PLSC 662a^U/**INRL 592a**/**MGT 586a**, **Strategy**, **Technology**, **and War** Paul Bracken The interrelationship of strategy, foreign policy, and technology has shaped international relations from Napoleon to the global information grid. Transformations arise from political change and technological advance. Topics include the role of "big" military organizations in the United States, Europe, and Asia; organizing for defense and intelligence; arms control; and the challenge of a second nuclear age. HTBA

PLSC 667a^U, The Causes of War Keith Darden

Examination of classical and contemporary theories of the causes of war. Consideration of historical cases that spawned such theories, including the Peloponnesian War, the Thirty Years' War, and World Wars I and II. w 1:30–3:20

PLSC 668b^u, International Dimensions of Democratization Nikolay Marinov

The current wave of democratizations around the world leads us to investigate the role played by international factors such as socialization, coercion, emulation. The main question of interest is how much democratic processes can be affected from the outside. M 1:30-3:20

PLSC 674b^U, Military Power Nuno Monteiro

The seminar explores the foundations, applications, evolution, and limits of military power. We read the main foundational text on the topic – Clausewitz's *On War* – and pair it with contemporary readings that complement it on the several aspects referred above. By the end of the course, students should have a general grasp of the main questions pertaining to the use of military power and its relation to international and domestic politics. T 9:25-11:15

PLSC 678b^U, Japan and the World Jun Saito

The nature of Japan's international relations and its foreign policy. The historical development of Japan's international relations since the late Tokugawa period, WWII and its legacy, domestic institutions and foreign policy, Japan's relations with neighboring countries, the implications of these relations for the United States, and interactions between nationalism and regionalism. M 9:25–11:15

PLSC 679a, International Relations Field Seminar Nuno Monteiro

The course is about theories of international relations – how to evaluate existing theories, how to construct new theories, and how to think about the nature and possibility of causal explanation in international relations. The course starts out with an examination of different philosophical treatments of the problem of causal explanation and goes on to explore how these underpin the different explanatory approaches in international relations and in the social sciences more generally. In doing so, the course provides a general survey of the main theoretical perspectives in the field of international relations, the methods used to substantiate their claims, and the philosophies of science that continue to play an important role in scholarly debates in the field. The course is not focused on a description or analysis of the events, institutions, and processes that make up international relations. Nor is the purpose of the course to expose students to the most recent works in all areas of contemporary international relations. It is designed to give students the theoretical foundations and conceptual tools needed to pursue the study of international relations and to pass the Ph.D. qualifying exam. T 9:25–11:15

PLSC 683b^U, Europe, the United States, and the Iraq Crisis Jolyon Howorth

Examination of the contrasting relations between the main European powers and the United States in their approaches to Iraq, in order to understand the divisions that attended the 2003 War and subsequent transfer of sovereignty. Topics incluce the Iran-Iraq War (1980–88), the first Persian Gulf crisis (1990–91), the sanctions regime (1991–2002), and the problems of peacekeeping and nation-building. M 1:30–3:20

PLSC 689a^U, Secession and Political Boundaries Nicholas Sambanis

The course analyzes the political economy of decentralization, secession, and political boundaries (both internal to states and international). We explain why some countries have stable systems of political decentralization and others do not. We develop a framework to explain why (and which) regions demand more self-determination and where these demands might lead to violent conflict. T 1:30-3:20

PLSC 693b/INRL 66ob, International Political Economy Kenneth Scheve

The course examines how domestic and international politics influence the economic relations between states. It addresses the major theoretical debates in the field and introduces the chief methodological approaches used in contemporary analyses. We focus on four types of cross-border flows and the policies and international institutions that regulate them: the flow of goods (trade policy), the flow of capital (financial and exchange rate policy), the flow and location of production (foreign investment policy), and the flow of people (immigration policy). T 9:25–11:15

PLSC 694b, Field Seminar: International Security Jason Lyall

The course examines how violence and the threat of its use shape relations between, and sometimes within, states. It surveys the field's key theoretical debates and introduces the methodological approaches and data that underpin contemporary research. Specific 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. W 1:30–3:20

COMPARATIVE POLITICS

PLSC 714a/LAW 20098, 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. T 2:10–4

PLSC 715b/HIST 985b/MGT 984b, Studies in Grand Strategies, Part I

John Gaddis, Paul Kennedy, 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 www.yale.edu/iss/gs for application information. M 3:30–5:20

PLSC 716a/HIST 985a/MGT 984a, Studies in Grand Strategies, Part II

Paul Kennedy, Charles Hill Part II of the two-term linked seminar offered during the calendar year 2010. Research seminar. M 3:30-5:20 **PLSC 726a**^U, **Property Rights, Politics, and the Economy** Ato Kwame Onoma What are property rights? What are the mechanisms that guarantee property rights? What are the impacts of property rights on the economy and on politics? What effects do property rights have on social justice and equality? Why are property rights more secure in some places than in others? What accounts for the transformation and persistence of property rights systems? These are some of the questions that the course addresses. M 3:30–5:20

PLSC 734a,b/SOCY 560a,b, Comparative Research Workshop Emily Erikson,

Julia Adams, Philip Gorski

This workshop is a weekly interdisciplinary seminar dedicated to group discussion of work-in-progress by distinguished visiting scholars, Yale graduate students, and inhouse faculty from various social science disciplines. Papers are distributed a week ahead of time and also posted at 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. HTBA

PLSC 756a^u, The European Union David Cameron

An examination of the origins, development, institutions, contemporary policy-making processes, and challenges facing the European Union. Topics include theories of European integration, the creation of a single internal market, the creation of an Economic and Monetary Union, the several enlargements, the contemporary role of the Union in economic policy, justice and home affairs, and foreign and defense policy, efforts to address the so-called democratic deficit in the Union, and the recent negotiation of a constitutional treaty. T 1:30–3:20

PLSC 765a^U, State and Society in China Jessica Weiss

The course examines state-society relations in the People's Republic of China, focusing on popular protest and social mobilization, media commercialization and the Internet, and prospects for political reform and democratization. T 3:30–5:20

PLSC 777a, Comparative Politics I Stathis Kalyvas

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. M 7-8:50

PLSC 778b, Comparative Politics II Steven Wilkinson

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. TH 3:30–5:20

PLSC 779a/ANTH 541a/F&ES 836a/HIST 965a, Agrarian Societies: Culture,

Society, History, and Development Michael McGovern, James Scott, Elisabeth Wood

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. TH 1:30–5:20

PLSC 782a^U, Public Opinion in China Pierre Landry

This seminar evaluates research on public opinion in China derived from survey research conducted since the 1990s. Although China remains an authoritarian regime, a great deal of public opinion research has been accumulated, and an increasing number of datasets have been released for scholarly analysis. The seminar familiarizes students with the substantive and theoretical debates that survey-based literature has generated and exposes them to the practical use of these data sources in their own work. TH 3:30–5:20

POLITICAL ECONOMY

PLSC 721b/ECON 792b, Political Economy of Institutions and Development

Alexandre Debs

How do political institutions affect economic outcomes? How do economic conditions determine political institutions? The course reviews recent advances in the emerging field of the political economy of institutions and development, with a focus on formal modeling and quantitative studies. We start with an introduction to the importance of institutions in affecting economic performance. Second, we review some basic models of democratic politics, focusing on the impact of economic conditions (such as inequality) on political outcomes. Third, we cover major theories of democratization, for example studying the effects of income and inequality on institutional change. Fourth, we study basic models of dictatorships, looking at the effect of nondemocratic institutions on growth and international conflict. Finally, we take a critical look at the role of institutions and consider the possibility of policy persistence despite institutional change. W 9:25–11:15

PLSC 787a^U, Japanese Politics and Political Economy Jun Saito

Examination of Japan's political institutions and the way these affect the policy-making process. Consideration also of Japan's emerging role in the world political economy. M 9:25–11:15

AMERICAN POLITICS

PLSC 800a, Introduction to American Politics David Mayhew

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. T 1:30–3:20 $\,$

PLSC 8014^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. M 1:30–3:20

PLSC 802b^U, Collective Action and Choice Justin Fox

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. The course meets for the first six weeks of the spring term at the time assigned to PLSC 802b and PLSC 803b. M 1:30–3:20

PLSC 803b^U, American Political Institutions Eleanor Powell

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. Particular 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. While this course builds on material covered in 801a and 802b, it is a stand-alone course without any prior requirements. The course meets for the second six weeks of the spring term at the time assigned to PLSC 802b and PLSC 803b. W 1:30–3:20

PLSC 804b^U, Empirical Research Strategies in the Study of American Political Behavior and Institutions Donald Green

The aim of the course is to expose students to the challenge of drawing secure causal inferences about political behavior and institutions. We give a close, critical reading to journal articles in various literatures, among them prejudice, political participation, and agenda setting. Students write a research paper in which they identify and estimate an interesting causal relationship.

PLSC 812b^U, Progressivism: Theory and Practice Stephen Skowronek

The course examines the progressive reform tradition in American politics. It considers the conceptual underpinnings of this tradition, its social supports, its practical manifestations in policy and in new governmental arrangements, and its conservative critics. Though the emphasis is on the origins of this reform tradition in early decades of the twentieth century, attention is given as well to its latter-day manifestations and to how the progressive impulse has changed over time. W 3:30-5:20

PLSC 818b^U, **Political Economy of Environmental Policy** Susan Rose-Ackerman A seminar on the tensions between economic analyses of environmental problems, on the one hand, and political realities and demands, on the other. We consider the different and overlapping roles of the legislature, the executive, and the courts. The seminar also explores the role of federalism and the democratic potential of participatory policy making. The seminar focuses on the United States but brings in international cases to illustrate some of the basic problems. Prerequisite: Introductory Microeconomics plus one course with a substantive policy focus. Limited enrollment. T 1:30–3:20

PLSC 823b/AFAM 814b^U, Race and Ethnicity Khalilah Brown-Dean

An introduction to research on race and ethnicity in American politics. Topics include the social construction of race; intersections between race and gender; black, Latino, and Asian American public opinion and political participation; minority representation; the relationship among race, racism, and public policy; immigration and citizenship; state politics; the psychology of racial politics; and the role of race in campaigns. We discuss and debate the empirical contributions of this literature, as well as questions of theory, methodology, and research design. T 9:25–11:15

PLSC 825b^U, Inequality and American Politics Jacob Hacker

The course explores the role of American politics and public policy in abetting the hyperconcentration of income at the top of the economic ladder in the United States, and the ways in which this hyper-concentration has in turn transformed American politics. Topics include changes in corporate governance and executive compensation, tax policy, campaign finance, the revolving door between government and the private sector, government contracting, and the role of unions. Readings range widely from recent political science contributions to sociological and economic analyses, and include some crossnational and historical works as well as contemporary discussions. M 9:25–11:15

PLSC 827a^U, **Politics, Law, and Economics of Affirmative Action** Ian Shapiro An exploration of the politics, law, and economics of affirmative action, principally in the United States. M 3:30–5:20

PLSC 834a, Politics, Law, and the American State Jacob Hacker

An investigation of the political and legal development of the American state in the contemporary era. Topics include the interplay of the president, courts, and Congress; the role of government in regulating American society and promoting economic security; and the challenges to American governance posed by rising inequality and global economic integration. M 2:10–4

PLSC 842a/LAW 20190, The Constitution: Philosophy, History, 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. HTBA

PLSC 846b/LAW 21172, The Civil Rights Revolution Bruce Ackerman

An analysis of the constitutional law and politics during the period beginning with *Brown* and ending with the election of Ronald Reagan to the presidency. Enrollment limited. Self-scheduled examination or paper option.

PLSC 853a^U, U.S. National Elections David Mayhew

A research seminar centering on presidential and congressional elections. Topics include electoral realignments, current presidential alignments, the electoral college, voter turnout, aggregate House election patterns, House incumbency advantage, challenger quality, career decisions, election laws, House and Senate constituencies, campaign finance, Senate elections, and divided party control. Assigned authors include R. Erikson, E. Tufte, G. Jacobson, A. Abramowitz, M. Fiorina, R. Wolfinger, E. Ladd, G. King, J. Snyder, and B. Grofman. Students are expected to read weekly assignments and write a twenty- to thirty-page research paper. W 1:30–3:20

PLSC 876b^U, **The American Welfare State in Comparative Perspective** Jacob Hacker An exploration of the causes and consequences of America's comparatively distinctive social welfare framework. Consideration of competing analytic and normative perspectives in the context of selected policy issues and political episodes, including health care, retirement pensions, economic inequality, the New Deal, the Great Society, and current debates over Medicare and Social Security. M 1:30–3:20

RESEARCH WORKSHOPS

PLSC 919, American Politics Workshop Alan Gerber

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 12–1:30

PLSC 920, Comparative Politics Workshop Stathis Kalyvas

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. The workshop faculty director is Stathis Kalyvas (stathis.kalyvas@yale. edu). Detailed information can be found at www.yale.edu/cpworkshop. Can be taken as Satisfactory/Unsatisfactory only. T 12–1:30

PLSC 921, Political Theory Workshop Andrew March

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. The workshop faculty director is Andrew March (andrew.march@yale.edu). 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 Stathis Kalyvas 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 presenttion of cutting-edge work from all social science disciplines and includes the presentation of ongoing research by Yale graduate students. The faculty director is Stathis

Kalyvas (stathis.kalyvas@yale.edu) and the coordinator for 2010–2011 is Francesca Grandi (francesca.grandi@yale.edu). Detailed information can be found at www.yale. edu/macmillan/ocvprogram. Can be taken as Satisfactory/Unsatisfactory only. W 6–8

PLSC 924, Leitner Political Economy Seminar Series Alexandre Debs,

Giovanni Maggi

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. The faculty directors are Alexandre Debs (alexandre.debs@yale.edu) and Giovanni Maggi (giovanni.maggi@yale.edu). Detailed information can be found at www.yale.edu/leitner/seminars.html. Can be taken as Satisfactory/Unsatisfactory only. M 12–1:30

PLSC 926, International Relations Workshop Bruce Russett

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. The workshop faculty director is Bruce Russett (bruce.russett@yale.edu). More information can be found at www.yale.edu/polisci/conferences/ir.html. Can be taken as Satisfactory/ Unsatisfactory only. W 12–1:30

PLSC 990a&b, Directed Reading

By arrangement with individual faculty.

PSYCHOLOGY

Kirtland Hall, 203.432.4500 www.yale.edu/psychology M.S., M.Phil., Ph.D.

Chair

Marcia Johnson (203.432.4545, marcia.johnson@yale.edu)

Director of Graduate Studies

Susan Nolen-Hoeksema (203.432.0699, susan.nolen-hoeksema@yale.edu)

Professors Woo-kyoung Ahn, Stephen Anderson (*Linguistics*), Amy Arnsten (*Neurobiology*), John Bargh, Sidney Blatt (*Psychiatry*), Paul Bloom, Thomas Brown, Kelly Brownell, Marvin Chun, Margaret Clark, Ravi Dhar (*School of Management*), John Dovidio, Carol Fowler (*Haskins Laboratories*), Robert Frank (*Linguistics*), Donald Green (*Political Science; ISPS*), Marcia Johnson, Alan Kazdin, Frank Keil, Marianne LaFrance (*Women's, Gender & Sexuality Studies*), Lawrence Marks (*Epidemiology & Public Health*), Gregory McCarthy, Susan Nolen-Hoeksema, Donald Quinlan (*Psychiatry*), Peter Salovey, Fred Volkmar (*Child Study Center*), Victor Vroom (*School of Management*), Allan Wagner, Karen Wynn

Associate Professors Elena Grigorenko (Child Study Center), Jeannette Ickovics (Epidemiology & Public Health), Joan Kaufman (Psychiatry), Robert Kerns (Veterans Administration Medical Center), Ami Klin (Child Study Center), Linda Mayes (Child Study Center), Douglas Mennin, Laurie Santos, Brian Scholl, Mary Schwab-Stone (Child Study Center), Jane Taylor (Psychiatry)

Assistant Professors Maria Babyonyshev (*Linguistics*), Walter Gilliam (*Child Study Center*), Jeremy Gray, June Gruber, Julia Kim-Cohen, Jaime Napier, Nathan Novemsky (*School of Management*), Kristina Olson, Maria Piñango (*Linguistics*), Glenn Schafe

Lecturers Marc Brackett, Nancy Close, Nelson Donegan, Carla Horwitz, David Klemanski, Kristi Lockhart, Burton Saxon, Barbara Shiller, Benjamin Toll

Fields of Study

Fields include behavioral neuroscience; clinical psychology; cognitive psychology; developmental psychology; 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) Nine units of teaching are required in years two through four. (3) Completion of a First-Year Research Paper due by May 1 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. Program

A combined Ph.D. degree with African American Studies is available. Students must apply to the African American Studies department with Psychology as the secondary department. Consult 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 www.yale.edu/psychology.

Courses [PSYC 501b, Social Cognitive Development] [PSYC 502a^U, Learning Theory] [PSYC 504a^U, Neurobiology of Emotion] [PSYC 505a, Stereotyping and Prejudice]

[PSYC 506b/LING 540b^U, Computational Models in Cognitive Science]

[PSYC 509a, Social Cognition]

[PSYC 510b^U, Thinking]

[PSYC 511b, Cognitive Development]

PSYC 514a^U, Topics in Infant Studies Karen Wynn

The course investigates selected advanced topics in infant cognitive, social, and/or emotional development. The topic varies from year to year. Some examples: infants' concept of object, concept of number, early social cognition, and early emotional development. W 2:30-4:20

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. MW 9–10:15

[PSYC 521b^U, Multivariate Statistics with Observable Variables]

[PSYC 522a^U, Mapping the Human Brain]

PSYC 523a, Cognitive Neuroscience Jeremy Gray

The aim of the course is to provide an overview of cognitive neuroscience at an introductory graduate level. We cover principles, methods, and key research findings in multiple topic domains (e.g., language, memory, vision, attention, working memory/ executive control, movement control, emotion and reward, social processes). The course emphasizes behavioral and neural processes, with some discussion of computational approaches. T 2:30–4:20

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 design experiments, acquire data, and perform analyses. The course makes extensive use of MATLAB. F 12–4

PSYC 539b, Advanced Psychopathology Douglas Mennin

The major forms of psychopathology approached from a cognitive-behavioral perspective. Diagnosis, assessment, conceptualization, and treatment are emphasized, drawing from both theory and current research. M 1:30–3:20

[PSYC 541a, Research Methods in Psychology]

PSYC 553a/MGMT 753a, Behavioral Decision Making I Ravi Dhar,

Nathan Novemsky, Joseph Simmons

The seminar examines research on the psychology of decision making, focusing on judgment. Although the normative issue of how decisions should be made is relevant, the descriptive issue of how decisions are made is the main focus of the course. Topics of discussion include judgment heuristics and biases, confidence and calibration, issues of well-being including predictions and experiences, regret and counterfactuals. The goal of the seminar is threefold: to foster a critical appreciation of existing knowledge in behavioral decision theory, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that 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 556b^U, Developmental Psychopathology]

PSYC 557a, Social Psychology and Relationships Margaret Clark

The course focuses on determinants of initial attraction and interpersonal processes that serve to promote and detract from high-quality relationships, together with individual differences and how they relate to those processes. Initial sessions focus on ways of conceptualizing attraction and relationships. The remaining sessions (constituting the bulk of the course) are organized around the theories that have organized the empirical research in this field including evolutionary approaches, interdependence theory, attachment theory, and self-evaluation maintenance theory. Grades are based on participation in the seminar and on three written assignments linked to the material covered in each third of the class. Each assignment can take the form either of answering a set of distributed questions that require knowledge of the material covered but also require going beyond that material to explore some implications of the work, or proposing a specific study relating to the material covered but also going beyond that material in some way. T 9:25–11:15

PSYC 575b^U, Brain and Behavior Thomas Brown

This introduction to brain and behavior is designed to be accessible to a broad range of students. The topics focus on some of the most fascinating areas of modern neuroscience. Lectures furnish the basic background for the subsequent seminars, which focus on recent or classical publications. The seminars furnish concrete examples of scientific questions and forms of argument. Students learn to understand and evaluate original research. TTH 1–2:15

PSYC 607b^U, Cognitive Science of Causality Frank Keil

Examination of how people and animals track causal patterns in the world around them. Topics include the perception of causality; mechanistic, teleological, and psychological causation; variations in causal thinking across domains; the role of counterfactuals, biases, and heuristics in causal thought; and the development of causal thinking. M 1:30-3:20

[PSYC 608b^U, Cognitive Science of Ignorance]

[PSYC 610a^U, The Modern Unconscious]

[PSYC 611b^U, What We Eat and Why]

[PSYC 613a^U, Mind, Brain, and Society]

[PSYC 615a, Psychology, Psychotherapy, History, Systems, and Practice]

PSYC 618a^U, The Social Brain Gregory McCarthy

Selected topics in the field of social neuroscience including animacy and the attribution of intention from motion, thinking about the self and others, and moral judgments. F 1:30-3:20

PSYC 619a^U, Food Policy and Science Kelly Brownell

The class involves a combination of experiences designed to expose students to science on food and nutrition and to connect the science with pressing policy issues. Mentored research and classroom activities are blended such that science and policy are integrated. Prerequisite: permission of the instructor. M 1:30–3:20

[PSYC 621b^U, Cognitive Science of Pleasure]

PSYC 623b^U, Cognitive Science of Good and Evil Paul Bloom

Where does our sense of right and wrong come from? How do emotion and reason interact? What is the relationship between moral thought and moral action? And what can the study of moral psychology tell us about how best to live our lives? This seminar explores these issues from the perspective of multiple disciplines, including philosophy, experimental psychology, evolutionary theory, theology, and law. T 2:30–4:20

PSYC 624b^u, The Psychology of Legitimacy Jaime Napier

The primary goal of the course is to familiarize students with themes and current research on the psychological aspects of justice and legitimacy, with a focus on understanding the psychological antecedents and consequences of legitimation and delegitimation in social relations. Key topics include the ways in which people construct ideological justifications or rationalizations for their own actions and for the actions of others taken on behalf of valued groups and systems. TH 2:30-4:20

PSYC 625b^U, Social Perception Brian Scholl

When exploring the structure of the mind, we typically think of visual perception as among the earliest and most basic of our cognitive processes, while we think of social cognition as among the most advanced forms of higher-level cognition. In this seminar we explore how these two aspects of the mind connect. Specific topics include the perception of animacy, agency, and goal-directedness; biological motion; face perception (including the perception of facial attractiveness); gaze processing and social attention; "thin-slicing" and "perceptual stereotypes"; and social and cultural influences on perception. TH 1:30–3:20

PSYC 632b^U, Food and the Brain Ivan de Araujo

How does the brain respond to the ingestion of food, and which brain circuits control appetite and body weight? The course aims at presenting the major sensory and physiological aspects of the neurobiology of feeding and appetite. It covers the basic neurobiology of chemosensation (taste, smell, and flavor perception) as well as the neural circuits responsible for the central control of energy metabolism and body weight. Special emphasis is given to the neurochemistry of food reward and nutrient preference. Altered physiological states associated with food intake are also covered, including food craving, the effects of stress on eating, and obesity. Each week consists of classes involving both

lectures and interactive discussions based on the reading of major literature references in the field. TTH $4-5{:}15$

[PSYC 648b^U/NSCI 648b, Cellular Analysis of Learning and Memory: Vertebrate Model Systems]

PSYC 650a^U/**LING 660a**^U, **Topics in Syntax: The Mental Lexicon** Maria Piñango Definitions of lexical knowledge; views of the lexicon as a repository of information vs. a "generative" system; the case of idioms; the lexicon and the grammar-conceptual structure interface; acquisition of the lexicon. M 1:30–3:20

PSYC 654b^U, Sensory Information Processing Lawrence Marks

A functional examination of the ways that sensory systems transduce stimulus energies and information. Topics include sensory anatomy and physiology, psychophysical analysis of the qualitative dimensions of sensory experience, selective attention, and interactions among sensory, perceptual, and cognitive mechanisms. T 9:25–11:15

PSYC 657a/CDE 505a, Social and Behavioral Influences on Health

Jeannette Ickovics

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 1-2:50

PSYC 664a/CDE 531a, Health and Aging Becca Levy

Since 1900 the number of individuals aged sixty-five and older has tripled and life expectancy has increased by about thirty years. The course examines some of the health issues related to this growing segment of the population. Class discussions address such questions as: How does the aging process differ between cultures? What kinds of interventions can best reduce morbidity in old age? How can health policy adapt to the aging populations? The course integrates psychosocial and biomedical approaches.

[PSYC 670b^U, Personality and Individual Differences]

PSYC 684a, Introduction to Psychotherapy: Technique David Klemanski

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. HTBA

PSYC 684b, Introduction to Psychotherapy: Technique David Klemanski

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). HTBA

PSYC 689a, Psychopathology and Diagnostic Assessment Douglas Mennin

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. HTBA

PSYC 690b, Ethics and Clinical Practice: Legislation and Diversity Issues

David Klemanski

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. HTBA

PSYC 702, Current Work in Cognition Jeremy Gray

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 Behavioral Neuroscience Allan Wagner

An informal student/faculty seminar in which each participant chooses, lays groundwork for, and presents some current work in behavioral neuroscience. Currently emphasizes the psychobiology of learning, but involves a variety of research approaches, designs, and methods. F 12–1:15

PSYC 708, Current Work in Developmental Psychology Frank Keil

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 Dovidio [F];

Marianne LaFrance, Jaime Napier [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 Walter Gilliam,

Edward Zigler, Sandra Bishop-Josef

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. F 10:35–12:25

PSYC 720, Current Work in Clinical Psychology Faculty

Basic and applied current research in clinical and community psychology is presented by faculty, visiting scientists, and graduate students, and examined in terms of theory, methodology, and ethical and professional implications. 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. HTBA

PSYC 722, Research Topics in Food, Nutrition, and Obesity Kelly Brownell

In-depth discussion and analysis of current research topics on bulimia, anorexia nervosa, and obesity. Topics include, but are not limited to, physiology, cultural influences, treatment studies, body image, binge eating, and epidemiology. HTBA

PSYC 723a, 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 725, Research Topics in Human Neuroscience Gregory McCarthy

Discussion of current and advanced topics in the analysis and interpretation of human neuroimaging and neurophysiology. HTBA

PSYC 726, Research Topics in Mood Regulation and Mental Health

Susan Nolen-Hoeksema

We discuss a range of topics related to mood regulation and psychological disorders, including models of depression, anxiety, and related disorders. We also discuss how gender impacts vulnerability to emotional problems, and how gender-related factors may serve to protect against certain types of psychopathology. HTBA

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. HTBA

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. HTBA

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. HTBA

PSYC 734a, Research Topics in Anxiety Disorders Douglas Mennin

We examine current conceptualizations of anxiety disorders, with particular emphasis on generalized anxiety disorder. Topics include the utility of an emotion-regulation perspective in understanding and treating anxiety disorders. HTBA

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. HTBA

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. HTBA

PSYC 739, Research Topics in Autism and Related Disorders Fred Volkmar,

Ami Klin

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. HTBA

PSYC 747, Research Topics in Affective Neuroscience Glenn Schafe

This laboratory course studies the neurobiological substrates of emotion, with particular emphasis on Pavlovian fear conditioning. We cover the current literature in fear conditioning, ranging from studies that emphasize the behavior/systems level of analysis to those that emphasize the cellular and/or molecular. HTBA

PSYC 748, Research Topics in Emotion and Cognitive Control Jeremy Gray

The course covers (1) research in emotion and cognitive control and (2) science communication skills. For research, the emphasis is on the design, conduct, and analysis of behavioral and fMRI studies, emphasizing individual differences. Once a month, we have a session on science communication skills, with topics chosen by students to meet their interests and needs (spoken research presentations, persuasive communication, graph design, Web design, and so on). Students may enroll in the course and attend only the science communication skills component. HTBA

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. TH 2:30–4:20

PSYC 750/C&MP 750, Research Topics in the Neurobiology of Learning and Memory

Thomas Brown

Discussion and analysis of current work on the neurobiological foundations of learning and memory systems in mammals. Informal weekly discussions span several levels of analysis, including molecular and biophysical studies, cellular and systems neurophysiology and neuro-anatomy, and contemporary behavioral neuroscience. HTBA

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. HTBA

PSYC 767, Research Topics in Emotion, Health, and Social Behavior Peter Salovey A forum for graduate students conducting research in the Health, Emotion, and Behavior Laboratory. HTBA

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. HTBA

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. HTBA

PSYC 777, Research Topics in Gender and Psychology Marianne LaFrance

The "Gender Lab" meets weekly to consider research being done in the department that bears on some gender-related issue. HTBA

PSYC 801, Clinical Internship (Child) Faculty

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) Faculty

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 Faculty

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 Faculty

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 Faculty 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 Douglas Mennin

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 Kelly Brownell,

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 David Klemanski

Supervised practicum in the assessment and treatment of mood disorders, with an emphasis on cognitive-behavioral perspectives. HTBA

PSYC 816b, Practicum in Developmental Disabilities and Developmental

Assessment Fred Volkmar, Ami Klin

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. HTBA

PSYC 817, Other Clinical Practica Faculty

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 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.

RELIGIOUS STUDIES

451 College Street, 203.432.0828 www.yale.edu/religiousstudies M.A., M.Phil., Ph.D.

Chair Harry Stout

Director of Graduate Studies Dale Martin

Professors Harold Attridge (*Divinity*), Gerhard Böwering, Jon Butler, Adela Collins (*Divinity*), John Collins (*Divinity*), John Darnell, Stephen Davis, Carlos Eire, Steven Fraade, Philip Gorski, Phyllis Granoff, Frank Griffel, John Hare (*Divinity*), Christine Hayes, Paula Hyman, Bentley Layton, Ivan Marcus, Dale Martin, Gene Outka, Harry Stout, Emilie Townes (*Divinity*), Denys Turner, Miroslav Volf (*Divinity*), Robert Wilson

Associate Professors Shannon Craigo-Snell, Ludger Viefhues-Bailey

Assistant Professors Kathryn Lofton, Andrew March, Andrew Quintman, Eliyahu Stern

Senior Lecturers Margaret Olin (Visiting), Koichi Shinohara, David H. Smith

Lecturers Adel Allouche, Hugh Flick, Jr., John Grim (*Visiting*), Jonathan Kaplan, Hizky Shoham, Mary Evelyn Tucker (*Visiting*), Sandra Valabregue-Perry

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 and previous study in areas relevant to the chosen field of study, including ancient languages where applicable.

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. 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, Theories in the Study of Religion: Major Thinkers

Ludger Viefhues-Bailey

How do various theoretical approaches to the study of religion create different visions of what counts as "religion"? With a focus on the modern search for "origins" and on "gender," we analyze the theoretical assumptions of each methodology and inquire into the contexts each theorist creates. In addition to some of the classics in our field (Durkheim, Eliade, Geertz), we read contemporary theorists (e.g., Kristeva, Chidester, Bell) and scholars of religion (Lopez, Gross, Jantzen). T 3:30–5:20

RLST 513a/WGSS 781a, Religion and Gender in the Philosophy of Stanley Cavell

Ludger Viefhues-Bailey

An introduction to the philosophy of Stanley Cavell with particular emphasis on gender and religion. W 3:30-5:20

RLST 553a, Monastic Life in Asia Koichi Shinohara

A careful study of primary texts and secondary sources on Asian monasticism, primarily Buddhist. Students may read the primary texts in translation or in the original language. M 9:25–11:15

RLST 582a, Readings in Buddhist and Jain Literature Phyllis Granoff

An introduction to Pali and Ardhamagadhi with readings from the Pali chronicles and Jain story literature. T1:30-3:20

RLST 583b^U, Biography in Asian Religions Andrew Quintman

The seminar examines a variety of primary texts and secondary theoretical works on biography and autobiography in order to evaluate the significance of life writing in the religious traditions of Asia. TH 1:30-3:20

RLST 605a, Greco-Roman Environment of the New Testament Dale Martin

An introduction for advanced students to the religious, philosophical, and cultural milieu in which the New Testament took shape. The course requires extensive readings in primary sources and selected secondary literature. W 3:30–5:20

RLST 608a, Christianity in Late Antiquity Stephen Davis

Required seminar for doctoral students in Ancient Christianity. Topics include the relation of church and state after Constantine; theological controversies and church councils; interfaith relations; pieties and practices; and material culture. M 1:30–3:20

RLST 649b^u/HIST 555b^u, Jesus to Muhammad: Ancient Christianity to the Rise of Islam Stephen Davis

The history of Christianity and the development of Western culture from Jesus to the early Middle Ages. The creation of orthodoxy and heresy; Christian religious practice; philosophy and theology; politics and society; gender; Christian literature in its various forms, up to and including the early Islamic period. MW 10:30–11:20, 1 HTBA

RLST 651b^U/JDST 728b^U, Midrash Seminar: Exodus 32 and Its Midrashic

Development Christine Hayes

A study of the midrashic career of the Golden Calf story. Examination of the rich and polyphonic tradition of interpretation found in the Bible itself, in ancient translations, and in classical rabbinic sources. Prerequisite: reading fluency in ancient Hebrew. TTH 1–2:15

RLST 653b^U/**EGYP 514b**^U, **Introduction to Gnostic Texts in Coptic** Bentley Layton Extensive reading in Gnostic literature in various subdialects of Coptic, mainly from Nag Hammadi. Prerequisite: EGYP 510b or equivalent. MW 9–10:15

RLST 656a^U/**NELC 735a**^U, **Gnostic Religion and Literature** Bentley Layton The most notorious early Christian heresy, as seen in its scriptures and the words of its ancient opponents. Gnostic myth and dualism; Satan and demons as creators of the world; theories of salvation; Gnostic versions of the Bible; Gnostic Christianity and ancient philosophy. Readings are studied in translation. Prerequisite: permission of the instructor. T 3:30–5:20

RLST 658a^U/EGYP 512a, Egyptian Monastic Literature in Coptic Bentley Layton Readings in the early Egyptian classics of Christian asceticism in Sahidic Coptic, including the desert Fathers and Shenoute. Prerequisite: EGYP 510b or equivalent. MW 9–10:15

RLST 659b^U/HIST 531b^U/NELC 534b^U, Seminar: The Making of Monasticism Bentley Layton

The social and intellectual history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity and the early Middle Ages, as seen in classic texts of monastic literature and in monastic archaeology. Readings are studied in translation. Prerequisite: permission of the instructor. T 3:30–5:20

[RLST 660a/EGYP 513a, Research Seminar on the Monastic Federation of Shenoute]

RLST 675b/JDST 722b, Ancient Judaism Christine Hayes

An in-depth survey of the history and literature of Judaism in late antiquity through the rabbinic period. Special attention is given to the problems and possibilities of employing rabbinic sources for the purposes of historical reconstruction in the period that saw the emergence of the Gospels and the formation of Christianity. Emphasis on methodological trends and cutting-edge scholarship. The course is designed primarily for students in the Ph.D. program in New Testament and Ancient Christianity. Doctoral students in Hebrew Bible and Ancient Judaism are also welcome. T 10–12

RLST 706a^U, Religion and Popular Culture Kathryn Lofton

Why does Ned Flanders go to church? What does a bracelet have to do with medieval Judaism? And is Brad Pitt a divine? So much of consumer culture encourages passivity and easy irony. The course explores the religious dimensions of that consumption, and of the products we consume. Religion is never merely institutions or texts, pulpits or liturgy. Popular arts and media not only explicitly portray religion and religious ideas, but also serve the religious purpose of conveying meaning in the people and values it represents. Meanwhile, religious institutions market goods, and purportedly secular goods frequently incorporate religious imagery. The course provides a profile in the vexing connections between religion and popular culture. Through readings, film screenings, and investigative projects, we develop a vocabulary and an analytical structure by which to interpret media objects and the religious mediations they include. Students develop a portfolio of cultural criticism through four reviews as well as a research study of a particular cultural event and its religious significations. TH 2:30–3:45

RLST 707b/AMST 699b/HIST 749b, Religion and Modernity Kathryn Lofton Is religion a construction of modernity? Is modernity the construction of religion? The course considers the historical and theoretical problem of modernity through readings that emphasize its interpretive location within the academic study of religions, the industrialization of the West, and the emergence of the social sciences as the epistemic presumption of the twentieth century. Included in our examinations are works that seek to provide for modernity a historical philosophy, a magic, and a gender; likewise, we evaluate critiques of modernity that query its classificatory utility, its imperial suppositions, and its sexual proclivities. Threaded throughout this focus on modernity is its discursive, sociological, and institutional relationship to religion, religions, and religious studies. In addition to more recent monographs, students read from works by Frazer, Freud, Marx, and Weber to develop a critical perspective on descriptions of religion developed through formats of the modern. M 2:30–4:20

RLST 711a^U/JDST 772a^U, Al-Ghazali and Maimonides Frank Griffel

Close study of the lives and the thought of two of the most influential theologians and philosophers in Islam and Judaism. Comparison of their lives and writings, focusing on their integration of Aristotelian philosophy into the theology of Islam and Judaism. M 1:30-3:20

RLST 720b, Seminar on the Qur'an Gerhard Böwering

Intensive study of the Qur'an. Readings in commentaries on the Qur'an. Special emphasis on textual and hermeneutical problems. Prerequisites: reading knowledge of Arabic and permission of the instructor. HTBA

RLST 721a, Seminar in Islamic Religious Thought 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 Timurid empires (600–1500 C.E.). Emphasis on the intellectual and religious history of the Arabs and Iranians. HTBA

RLST 750a^U/HIST 953a^U/JDST 795a^U, Religion, Ethnicity, and Identity in American Jewish History Paula Hyman

An exploration of how Jews in American negotiated, and renegotiated, religion and ethnicity to forge a hyphenated American identity. Topics include the impact of Protestant domination, immigrant experiences and legacies, the role of discrimination, and selfpresentation and representation by others. M 1:30-3:20

RLST 751a^U/JDST 728a^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 (Deuteronomy 32), as found in the collection Sifre Haazinu. Discussion of early rabbinic methods and rhetoric of scriptural interpretation, with consideration of its place in the history of interpretation and possible contribution to historical understanding of ancient Jewish society and culture. Prerequisite: reading fluency in ancient Hebrew. W 9:25–11:15

RLST 752b^U/**JDST 727b**^U, **Mishnah Seminar: Tractate Megillah** Steven Fraade Study of rabbinic texts treating rules for the public recitation and translation of the Scroll of Esther on the holiday of Purim and of other sacred scriptures throughout the year, with special attention to the relation between law and ritual and the narrativity of both. Prerequisite: reading fluency in ancient Hebrew. M 1:30–3:20

RLST 756b/JDST 756b, Ancient Judaism Seminar. From Qumran to the Rabbinic Revolution: Conceptions of Impurity Vered Noam

The topic of this required Ancient Judaism seminar changes yearly. The seminar focuses this year on purity, impurity, holiness, and the profane, which are basic concepts of almost every religious system. Topics include the development of these terms from the Bible, though Second Temple exegesis and into the rabbinic literature; the theological-political polemics that these religious conceptions generated; and the emergence of rabbinic culture against the background of the earlier, dissenting Qumranic legislation. Prerequisite: reading fluency in ancient Hebrew. W 1:30–3:20

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: Miqsat Ma'aseh 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. M 9:25–11:15

RLST 762b^u/HIST 952b^u/JDST 784b^u, Memory, Memoirs, and Modern Jewish History Paula Hyman

Exploration of how memoir writers from the seventeenth century to the twentieth understand their own experience against the backdrop of Jewish history. Focus on the construction of identity and the relation of personal and collective memory, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. TH 1:30-3:20

RLST 768a^U/HIST 979a^U/JDST 788a^U, The Holocaust in Historical Perspective Paula Hyman

A survey of the major historical issues raised by the Holocaust, including the roots of Nazism; different theoretical perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. MW 10:30–11:20, 1 HTBA

RLST $_{773}a^{\scriptscriptstyle U}/\rm HIST\,_{535}a^{\scriptscriptstyle U}/\rm JDST\,_{761}a^{\scriptscriptstyle U},$ History of the Jews to the Reformation

Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Jews, Christians, and Muslims. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. Prerequisite: reading knowledge of modern Hebrew. TTH 11:35–12:50

RLST 774b^U/HIST 566b^U/JDST 781b^U, History of Jewish Culture, 1500 to the Present Paula Hyman

A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. TTH 11:35–12:50

RLST 775b^U/JDST 734b^U, Loving God in Ancient Judaism and Early Christianity

Jonathan Kaplan

Loving God is historically one of the highest ideals in both Judaism and Christianity. The purpose of the course is to explore the emergence of this ideal from its background in ancient Near Eastern literature and culture and to examine its development in the literature of ancient Israel and its expression in the literature of ancient Judaism and early Christianity. TH 9:25–11:15

RLST 776b/HIST 541b/JDST 790b, The Jews in Medieval Societies Ivan Marcus Research seminar that focuses on a comparison of the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain). Issues in historiography and comparative methodology complement discussions about the symbols and reality of literary, political, and economic features of each society. Prerequisite: reading knowledge of modern Hebrew. T 1:30–3:20

RLST 777b^U/HIST 532b^U/JDST 764b^U, Jews in Muslim Lands from the Seventh to the Sixteenth Century Ivan Marcus

Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire. Prerequisite: reading knowledge of modern Hebrew. TTH 11:35–12:50

RLST 780a^U/JDST 799a^U, Modern Zionist Traditions: Time, Space, and Body Hizky Shoham

A description and analysis of the role of tradition in the modernist project of Zionism, with a focus on "public rituals" in the New Hebrew culture since its early beginnings in the late nineteenth century until today. Examination of the role of tradition in the negotiation of political visions, ideologies, and identities; exploration of sociocultural loci of the new traditions and their relationship with past festive Jewish practices. T 3:30–5:20

RLST 783b^U/HIST 538b^U/JDST 794b^U, The Jewish Enlightenment Eliyahu Stern An overview of the eighteenth- and nineteenth-century transnational Jewish Enlightenment movement. Focus is on the origins of modernity and the breakdown of traditional society. Topics include religious reform, separation between public and private spheres, emancipation, acculturation, and anti-Semitism. MW 2:30–3:45

RLST 791b^U/**JDST** 777**b**^U, **Major Trends in Kabbalah** Sandra Valabregue-Perry An advanced introduction to Jewish mysticism (through texts) from the Bible to the twentieth century: biblical mystical visions, magic in rabbinic literature, Hekhalot literature, the Book of Creation, medieval Kabbalah, the Book of Splendor (Zohar), Italian Kabbalah, Lurianic Kabbalah, Hasidism, and modern and new age Kabbalah. T 9:25–11:35

RLST 794b/HSAR 730b/JDST 716b/REL 955b, Jewish Space Margaret Olin The seminar examines modern concepts of Jewish space, concentrating on how people have imagined, constructed, or enacted space in Jewish life from the nineteenth century to the present. The course is structured around three themes: the characteristic blend of the secular and sacred; the relation between space and time; and the relation between Jews and others. The types of spaces considered range from the secular to the ritual, memorial, and spiritual. Thus ways in which spaces are constructed or conceived to include or exclude Jews are considered, as are spaces where people mingle with one another in imagination or reality. The themes overlap, particularly in cases in which concepts of time merge with concepts of space, as in spaces, such as the Eruv, that are activated only at certain times. Examples of spaces treated include synagogues (modern buildings and ancient objects of modern scholarship), Eruvim, prison (or concentration) camps, baseball fields, Jewish museums, and Eretz Israel. Readings include theorists of space such as Henri Lefebvre and Michel de Certeau as well as writers associated (as primary or secondary sources) with the particular case studies. Students make presentations and submit papers on topics of their choosing in consultation with the instructor. A major aim of the seminar is a better understanding of the role of space in concepts of Jewish identity, as conceived by Jews and others. Qualified undergraduates are welcome. T 1:30–3:20

RLST 796b^U/HIST 663b^U, Secular and Traditional Worldviews in Modern Western

Thought Eliyahu Stern Seminar examining the historical construction of secular and traditional worldviews from the eighteenth to the twentieth century. Attention to recent scholarship on the formation of a secular ideology and its effects on notions of time, space, and knowledge. Readings include works by John Locke, Ludwig Feuerbach, Max Weber, Talal Asad, and Mark Lilla. W 9:25–11:15

RLST 799a^U/HIST 951a^U/JDST 793a^U, Introduction to Modern Jewish Thought Eliyahu Stern

An overview of modern Jewish philosophical trends, movements, and thinkers from the seventeenth to the twenty-first century. Subject matter addressed: enlightenment, historicism, socialism, secularism, religious radicalism, and Zionism. MW 11:35–12:50

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 apocalyptic. Prerequisites: two years of Biblical Hebrew and previous work in biblical interpretation. M 1:30–3:20

RLST 802b^U, **Apocalyptic Religion in Cross-Cultural Perspective** Robert Wilson An examination of millennial and "end-time" beliefs in a variety of cultures around the world. Attention given to Jewish and Christian texts as well as Native American traditions, African and Asian movements, and modern manifestations such as Jonestown and Heaven's Gate. TH 1:30–3:20

RLST 805b, History and Methods of Old Testament Interpretation Robert Wilson,

John J. Collins, Joel Baden

Reading and critical evaluation of major classic works in the history of Old Testament studies from Wellhausen to the present. Prerequisite: working knowledge of biblical Hebrew; reading knowledge of German helpful but not required. M 1:30–3:20

RLST 847a/AFAM 821a/REL 642a, Warrior Chants and Unquiet Spirits

Emilie Townes

An exploration of the spiritual autobiographies and social actions of four significant representatives of the Christian protest tradition. Study of public and private documents, and analysis of personal disciplines and basic commitments for social justice, form the framework for exploring the nature of a spirituality that is a social witness. T 8:30–10:20

RLST 852b/REL 778b, Agape and Special Relations Gene Outka

A study of the love commandments and the urgencies of special relations, especially the bonds among co-religionists, family members, friends, and compatriots with a focus on contemporary Christian and philosophical literature. Prerequisite: permission of the instructor. TH 1:30–3:20

RLST 865a^U, Moral, Religious, and Social Issues in Bioethics David H. Smith

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. TTH 10:30–11:20, 1 HTBA

RLST 867a^U, **Bioethics: Freedom, Justice, and Religion** David H. Smith Moral issues that arise in care for the terminally ill, set in the context of social, political, philosophical, and religious argument about justice in the payment for and distribution of health care. Focus on organ transplantation, treatment of dementia, and care for the

[RLST 872a/F&ES 872a, Seminar on World Religions and Ecology]

[RLST 872b/F&ES 879b, World Religions and Ecology: Asian Religions]

RLST 875a/F&ES 876a/REL 810a, Indigenous Religions and Ecology John Grim The course explores how particular indigenous peoples relate to local bioregions and biodiversity. Opening with an examination of such terms as *indigenous, religion,* and *ecology,* the course investigates religious studies and ethnography related to small-scale societies and the many ways in which they relate to local bioregions and biodiversity. The course examines indigenous ethnic diversity and cultural relationships to place, and the ways values associated with physical places are articulated in symbols, myths, rituals, and other embodied practices. The emphasis on place and religious ecology in this course illustrates what indigenous peoples could bring to studies in environmental culture. Finally, this course necessarily involves questions of environmental justice, namely, the imposition of environmentally damaging projects on a people whose voice in decision making is diminished or eliminated.

RLST 915b, Ethics and Human Nature Gene Outka

We examine how beliefs about human nature and moral judgments about character and conduct may combine and may cross-fertilize. Theological estimates about creation, the fall, and salvation, and anthropological estimates of human powers and possibilities and failings, bear on the first side. Ethical estimates about equality, evil, and perfectibility, and capacities for virtue and vice, right and wrong conduct, bear on the second side. F 1:30–3:20

RLST 920a^U, Reason, Faith, and Feeling: Early Modern Christian Thought

Shannon Craigo-Snell

dying. TTH 11:35-12:50

A survey of major developments in religious thought in the West from Descartes to Schleiermacher, focusing on the struggles to defend, discredit, or distance religious belief in relation to reason. Connections between theology, philosophy, and social history. TTH 11:35–12:25, 1 HTBA

RLST 921b^U, History, Hope, and the Self: Modern Christian Thought Shannon Craigo-Snell

An overview of important developments in Western religious thought during the nineteenth and twentieth centuries. Connections among philosophy, theology, and social history. Authors include Hegel, Barth, Tillich, Rahner, and Gutiérrez. TTH 11:35–12:25, 1 HTBA

RLST 924a, Readings in Constructive Theology Shannon Craigo-Snell

Students analyze and engage contemporary theology, with a focus on the methodologies of constructive theological arguments. M $1{-}3{:}20$

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 Robert Nelson [F] (robert.nelson@yale.edu)

Acting Chair and Director of Graduate Studies Bruce Gordon [Sp] (bruce.gordon@yale.edu)

Executive Committee Edwin Duval, Carlos Eire, Roberto González Echevarría, Lawrence Manley, John Matthews, Giuseppe Mazzotta, Robert Nelson, David Quint, John Rogers, Ellen Rosand, Christopher Wood, Keith Wrightson

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, K. David Jackson, Maija Jansson, David Scott Kastan, Christina Kraus, David Lummus, Lawrence Manley, John Matthews, Giuseppe Mazzotta, Mary Miller, Alastair Minnis, Robert Nelson, Catherine Nicholson, Lee Patterson (*Emeritus*), Steven Pincus, David Quint, John Rogers, Ellen Rosand, Francesca Trivellato, Brian Walsh, Christopher Wood, Keith Wrightson

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, 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. Requirements for
the combined degree will 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. 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. 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. 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.

Students concentrating in modern language and literature departments (including Comparative Literature, English, Italian, and Spanish and Portuguese) are required to complete three courses in at least two disciplines outside of literature, three courses in the Renaissance literature of the primary department, and two courses in Renaissance literatures outside of the primary department. The remaining courses will be taken in other periods and topics as required by the department of concentration. Students concentrating in History or Music are required to complete four courses dealing with Renaissance culture in disciplines outside of the primary department and four courses in the Renaissance period within the department; the remaining courses are to be taken in other periods and topics as required by the department of concentration. Students concentrating in History of Art are required to take four courses within the department and three courses outside the department dealing with the Renaissance period. Students concentrating in Classics are required to take six courses outside the department in the Renaissance period. 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 a standard fifteen-minute question on the bibliographical resources for Renaissance Studies across the disciplines and three fifteen-minute questions (in the case of English two fifteen-minute questions) in 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.

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 900a,b, Directed Reading By arrangement with faculty.

SLAVIC LANGUAGES AND LITERATURES

2704 Hall of Graduate Studies, 203.432.1300, slavic.department@yale.edu www.yale.edu/slavic M.A., M.Phil., Ph.D.

Chair Harvey Goldblatt

Director of Graduate Studies Katerina Clark (katerina.clark@yale.edu)

Professors Vladimir Alexandrov, Katerina Clark, Laura Engelstein (*History*), Harvey Goldblatt, Robert Greenberg (*Adjunct*), Benjamin Harshav (*Comparative Literature*), John MacKay, Tomas Venclova

Assistant Professors Molly Brunson, Bella Grigoryan

Senior Lector II Irina Dolgova

Senior Lector I Krystyna Illakowicz

Fields of Study

Fields include Russian literature, medieval Slavic literature and philology (by special arrangement), Polish literature (by special arrangement).

Special Admissions Requirement

An advanced-level command of the Russian language is required.

Special Requirements for the Ph.D. Degree

All entering graduate students must pass departmental proficiency examinations in Russian. During their residence, students specializing in Russian literature take a minimum of sixteen term courses (including three required courses) and are expected to acquire a comprehensive knowledge in all periods of Russian literature, a familiarity with medieval Slavic literature, a thorough command of the Russian language, and a mastery of a field of concentration within Russian literature. The student's course work, with the approval of the director of graduate studies (DGS), may be selected from the offerings of the department and (if relevance can be demonstrated) any other department of the University. In addition, the student will 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 the student's primary interests in Russian literature. A special curriculum may be arranged for students wishing to specialize in either medieval Slavic literature and philology or Polish literature. A reading examination in either French or German, administered and evaluated by the department, must be passed by all graduate students by the beginning of the fifth term of study. The qualifying examinations should be passed by the end of the sixth term of study. A dissertation prospectus must be submitted no later than September 15 of the seventh term of study. For additional details, see the DGS and the departmental Web site: www.yale.edu/slavic. Upon completion of all predissertation requirements, including the prospectus and its defense, students are admitted to candidacy for the Ph.D.

The faculty considers teaching to be an important part of the professional preparation of graduate students. Students in Slavic normally teach in their third and fourth years.

Joint Ph.D. Program with Film Studies

The Department of Slavic Languages and Literatures also offers, in conjunction with the Film Studies Program, a joint Ph.D. in Slavic Languages and Literatures and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film 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.

Terminal Master's Degree Program 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 604b, Literature and Society in Late-Eighteenth- and Early-Nineteenth-Century Russia Bella Grigoryan

The course surveys late-eighteenth- and early-nineteenth-century Russian literature. Topics of interest: discourses of imperial statehood; subjectivity and the representation of private life; generic imports and generic diversity; the evolution of the Russian literary language; official and popular cultures; court life (in print, visual, and material culture). Key figures under consideration include Novikov, Catherine II, Fonvizin, Derzhavin, Radishchev, Karamzin. W 9:25–11:15

RUSS 644b, Dostoevsky, Tolstoy, and the Novel Molly Brunson

An examination of the place of Dostoevsky and Tolstoy in the history and theory of the novel. Topics include modernity and the rise of the novelistic genre; narrative and description, time and space; novelistic form and discourse; psychological interiority and the elaboration of the self; the Realist novel, the *Bildungsroman*, and the epic; limits of novelistic representation. Alongside a selection of novels and contemporaneous critical and theoretical texts, we read the central works of twentieth-century novel theory, by Bakhtin, Lukács, and others. T 2:30–4:20

RUSS 676a, Tsvetaeva Tomas Venclova

Discussion of Tsvetaeva's life and art in context of her times. Close readings of her poems. T 2:30-4:20

RUSS 680a, Acmeism Tomas Venclova

Acmeist ideas and values within the historical and cultural context. Close readings of poems by Gumilev, Mandelstam, Akhmatova, and others. TH 2:30-4:20

RUSS 696a, Post-Stalin Literature and Film Katerina Clark

The main development in Russian and Soviet literature and film from Stalin's death in 1953 to the present. W 1:30-3:20

RUSS 746b/CPLT 527b/FILM 828b, Art and Ideology Katerina Clark

Examination of texts identified as ideological art, focusing on the relationship between the conventions they use and the ideology they seek to advance. Theoretical readings include works by Benjamin, Jameson, Lukács, Bakhtin, Marx, Althusser, and Judith Butler; literary works by Balzac, Brecht, Tretiakov, Ostrovsky, Orwell, Koestler, and others; films by Eisenstein, Leni Riefenstahl, and others. w 1:30–3:20

RUSS 833b, Advanced Russian Conversation and Composition: Topics in

Contemporary Russian Press and Media Rita Lipson

A course designed to equip students with language skills necessary to comprehend complexities of contemporary Russia. Accompanied by a grammar review. TTH 4:30–5:20

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. TH 1:30–3:20

RUSS 851b, Proseminar in Russian Literature Vladimir Alexandrov

Introduction to the graduate study of Russian literature. Topics include literary theory, methodology, introduction to the profession. TH 2:30–4:20

SLAV 722a, Medieval Slavic Literature Harvey Goldblatt

An examination of the literary civilization that emerged in connection with the entry of the Slavs into Christendom. Special attention to the Cyrillo-Methodian mission and the literature of the first Bulgarian empire. M 9:25–11:15

SLAV 752a^U, The Slavic Peoples and Their Languages: From Unity to Diversity Robert Greenberg

Examination of the linguistic and cultural history of the Slavs from the period of the earliest Slavic migrations up to modern times. Emphasis on the Slavic national awakenings, formation of their languages and literatures, and an introduction to contemporary Slavic cultures. M $7-8{:}50$

SLAV 784b^U, Language and Politics Robert Greenberg

The course explores political controversies surrounding issues of language planning and language policy. Consideration is given to how social and political actors differentiate languages and dialects, and how nationalist ideology has shaped language choices. Topics include the English-only movements in the United States, the policy of official bilingualism in Canada, and language policies in Europe with emphasis on the Slavs. M 7–8:50

SLAV 805b, History of the Russian Literary Language Harvey Goldblatt

The course traces the different types of literary language used in the Russian lands from the medieval period to modern times. Special attention is devoted to the relations between language and culture in general and literary codification and formal techniques in particular. M 9:25–11:15

SLAV 900, Directed Reading

By arrangement with faculty.

SOCIOLOGY

140 Prospect Street, 203.432.3323 www.yale.edu/sociology M.A., M.Phil., Ph.D.

Chair Julia Adams

Director of Graduate Studies Philip Gorski

Professors Julia Adams, Jeffrey Alexander, Elijah Anderson, Scott Boorman, Richard Breen, Hannah Brueckner, Deborah Davis, Ron Eyerman, Philip Gorski, Philip Smith

Assistant Professors Rene Almeling, Emily Erikson, Vida Maralani, Peter Stamatov, Christopher Wildeman, Jonathan Wyrtzen

Fields of Study

Fields include Comparative Sociology/Macrosociology, Cultural and Historical Sociology, Life Course/Social Stratification, Mathematical 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

Philip Smith

The course looks at the work of Emile Durkheim and his legacy for both social theory and empirical sociology. In the first part we examine Durkheim's major writings and key concepts. Next an exploration is made of the multiple and often contending ways these have been taken up and interpreted over the past hundred or so years. Particular emphasis is given to the decline in functionalist and positivist readings of Durkheim and his emergence as a major cultural theorist in recent decades. We consider the contributions of Mauss, Bataille, Goffman, Victor Turner, Collins, Lukes, Douglas. W 9:25–11:15

[SOCY 503a^U, Historical Explanations]

SOCY 507a/b/EAST 501a/b, Social Science Workshop on Contemporary China

A yearlong course for one credit. Students must register for and complete both disciplinary perspectives, including anthropology, economics, law, political science, and sociology. At each session, Yale faculty, visitors, and advanced graduate students deliver short presentations of current works in progress, circulated in advance, for group discussion and critique. In addition there are two weekend data analysis workshops in each term to which seminar members are invited. One unit of course credit is available to students who attend the colloquium in both terms and submit a thirty-page paper. Prerequisite: permission of the instructor. M 12-1

SOCY 510b^U, Religious Nationalism Philip Gorski

"Religious nationalism" treated as more than a transitional phase. Readings and reflections about religious nationalism, past and present, East and West; the normative issues the phenomenon raises. Religious roots of Western nationalism; nationalistic propensities of different religious traditions; conditions under which religious nationalism turns violent; and whether religion, nationalism, pluralism, and democracy are compatible. TH 1:30–3:20

SOCY 511b^U, Building Social Theory for Empirical Analysis Richard Breen

Examination of approaches to developing explanatory theories in contemporary sociology with an emphasis on mid-range theory aimed at addressing specific empirical questions. Approaches include rational choice, game theory, and social (or endogenous) interaction models. The course also covers the use of agent-based models and other simulation techniques in building models of social phenomena. The emphasis throughout is on applications: that is to say the construction of explanatory models and their testing against empirical data. TH 9:25-11:15

[SOCY 515a^U, Urban Poverty and Policy]

[SOCY 520b, Revolutions in a Comparative Perspective]

SOCY 542a, Sociological Theory Peter Stamatov

The course seeks to give graduate students the basic tools for a constructive engagement with sociological theory and practice. We read closely the major works that have informed the logic of theoretical inquiry in contemporary sociology. The main focus is on the writings of Weber, Marx, and Durkheim. We trace the lineaments of dominant theoretical approaches and explore the ways in which sociologists have contended with these approaches when confronting the central questions of the discipline. W 2:30–4:20

SOCY 543b^U, Demography, Gender, and Health Vida Maralani

The course explores the interplay of population processes, socioeconomic development, investments in women's status, and health outcomes such as maternal and child mortality and infectious and chronic disease burdens, and examines how key health outcomes differ across regions and change over time in response to investments in women's education and changing women's roles. The course includes readings across several literatures including demography, sociology, economics, epidemiology, and public health. T 1:30–3:20

SOCY 547a^U, Gender, Race, and Genetic Testing Rene Almeling

Overview of sociological approaches to genetics, including gene/environment interactions and the history of genetic medicine. A focus on genetic testing in Huntington's disease, pregnancy, cancer, and psychological disorders to explore how genetic information is provided to patients, and how patients experience genetic risk. Discussion of commercial firms offering direct-to-consumer genetic testing. TH 1:30–3:20

[SOCY 550a, A Secular Age?]

SOCY 551a/PLSC 525a, Comparative and Historical Methods Philip Gorski

The course provides a hands-on introduction to the craft of comparative and historical analysis. Through a series of small-scale, individual, and group projects, students learn how to frame researchable problems, how to use comparisons to address them, how to work with different types of primary sources, how to transform them into "data," and how to manage this data. In order to create a substantive focus for the course, and to exploit the strengths of Yale's libraries and archives, the readings and assignments are centered on English history and historiography. The course is designed for graduate students in history and the social sciences but is also open to undergraduates with a strong interest in research. M 1:30-3:20

SOCY 552a^U, Punishment and Inequality Christopher Wildeman

Massive increases in the American imprisonment rate since the mid-1970s have rendered contact with the criminal justice system a common event for marginalized Americans. The course considers whether this change affected inequality in the labor market, family life, politics, and health. TH 9:25–11:15

SOCY 553a^u, Empires and Imperialism Peter Stamatov

A study of empire as a territorial organization of political power. Comparison of empire in different historical periods, from antiquity to European overseas expansion in the fifteenth through twentieth century, and in different geographic contexts in Africa, Asia, and Europe. Review of economic, political, and cultural theories of imperialism, colonialism, and decolonization. W 9:25–11:15

SOCY 555b^U, Social Dimensions of Medicine and Health Rene Almeling

Survey course of sociological perspectives on medicine and health. Topics include the history of the medical profession; government, markets, and medical care; and health inequalities by gender, race, and class. W 9:25–11:15

[SOCY 557b, Political Sociology]

[SOCY 558b, Topics in Social Stratification]

SOCY 560a/PLSC 734a, Comparative Research Workshop Emily Erikson,

Julia Adams, Philip Gorski

This workshop is a weekly interdisciplinary seminar dedicated to group discussion of work-in-progress by distinguished visiting scholars, Yale graduate students, and in-house faculty from various social science disciplines. Papers are distributed a week ahead of time and also posted at 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. HTBA

SOCY 56ob/PLSC 734b, Comparative Research Workshop Emily Erikson,

Julia Adams, Philip Gorski

See SOCY 560a for course description.

[SOCY 561b^U, Civil Society in China]

SOCY 562b, Topics in Cultural Sociology Jeffrey Alexander

After reviewing contemporary sociological perspectives on culture, the seminar concentrates on the intellectual origins, theories, and empirical exemplars of the strong program in cultural sociology. We discuss hermeneutics and interpretation, critical theory, semiotics, structuralism, and post-structuralism; how a cultural-sociological program emerged in the late 1980s and early 1990s; and how this program has produced a range of research studies. We examine in particular emerging foci on social drama and performance, cultural trauma, and the iconic turn. TH 9:25–11:15

SOCY 565a-b, Advanced Seminar in Cultural Sociology Jeffrey Alexander

The seminar focuses on the unpublished work of advanced graduate students in cultural sociology at Yale and elsewhere, as well as on just-emerging published work that exemplifies "strong program" work in cultural sociology and surrounding fields. The format is intended to maximize student participation so as to develop collegial networks of intellectual support as well as capacities for critical evaluation. The workshop may be audited by more advanced graduate students who wish to participate in this process but whose course work is completed, as well as by Visiting Fellows to the Center for Cultural Sociology, or with permission of the instructor. This is a full-year course. T 6-8

SOCY 566b, Public Sociologies Julia Adams

Some "public sociologists" in the late-twentieth-century United States and other countries have thought of their work as fundamentally transforming political governance, social theory, and the discipline of sociology itself. The course examines exemplary public sociologists like Pierre Bourdieu, Michael Burawoy, James Coleman, Andre Gunder Frank, the Australian Femocrats, Anthony Giddens, Orlando Patterson, and others. What are the possibilities and limits inherent in the enterprise of public sociology? W 1:30–3:20

SOCY 570b, Social Theory Trauma and Memory Ron Eyerman

The seminar explores sociological approaches to memory and trauma. A central theme is how cultural trauma has influenced the development of social theory, as well as literature and the arts generally. While aimed at graduate students in the social sciences and humanities, the seminar is open to advanced graduate students after consultation with the instructor. W 9:25–11:15

SOCY 576a^u, Civil Society and Democracy Jeffrey Alexander

Examination of normative and sociological theories of civil society and of empirical studies of its culture. Attention to organizations such as polls, mass media, law, and office, which provide ways of partially institutionalizing civil society. The civil rights movement and multiculturalism as illustrations of struggles inside the civil sphere. Discussion of whether a global civil society is possible. T 9:25–11:15

SOCY 578b, Logic of Empirical Social Research Richard Breen

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. T 9:25–11:25

SOCY 580a, Statistics I Vida Maralani

Introduction to probability and descriptive statistics. In-depth coverage of the linear model and its assumptions. TH 1:30-3:20, 1 HTBA

SOCY 581b, Statistics II Vida Maralani

The course provides the second part of a two-term introduction to statistical analysis for quantitative social science research. The course covers advanced topics in linear regression and provides an introductory overview of models for categorical and count data, the analysis of time data, and longitudinal data. We also discuss data-related issues such as missing data and weighting, and data that are complicated by issues of non-random design. TTH 11:30–12:50, 1 HTBA

[SOCY 582a, Statistics III]

[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 Ron Eyerman

The course offers an advanced introduction to sociological perspectives on the arts and popular culture. Emphasis is given to the conceptualization of culture within social theory, with the aim of interpreting cultural expressions and artifacts: artworks, music, television, film, and literature. Students are exposed to a wide range of classical and contemporary perspectives and styles of analysis. M 9:25–11:15

SOCY 595a, Inequality and Life Course Workshop Christopher Wildeman,

Hannah Brueckner, Vida Maralani

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. F 2-4

SOCY 595b, Inequality and Life Course Workshop Christopher Wildeman,

Richard Breen, Hannah Brueckner, Vida Maralani See SOCY 595a for course description.

SOCY 597a,b, Special Topics in Sociology Faculty

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 610b^U/WGSS 745b^U, Race, Gender, and the African American Experience]

[SOCY 612b, Agency and Action]

[SOCY 616a, Urban Ethnography]

SOCY 620b^U, **Material Culture and the Iconic Consciousness** Jeffrey Alexander Exploration of how and why modern and postmodern societies have continued to sustain material symbolism and iconic consciousness. Study of theoretical approaches to debates about icons and symbols in philosophy, sociology, linguistics, psychoanalysis, and semiotics. Use of case studies to analyze modern iconography in advertisements and brand, food and bodies, nature, fashion, celebrities, popular culture, art, and politics. T 9:25–11:15

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. 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, Workshop in Cultural Sociology Jeffrey Alexander, Ron Eyerman, Philip Smith

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. HTBA

SOCY 628b, Workshop in Cultural Sociology Jeffrey Alexander, Ron Eyerman,

Philip Smith

Continuation of SOCY 628a; see 628a for course description. HTBA

SOCY 630a/AFAM 773a, 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 647b, Social Processes]

SOCY 656a, Professional Seminar DGS and faculty

This required seminar aims at introducing incoming sociology graduate students to the department and the profession. Members of the department 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. The Sociology DGS is responsible for the seminar. Held biweekly. F 9:25–11:15

SPANISH AND PORTUGUESE

82-90 Wall Street, 203.432.5439, 203.432.1151 www.yale.edu/span-port M.A., M.Phil., Ph.D.

Chair Rolena Adorno

Director of Graduate Studies Noël Valis

Professors Rolena Adorno, Aníbal González, Roberto González Echevarría, K. David Jackson, María Rosa Menocal, Noël Valis

Assistant Professors Susan Byrne, Ernesto Estrella, Paulo Moreira, Kevin Poole

Senior Lector Sonia Valle

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.

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 Foreign Language Teaching, and two courses taken outside the department. Also required are a reading knowledge of Latin

and a second language, as well as a third language-literature minor. 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 960a^U, World Cities and Narratives K. David Jackson

Study of world cities and narratives that describe, belong to, or represent them. Topics range from the rise of the urban novel in European capitals to the postcolonial fictional worlds of major Portuguese, Brazilian, and Spanish American cities. Conducted in English. M 1:30–3:20

PORT 991a, Tutorial By arrangement with faculty.

PORT 991b, Tutorial By arrangement with faculty.

SPAN 522b, Chronicle and Epic in the Spanish Middle Ages Kevin Poole

In this course students survey the genres of chronicle and epic through a close reading of such works as the *Cantar de Mío Cid*, the *Poema de Fernán González*, the *Libro de Alexandre*, the *Libro del Caballero Zifar*, and *El Victorial: Crónica de Pero Niño*. Shorter excerpts from *Tirant lo Blanc*, the *"Embajada a Tamorlán*," the *Cantar de Sancho II*, the *Crónica de Jaime el Conquistador*, and the *Gran conquista de Ultramar* are also analyzed for comparison with the longer narratives. In Spanish. w 1:30–3:20

SPAN 526a/CPLT 578a/MDVL 558a, Love in the Western World

María Rosa Menocal

Readings in the formative period of the vernacular lyric in Europe, with special emphasis on the development of the poetic ideology long known as "courtly love." We read selections from the great variety of lyric languages involved at this turning point in European literary history: from the eleventh- and twelfth-century Occitan troubadours and their contemporaries writing in the Arabic and Hebrew of the Taifas of Islamic Spain and Norman Sicily, to the range of other medieval literary forms and languages that refined poetic expression and philosophies of love simultaneously (including, among others, the Anglo-Norman Tristan, the *scuola siciliana* and the *dolce stil nuovo*, the Galician-Portuguese *cantigas*). We also explore the central role that the study of these new poetic languages and ideologies played in the rise of the new philologies of the nineteenth century, the immediate ancestors of our own fields of national language and comparative literary studies. Conducted in English. TH 1:30–3:20

SPAN 533a, Garcilaso and Poetry Roberto González Echevarría

A careful reading of Garcilaso's brief but influential corpus of poetry to examine why and how it had such a revolutionary effect on all subsequent poetry in Spanish, particularly during the Golden Age. Garcilaso's impact is studied in the works of San Juan de la Cruz, Fray Luis de León, Lope de Vega, Luis de Góngora, Francisco de Quevedo, Calderón de la Barca, and Sor Juana Inés de la Cruz. Concomitantly the seminar considers the current state of the study of poetry by reading the work of twentieth-century theoreticians and critics such as M.H. Abrams, Amado Alonso, Dámaso Alonso, Harold Bloom, Cleanth Brooks, Paul de Man, T.S. Eliot, Helmut Hatzfeld, Martin Heidegger, Jacques Derrida, Roman Jakobson, Leo Spitzer, Karl Vossler, and William Wimsatt. In Spanish. W 3:30–5:20

SPAN 747a, Generation of '27: Poetry Noël Valis

The course examines the theory and art of vanguard writing. Readings include selected poetry of Pedro Salinas, Federico García Lorca, Rafael Alberti, and Luis Cernuda, along with Ortega y Gasset's influential *Deshumanización del arte* and other texts. In Spanish. M 3:30–5:20

SPAN 790b: Methodologies of Modern Language Teaching Sonia Valle

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 5-6:30

SPAN 811a, Literary Classics of Colonial Spanish America Rolena Adorno

Five classics of the colonial Spanish American literary tradition of the Hapsburg era are studied for their literary and rhetorical merits and in consideration of their enduring, provocative value today: Fray Bartolomé de las Casas's *Brevísima relación de la destrucción de las Indias*, Alonso de Ercilla's *La Araucana*, Bernardo de Balbuena's *Grandeza Mexicana*, El Inca Garcilaso de la Vega's *Comentarios reales de los Incas*, and Sor Juana Inés de la Cruz's learned prose and lyrical poetry. In Spanish. T 1:30–3:20

SPAN 941b/CPLT 958b, Severo Sarduy and Tel Quel Roberto González Echevarría A study of Severo Sarduy's work in relation to the major figures of the *Tel Quel* group (Barthes, Derrida, Lacan) and his impact on leading Latin American writers, particularly Octavio Paz. Among the topics to be considered: Sarduy's relations with the Boom novelists (Fuentes, García Márquez, Cortázar, Vargas Llosa), his readings of Lezama Lima and Carpentier, and his contacts with the Cuban Revolution, the Orient, the Baroque, and transvestism. In Spanish. W 3:30–5:20

SPAN 971b, Ethics and Writing in Modern Spanish American Narrative

Aníbal González

A study of the ethical dimension of Spanish American narrative from the late nineteenth century until the present. Issues to be discussed include the relation between violence and writing, the "fear of writing," the question of art and morality, and the social role of the artist. Readings in theory and philosophy of works by Emmanuel Levinas, Fernando Savater, J. Hillis Miller, Geoffrey Galt Harpham. Authors to be read include Manuel Gutiérrez Nájera, Manuel Zeno Gandía, Leopoldo Lugones, Rosario Castellanos, Jorge Luis Borges, Alejo Carpentier, Juan Rulfo, Julio Cortázar, Gabriel García Márquez, Cristina Peri Rossi, Jorge Volpi, Roberto Bolaño. In Spanish. M 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 www.stat.yale.edu M.A., Ph.D.

Chair Joseph Chang

Director of Graduate Studies David Pollard (24 Hlh, david.pollard@yale.edu)

Professors Donald Andrews (*Economics*), Andrew Barron, Joseph Chang, Donald Green (*Political Science*), John Hartigan (*Emeritus*), Theodore Holford (*Epidemiology* & *Public Health; Biostatistics*), Peter Phillips (*Economics*), David Pollard, Heping Zhang (*Epidemiology* & *Public Health; Biostatistics*), Hongyu Zhao (*Epidemiology* & *Public Health; Biostatistics*), Harrison Zhou

Associate Professors John Emerson, Sekhar Tatikonda (Electrical Engineering)

Assistant Professors Lisha Chen, Mokshay Madiman, Jing Zhang

Lecturers Jonathan Reuning-Scherer, David Salsburg

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; 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.

Special Requirements for the Ph.D. Degree

There is no foreign language requirement. Normally during the first two years, fourteen term courses in this and other departments are taken to prepare students for research and practice of statistics. These include courses devoted to case studies and practical work, for which students prepare a written report and give an oral presentation. The qualifying examination consists of three parts: a written report on an analysis of a data set, a written reason on theoretical statistics, and an oral examination. The examination is

taken not later than when scheduled by the department in the middle of the second year, 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 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, 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 on the Web at www.stat.yale.edu.

Courses

STAT 500b, Introductory Statistics Andrew Barron

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 5014^U/**E&EB 5104**^U, **Introduction to Statistics: Life Sciences** Günter Wagner Statistical and probabilistic analysis of biological problems presented with a unified foundation in basic statistical theory. Problems are drawn from genetics, ecology, epidemiology, and bioinformatics. Graduate students are expected to finish a course project in addition to regular homework and exams. TTH 1–2:15

STAT 502a^U, **Introduction to Statistics: Political Science** Jonathan Reuning-Scherer, Alan Gerber

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,

David Salsburg

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 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 501a. MW 2:30-3:45

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: MATH 118a or b or 120a or b; some acquaintance with matrix algebra and computing assumed. MWF 2:30–3:20

STAT 541a^U, Probability Theory Mokshay Madiman

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: after or concurrent with MATH 120a or b or the equivalent. MWF 9:25–10:15

STAT 542b^U, Theory of Statistics Lisa Chen

Principles of statistical analysis: maximum likelihood, sampling distributions, estimation, confidence intervals, tests of significance, regression, analysis of variance, and the method of least squares. Prerequisites: STAT 541a; after or concurrent with MATH 222. MWF 9:25–10:15

STAT 551b^U, Stochastic Processes Joseph Chang

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 to image reconstruction, Bayesian statistics, finance, probabilistic analysis of algorithms, genetics, and evolution. Prerequisite: STAT 541a or the equivalent. 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 Mokshay Madiman

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. Undergraduate probability at the level of STAT 541a assumed. TTH 10:30–11:45

STAT 612a^U, Linear Models David Pollard

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. TTH 9–10:15

STAT 625a, Case Studies David Pollard

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 Staff

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 Hartigan [F], John Emerson [Sp]

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.

STAT 645b/CB&B 645b, Statistical Methods in Genetics and Bioinformatics

Jing Zhang

Introduction to problems, algorithms, and data analysis approaches in computational biology and bioinformatics; stochastic modeling and statistical methods applied to problems such as mapping disease-associated genes, analyzing gene expression microarray data, sequence alignment, SNP analysis, transcription regulation and sequence motif finding, and RNA/protein structure prediction. Statistical methods include maximum likelihood, EM, Bayesian inference, Markov chain Monte Carlo, and some methods of classification and clustering; models include hidden Markov models, Bayesian networks, and the coalescent. The limitations of current models, and the future opportunities for

model building, are critically addressed. Prerequisite: STAT 361, 538a, or 542b. Prior knowledge of biology is not required, but some interest in the subject and a willingness to carry out calculations using R is assumed. TTH 10:30–11:45

STAT 66ob^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 Jing Zhang

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. Weekly sessions are held in the Social Sciences Statistical Laboratory. Prerequisites: after or concurrent with STAT 542b and MATH 222a or b or 225a or b or the equivalents. MW 2:30–3:45

[STAT 664b^U/ENAS 954b^U, Information Theory]

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

STAT 690a or b, Independent Study

By arrangement with faculty. Approval of DGS required.

STAT 695a, Internship in Statistical Research David Pollard

The internship is designed to give students an opportunity to gain practical exposure to problems in the analysis of statistical data, as part of a research group within industries such as medical and pharmaceutical research, finance, information technologies, tele-communications, public policy, and others. The internship experience often serves as a basis for the Ph.D. dissertation. Students work with the DGS and other faculty advisers to select suitable placements. Students submit a one-page description of their internship plans to the DGS by May 1, which will be evaluated by the DGS and other faculty advisers by May 15. Upon completion of the internship, students submit a written report of their work to the DGS, no later than October 1. The internship is graded on a Satisfactory/Unsatisfactory basis, and is based on the student's written report and an oral presentation. This course is an elective requirement for the Ph.D. degree. Prerequisite: completion of one term of the Ph.D. program.

URBAN EDUCATION STUDIES PROGRAM

35 Broadway, 203.432.4631 www.yale.edu/urbanteaching M.A.

Director and Director of Graduate Studies

Jonathon Gillette

Committee of the Yale Teacher Preparation and Education Studies Program Jill

Campbell (Professor, English), Linda Cole-Taylor (Associate Director, Teacher Preparation Program), Gordon Geballe (Associate Dean, Forestry & Environmental Studies), Jonathon Gillette (Director, Teacher Preparation Program; Lecturer, Sociology and Child Study Center), Judith Hackman (Associate Dean, Yale College), Roger Howe (Professor, Mathematics), Matthew Jacobson (Professor & Chair, American Studies; Professor, History and African American Studies), Frank Keil (Professor, Psychology and Linguistics), Michael Morand (Associate Vice President, New Haven and State Affairs), Robert Wyman (Professor, Molecular, Cellular & Developmental Biology)

The Urban Education Studies Program is a one-year terminal master's that integrates advanced graduate work with preparation for teaching in an urban setting. Candidates complete an intensive twelve-course study program over a fourteen-month period and gain both a Master of Arts in Urban Education Studies and a State of Connecticut Initial Educator License for grades seven to twelve. Courses begin in the summer for ten weeks along with summer school teaching, continue through the academic year, and end with a final five-week summer course. Students who successfully complete the program are expected to do multi-year teaching in New Haven Public Schools.

Courses

TPRP 590a^U, Schools, Community, and the Teacher Jonathon Gillette

A survey of the important historical shifts in the purpose of education as well as the growing literature on the role of race in achievement. Students identify different philosophical stances and begin to generate their own guiding principles. TTH 1-2:15

TPRP 594c, Education Psychology: Learning Theory and Urban Classrooms David Berg

An introduction to cognitive and social psychology as well as the intersection of adolescence with race and class. HTBA

TPRP 595c, Special Education: Legal and Psychological Issues Barbara Shiller An introduction to the legal mandates of IDEA legislation as well as a survey of the various learning styles of students eligible for special education. HTBA

TPRP 598c, An Introduction to Urban Education Linda Cole-Taylor

An introduction to a way of thinking about teaching that involves an understanding of one's discipline, sociological understanding of context, and psychological knowledge of students. HTBA

TPRP 599a, Seminar in Teaching and Learning Linda Cole-Taylor

Taught in conjunction with TPRP 650a, this seminar expects students to demonstrate growing proficiency merging theory and practice. In addition to seminar discussion and purposeful assignments, the seminar supports a daily teaching internship in New Haven as the lead teacher in a mentor's classroom. Together, the fieldwork and campus work are intended to deepen one's professional habits of practice and encourage the candidate to significantly contemplate one's role within this teaching context. W 2–4

TPRP 600-604a^U, The Methods of Teaching

A design seminar based on translating content knowledge into instructional practice. Participants demonstrate an ability to break down complex concepts in order to develop higher-order learning experiences for students.

TPRP 600a^U, The Teaching of English Faculty

M 2:30-4:20

TPRP 601a^U, **The Teaching of History** Linda Cole-Taylor M 2:30–4:20

TPRP 603a^U, **The Teaching of Mathematics** Nicholas Fiori M 2:30–4:20

TPRP 604a^U, **The Teaching of Science** Katherine Doerr Morosky M 2:30–4:20

TPRP 620b, Student Teaching Linda Cole-Taylor

This 3-credit seminar (620/621/622) is taken in conjunction with the full-time teaching placement in the Urban Education master's program. The weekly seminar is designed to support and deepen the candidate's work with New Haven students while challenging the candidate to enact the theoretical basis of the academic study in the program. HTBA

TPRP 621b^U, Student Teaching Linda Cole-Taylor

TPRP 622b^U, Student Teaching Linda Cole-Taylor

TPRP 650a, Advanced Issues in Urban Settings Jonathon Gillette

This seminar is designed to extend and deepen themes introduced in earlier course work as well as to integrate theoretical understanding with candidates' daily teaching practice. Topics include developing an initial intellectual identity in one's academic field and generating alternate understandings of urban students' behavior. F 2:30–4:20

TPRP 650b, Advanced Issues in Urban Settings Jonathon Gillette

Structured like the fall seminar. Topics for the spring include stereotype threat and cross-racial feedback, advances in cognition and their implication for learning theory, theories of student resistance, and theories of organizational change. TH 2:30–4:20

TPRP 660c, Theory into Practice Jonathon Gillette

A capstone seminar in which candidates examine the dual dynamics of "teaching against the grain." Elements include articulating an instructional stance as teachers, and different approaches to creating and managing an alternative class culture. HTBA

Non-Degree-Granting Programs, Councils, and Research Institutes

ATMOSPHERIC SCIENCE

Advisory Committee Hagit Affek (Geology & Geophysics), Donald Aylor (Forestry & Environmental Studies), Sarbani Basu (Astronomy), Michelle Bell (Forestry & Environmental Studies), William Boos (Geology & Geophysics), Alexey Fedorov (Geology & Geophysics), Debra Fischer (Astronomy), Gary Haller (Chemical Engineering; Chemistry), Xuhui Lee (Forestry & Environmental Studies), Steven Orszag (Applied Mathematics; Mathematics), Rajendra Pachauri (Forestry & Environmental Studies), Mark Pagani (Geology & Geophysics), Daniel Rosner (Chemical Engineering; Mechanical Engineering), Ronald Smith (Geology & Geophysics), Mitchell Smooke (Mechanical Engineering), Sabatino Sofia (Astronomy), Trude Storelvmo (Geology & Geophysics), Mary-Louise Timmermans (Geology & Geophysics), Karl Turekian (Geology & Geophysics), Andrew Wells (Applied Mathematics), 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 Epidemiology and Public Health and Engineering & Applied Science (which includes the programs of Applied Physics, Biomedical Engineering, Chemical Engineering, Electrical Engineering, Environmental Engineering, and Mechanical Engineering) 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 publication).

COMBINED PROGRAM IN THE BIOLOGICAL AND BIOMEDICAL SCIENCES (BBS)

L-203A Sterling Hall of Medicine, 203.785.5663 www.bbs.yale.edu

Director

Lynn Cooley (lynn.cooley@yale.edu)

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 as well as at the School of Medicine.

Within BBS there are approximately 280 participating faculty, several dozen courses, and a great many seminars from which to choose. BBS is currently divided into eight interest-based "tracks":

Computational Biology and Bioinformatics Immunology Microbiology Molecular Biophysics and Biochemistry Molecular Cell Biology, Genetics, and Development Neuroscience Pharmacological Sciences and Molecular Medicine Physiology and Integrative Medical Biology

Students apply to and, upon matriculation, affiliate with one of these eight 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.

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 BIOPHYSICS AND BIOCHEMISTRY

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.

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.

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.

PHARMACOLOGICAL SCIENCES AND MOLECULAR MEDICINE

All applicants are expected to meet general BBS requirements for entrance. Successful applicants will have a firm foundation in the sciences. A GRE Subject Test in Biochemistry, Cell and Mollecular Biology, or Chemistry is preferred. The experimental approaches and methods in this track are diverse and involve chemistry, biochemistry, physiology, and biophysics. For this reason, appropriate undergraduate preparation may involve majors that emphasize biology, chemistry, or physics.

PHYSIOLOGY AND INTEGRATIVE MEDICAL BIOLOGY

All applicants are expected to meet general BBS requirements for entrance. Successful applicants should have 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.

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, www.bbs. yale.edu.

THE COWLES FOUNDATION

30 Hillhouse Avenue, 203.432.3702 http://cowles.econ.yale.edu

Director

Philip Haile

The Cowles Foundation for Research in Economics at Yale University has as its purpose the conduct and encouragement of research in economics and related fields. 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 the economic relations between low- and high-income countries. The research program emphasizes the search for regularities in the process of growth and changes in economic structure using existing data sets. 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 development; choice and transfer; 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; 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, labor and population, 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 Social Science Library, 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.

INSTITUTION FOR SOCIAL AND POLICY STUDIES

77 Prospect Street, 203.432.3234 http://isps.research.yale.edu

Director Donald Green (*on leave* [F])

Acting Director Gregory Huber [F]

Executive Committee Kelly Brownell, Hannah Brueckner, Ian Shapiro, Jody Sindelar, Stephanie Spangler, Christopher Udry

The Institution for Social and Policy Studies (ISPS) facilitates interdisciplinary inquiry in the social sciences and research on important public policy subjects. Recognizing that important social problems cannot be studied adequately by a single discipline, the Yale Corporation established the Institution for Social and Policy Studies in 1968 in order to stimulate interdisciplinary collaboration within the University. Faculty and students from many departments in the Faculty of Arts and Sciences and from Yale's graduate and professional schools are involved in a variety of activities. These include interdisciplinary faculty seminars, research projects, postdoctoral programs, and the undergraduate major in Ethics, Politics, and Economics. Through these activities, ISPS seeks to provide intellectual leadership in the social sciences and shape public policies of local, national, and international significance.

Among the major programs at ISPS are the Yale University Interdisciplinary Center for Bioethics, David Smith, director; the Center for the Study of American Politics, Alan Gerber, director; the Agrarian Studies Program, James Scott and K. Sivaramakrishnan, co-directors; the Program in Ethics, Politics, and Economics, Nicholas Sambanis, director; and the Yale Initiative for Interdisciplinary Study of Antisemitism, Charles Asher Small, director. One of the hallmarks of ISPS is its commitment to field experimentation. For examples of experiments currently being conducted by ISPS scholars, please visit our Web site: http://isps.research.yale.edu/research-2/projects.

INTERNATIONAL SECURITY STUDIES

31 Hillhouse Avenue, 203.432.6242 www.yale.edu/iss

Director

Paul Kennedy

International Security Studies (ISS) supports interdisciplinary research and teaching in grand strategy, as well as international, diplomatic, and strategic history. Its goals are to fill the critical national need for educators and leaders with knowledge of these fields; to advance analysis, training, and teaching in its areas of interest; and to provide a forum for informed and independent discussions of historical and contemporary policy thinking and policy making on relevant issues.

ISS is not a degree-granting program: it facilitates the work and welcomes the participation of all Yale undergraduate, graduate, and professional school students in its events and its program of research grants and internship support. ISS is supported by Yale University, the Smith Richardson Foundation, the George Frederick Jewett Foundation, and the Friends of ISS, an organization of private donors.

The Brady-Johnson Program in Grand Strategy at Yale University, led by John Lewis Gaddis, is part of ISS. The program – which includes the Ivy Scholars Program, a rigorous academic experience for outstanding high school students – seeks to revive the study and practice of grand strategy by teaching future leaders to appreciate and apply its principles; by supporting undergraduate, graduate, and postdoctoral education and scholarship grounded in these principles; and by promoting a broader recognition of the centrality of grand strategy to successful, pragmatic leadership.

The program, launched in January 2000 and dedicated on December 11, 2006, to Nicholas F. Brady (B.A. 1952) and Charles B. Johnson (B.A. 1954), combines historical depth and analytical range with the belief that training future leaders at the graduate and undergraduate levels is the best long-term investment ISS can make in the future.

Inquiries should be directed to International Security Studies, Yale University, PO Box 208353, New Haven CT 06520-8353. Further information on ISS and the Brady-Johnson Program can be found at www.yale.edu/iss.

JUDAIC STUDIES

451 College Street, 203.432.0843 www.yale.edu/judaicstudies

Chair and Director of Graduate Studies Steven Fraade

Professors Steven Fraade (*Religious Studies*), Christine Hayes (*Religious Studies*), Paula Hyman (*History; Religious Studies*), Ivan Marcus (*History; Religious Studies*), Vered Noam (*Visiting, Religious Studies*)

Assistant Professor Eliyahu Stern (Religious Studies; History)

Senior Research Scholar Margaret Olin (Divinity School; History of Art; Religious Studies)

Senior Lecturer Peter Cole (Visiting, Humanities)

Lecturers Jonathan Kaplan, Micha Perry, Hizky Shoham, Sandra Valabregue-Perry (*Religious Studies*)

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 208287, New Haven CT 06520-8287, and at www.yale.edu/judaicstudies.

Courses

JDST 716b/HSAR 730b/REL 955b/RLST 794b, Jewish Space Margaret Olin The seminar examines modern concepts of Jewish space, concentrating on how people have imagined, constructed, or enacted space in Jewish life from the nineteenth century to the present. The course is structured around three themes: the characteristic blend of the secular and sacred; the relation between space and time; and the relation between Jews and others. The types of spaces considered range from the secular to the ritual, memorial, and spiritual. Thus ways in which spaces are constructed or conceived to include or exclude Jews are considered, as are spaces where people mingle with one another in imagination or reality. The themes overlap, particularly in cases in which concepts of time merge with concepts of space, as in spaces, such as the Eruv, that are activated only at certain times. Examples of spaces treated include synagogues (modern buildings and ancient objects of modern scholarship), Eruvim, prison (or concentration) camps, baseball fields, Jewish museums, and Eretz Israel. Readings include theorists of space such as Henri Lefebvre and Michel de Certeau as well as writers associated (as primary or secondary sources) with the particular case studies. Students make presentations and submit papers on topics of their choosing in consultation with the instructor. A major aim of the seminar is a better understanding of the role of space in concepts of Jewish identity, as conceived by Jews and others. Qualified undergraduates are welcome. T 1:30-3:20

JDST 721b^U, Introduction to Judaism in the Ancient World 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; faith in reason; Sabbath and festivals; history and its redemption. No prior background in Jewish history assumed. MW 11:35–12:50

JDST 722b/RLST 675b, Ancient Judaism Christine Hayes

An in-depth survey of the history and literature of Judaism in late antiquity through the rabbinic period. Special attention is given to the problems and possibilities of employing rabbinic sources for the purposes of historical reconstruction in the period that saw the emergence of the Gospels and the formation of Christianity. Emphasis on methodological trends and cutting-edge scholarship. The course is designed primarily for students in the Ph.D. program in New Testament and Ancient Christianity. Doctoral students in Hebrew Bible and Ancient Judaism are also welcome. T 10–12

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 Ma'aseh 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. M 9:25–11:15 **JDST 727b^U/RLST 752b^U, Mishnah Seminar: Tractate Megillah** Steven Fraade Study of rabbinic texts treating rules for the public recitation and translation of the Scroll of Esther on the holiday of Purim and of other sacred scriptures throughout the year, with special attention to the relation between law and ritual and the narrativity of both. Prerequisite: reading fluency in ancient Hebrew. M 1:30–3:20

JDST 728a^U/RLST 751a^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 (Deuteronomy 32), as found in the collection Sifre Haazinu. Discussion of early rabbinic methods and rhetoric of scriptural interpretation, with consideration of its place in the history of interpretation and possible contribution to historical understanding of ancient Jewish society and culture. Prerequisite: reading fluency in ancient Hebrew. W 9:25–11:15

JDST 728b^U/RLST 651b^U, Midrash Seminar: Exodus 32 and Its Midrashic

Development Christine Hayes

A study of the midrashic career of the Golden Calf story. Examination of the rich and polyphonic tradition of interpretation found in the Bible itself, in ancient translations, and in classical rabbinic sources. Prerequisite: reading fluency in ancient Hebrew. TTH 1–2:15

JDST 734b^u/RLST 775b^u, Loving God in Ancient Judaism and Early Christianity Jonathan Kaplan

Loving God is historically one of the highest ideals in both Judaism and Christianity. The purpose of the course is to explore the emergence of this ideal from its background in ancient Near Eastern literature and culture and to examine its development in the literature of ancient Israel and its expression in the literature of ancient Judaism and early Christianity. TH 9:25–11:15

JDST 756b/RLST 756b, Ancient Judaism Seminar. From Qumran to the Rabbinic Revolution: Conceptions of Impurity Vered Noam

The topic of this required Ancient Judaism seminar changes yearly. The seminar focuses this year on purity, impurity, holiness, and the profane, which are basic concepts of almost every religious system. Topics include the development of these terms from the Bible, though Second Temple exegesis and into the rabbinic literature; the theological-political polemics that these religious conceptions generated; and the emergence of rabbinic culture against the background of the earlier, dissenting Qumranic legislation. Prerequisite: reading fluency in ancient Hebrew. W 1:30–3:20

JDST 761a^U/HIST 535a^U/RLST 773a^U, History of the Jews to the Reformation

Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Jews, Christians, and Muslims. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. Prerequisite: reading knowledge of modern Hebrew. TTH 11:35–12:50

JDST 763a^U, Medieval Jews, Christians, and Muslims Imagining Each Other Ivan Marcus

How members of Jewish, Christian, and Muslim communities thought of and interacted with members of the other two cultures during the Middle Ages. Topics include the cultural grids and expectations each imposed on the other; the rhetoric of otherness such as humans or devils, purity or impurity, and animal imagery; and models of religious community and power in dealing with the other when confronted with cultural differences. T 1:30-3:20

JDST 764b^U/HIST 532b^U/RLST 777b^U, Jews in Muslim Lands from the Seventh to the Sixteenth Century Ivan Marcus

Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire. Prerequisite: reading knowledge of modern Hebrew. TTH 11:35–12:50

JDST 765a^U/HIST 573a^U, Folklore and History in the Jewish Middle Ages

Micha Perry

The course examines legends, stories, fairy tales, myths, and other works of folklore culled from the Jewish Middle Ages (800-1500). It assesses their historical value through an understanding of their literary structure and the use of folklore methodology. M 3:30-5:20

JDST 772a^U/RLST 711a^U, Al-Ghazali and Maimonides Frank Griffel

Close study of the lives and the thought of two of the most influential theologians and philosophers in Islam and Judaism. Comparison of their lives and writings, focusing on their integration of Aristotelian philosophy into the theology of Islam and Judaism. M 1:30-3:20

JDST 777**b**^U/**RLST** 791**b**^U, **Major Trends in Kabbalah** Sandra Valabregue-Perry An advanced introduction to Jewish mysticism (through texts) from the Bible to the twentieth century: biblical mystical visions, magic in rabbinic literature, Hekhalot literature, the Book of Creation, medieval Kabbalah, the Book of Splendor (Zohar), Italian Kabbalah, Lurianic Kabbalah, Hasidism, and modern and new age Kabbalah. T 9:25–11:35

JDST 781b^U/HIST 566b^U/RLST 774b^U, History of Jewish Culture, 1500 to the Present Paula Hyman

A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. TTH 11:35–12:50

JDST 784b^U/HIST 952b^U/RLST 762b^U, Memory, Memoirs, and Modern Jewish

History Paula Hyman

Exploration of how memoir writers from the seventeenth century to the twentieth understand their own experience against the backdrop of modern Jewish history. Focus on the construction of identity and the relation of personal and collective memory, with special
attention to the interaction of minority status, gender, and class in a variety of historical contexts. TH 1:30–3:20

JDST 788a^U/HIST 979a^U/RLST 768a^U, The Holocaust in Historical Perspective Paula Hyman

A survey of the major historical issues raised by the Holocaust, including the roots of Nazism; different theoretical perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. MW 10:30–11:20, 1 HTBA

JDST 790b/HIST 541b/RLST 776b, The Jews in Medieval Societies Ivan Marcus Research seminar that focuses on a comparison of the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain). Issues in historiography and comparative methodology complement discussions about the symbols and reality of literary, political, and economic features of each society. Prerequisite: reading knowledge of modern Hebrew. T 1:30–3:20

JDST 793a^U/HIST 951a^U/RLST 799a^U, Introduction to Modern Jewish Thought Eliyahu Stern

An overview of modern Jewish philosophical trends, movements, and thinkers from the seventeenth to the twenty-first century. Subject matter addressed: enlightenment, historicism, socialism, secularism, religious radicalism, and Zionism. MW 11:35–12:50

JDST 794b^U/**HIST 538b**^U/**RLST 783b**^U, **The Jewish Enlightenment** Eliyahu Stern An overview of the eighteenth- and nineteenth-century transnational Jewish Enlightenment movement. Focus is on the origins of modernity and the breakdown of traditional society. Topics include religious reform, separation between public and private spheres, emancipation, acculturation, and anti-Semitism. MW 2:30–3:45

JDST 795a^U/HIST 953a^U/RLST 750a^U, Religion, Ethnicity, and Identity in American Jewish History Paula Hyman

An exploration of how Jews in America negotiated, and renegotiated, religion and ethnicity to forge a hyphenated American identity. Topics include the impact of Protestant domination, immigrant experiences and legacies, the role of discrimination, and selfpresentation and representation by others. M 1:30-3:20

JDST 797a, Law and Ethics in Modern Jewish Thought Eliyahu Stern

The seminar examines the way modern Jewish thinkers theorize the respective roles of law and ethics in Judaism. Close readings of Jewish thinkers from the seventeenth to the twentieth century. Topics include modern ethics, legal positivism, social justice, and Jewish law. TH 9:25–11:15

JDST 799a^U/RLST 780a^U, Modern Zionist Traditions: Time, Space, and Body Hizky Shoham

A description and analysis of the role of tradition in the modernist project of Zionism, with a focus on "public rituals" in the New Hebrew culture since its early beginnings in the late nineteenth century until today. Examination of the role of tradition in the negotiation of political visions, ideologies, and identities; exploration of sociocultural loci of the new traditions and their relationship with past festive Jewish practices. T 3:30–5:20

Related Courses

HEBR 501^U, Elementary Modern Hebrew HEBR 502^U, Intermediate Modern Hebrew HEBR 504b^U, Introduction to Modern Israeli Literature [HEBR 505b, Contemporary Israeli Society in Film] [HEBR 509b, Reading Academic Texts in Modern Hebrew] NELC 554a^U, Israeli Identity and Culture: 1948 to the Present For descriptions, see under Near Eastern Languages and Civilizations.

THE WHITNEY AND BETTY MACMILLAN CENTER FOR INTERNATIONAL AND AREA STUDIES AT YALE

Luce Hall, 203.432.3410 www.yale.edu/macmillan

Director

Ian Shapiro (Political Science)

Executive Committee Ian Shapiro (*Chair; Political Science*), Nancy Ruther (*Secretary; Associate Director, The MacMillan Center*), Elizabeth Bradley (*School of Public Health*), Michael Cappello (*Medicine; World Fellows Program*), Judith Chevalier (*School of Management*), Michael Donoghue (*Ecology & Evolutionary Biology*), Laura Engelstein (*History*), Philip Gorski (*Sociology*), Oona Hathaway (*Law*), William Kelly (*Anthropology*), Sandra Nuhn (*Associate Director, The MacMillan Center*), Thomas Pogge (*Philosophy*), Benjamin Polak (*Economics; School of Management*), Frances Rosenbluth (*Deputy Provost*), Steven Wilkinson (*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 twelve degree programs. The eight undergraduate majors include African Studies; East Asian Studies; Ethnicity, Race, and Migration; International Studies; Latin American Studies; Modern Middle East Studies; Russian and East European Studies; and South Asian Studies. The four graduate degree programs award master's degrees in African Studies, East Asian Studies, International Relations, 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 seven Graduate Certificates of Concentration: in African Studies, European Studies, Global Health, International Development Studies, International Security 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 Jackson Institute for Global Affairs (formerly the International Affairs Council); the Center for the Study of Globalization; Ethnicity, Race, and Migration; European Union Studies; Genocide Studies; the Gilder Lehrman Center for the Study of Slavery, Resistance, and Abolition; Global Health; Global Justice; Global Affairs; International and Comparative Political Economy; International Security Studies; Order, Conflict, and Violence; Program on Democracy; and Religion, Politics, and Society.

The MacMillan Center's regional councils regularly teach all levels of nine foreign languages (Zulu, Yorùbá, Vietnamese, Tamil, Swahili, Sanskrit, Modern Greek, Indonesian, Hindi). With the Jackson Institute, they collaborate with the Center for Language Study in supporting Directed Independent Language Study of another sixty-four languages for undergraduate, graduate, and professional school students.

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. In addition to administering the master's program in International Relations, the Jackson Institute for Global Affairs provides career counseling services to Yale students interested in diplomatic service or careers with international agencies or nongovernmental organizations. Through the Programs in International Educational Resources (PIER), it brings international education and training to educators, K–12 students, the media, businesses, and the community at large. The MacMillan Center also 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.

For details on degrees, programs, and faculty leadership, please consult www.yale.edu/ macmillan.

Graduate Certificates of Concentration in International and Area Studies

GENERAL GUIDELINES - PROGRAM DESCRIPTION

The Whitney and Betty MacMillan Center for International and Area Studies at Yale, through the Jackson Institute for Global Affairs and 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 the seven areas of concentration: regional (Africa, Europe, Latin America, Middle East) or thematic and international (Development, Global Health, and Security).

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).
- 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 HP 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 relevant associate 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 relevant associate 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

M. Kamari Clarke (Anthropology)

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, Africa and the Disciplines, 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, african.studies@yale.edu.

COUNCIL ON EAST ASIAN STUDIES

The MacMillan Center 320 Luce Hall, 203.432.3426 http://eastasianstudies.research.yale.edu

Chair

Haun Saussy (Comparative Literature; East Asian Languages & Literatures)

Faculty

For faculty list, see the section on East Asian Studies, under Degree-Granting Departments in this bulletin.

The Council on East Asian Studies (CEAS) at the MacMillan Center 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. For almost fifty years, it has promoted education about East Asia both in the college curricula and through lectures and workshops, conferences, cultural events, and educational activities open to faculty, students, and the general public. CEAS has been designated a National Resource Center for the study of Asian languages and cultures by the U.S. Department of Education. With more than twenty core faculty and twenty language instructors spanning twelve 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 curricula 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. The M.A. program focuses on Chinese, Japanese, and Korean Studies. For details on the M.A. program, see the section on East Asian Studies, under Degree-Granting Departments in this bulletin.

EUROPEAN STUDIES COUNCIL

The MacMillan Center 342 Luce Hall, 203.432.3423 www.yale.edu/macmillan/europeanstudies Graduate Certificate of Concentration in European Studies

Chair

Philip Gorski (Sociology)

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 formulates and implements new curricular and research programs on European politics, culture, economy, society, and history. The geographical scope of the council's activities extends from Ireland to the lands of the former Soviet Union. Its concept of Europe transcends the conventional divisions into Western, Central, and Eastern Europe, and includes the Balkans and Russia. In 2006 the U.S. Department of Education again designated the council a National Resource 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, 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 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, and Hellenic Studies.

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 not only its status as an HEA Title VI National Resource Center, but also its affiliation with interuniversity and international organizations that can offer specialized training programs and research grants for graduate students, support conferences among European and 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. Furthermore, the council supplements the regular Yale curriculum with lectures and seminars by eminent European and American scholars, diplomats, and political officials. Each year the European Commission sponsors a European Union Fellow at Yale. The European Studies Council is now pursuing formal links with a variety of European institutions and is in its fourth year of a scholarly exchange with École des Hautes Études en Sciences Sociales (EHESS) in Paris.

Fields of Study

European and Slavic languages and literatures; economics; history; music; political science; law; sociology.

Special Requirements for the Graduate Certificate of Concentration in European Studies

Yale 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 specify as an area of primary focus either (1) Russia and Eastern Europe or (2) Central and Western Europe. Admission is contingent on the candidate's acceptance 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. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on successful completion of the candidate's Yale University degree program.

Specific Requirements

- Language proficiency in two modern European languages, in addition to English. Students 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.
- 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 paper written either:
 - a. in the context of one of the six courses in the area of concentration, or
 - b. as independent work under faculty supervision, replacing one of the six required courses.

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, 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, visit www.yale.edu/macmillan/grad_certificates.htm and www. yale.edu/macmillan/iac/certificates.htm; write to European Studies Council, Yale University, PO Box 208206, New Haven CT 06520-8206; or call 203.432.3423.

JACKSON INSTITUTE FOR GLOBAL AFFAIRS

The MacMillan Center 136 Rosenkranz Hall, 203.432.3418 http://jackson.yale.edu Graduate Certificate of Concentration in Development Studies Graduate Certificate of Concentration in Global Health Graduate Certificate of Concentration in International Security Studies

Director

James Levinsohn (Global Affairs; Management)

Faculty

For faculty listings, see the section on International Relations under Degree-Granting Departments and Programs in this bulletin.

Graduate Certificate of Concentration in Development Studies

The Graduate Certificate of Concentration in Development Studies provides recognition that a graduate or professional student at Yale has completed interdisciplinary study and integrative research to address fundamental and applied economic, political, social, and cultural issues facing developing countries.

The certificate in Development Studies may be pursued only in conjunction with graduate degree programs in the Graduate School of Arts and Sciences and the professional schools. By pursuing the certificate, students are able to develop and demonstrate their competence in this interdisciplinary field. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on the successful completion of the candidate's Yale University degree program. The Development Studies faculty adviser may set a limit on the number of applicants accepted into this certificate program in any given year.

The certificate courses and research should be planned, in consultation with the Development Studies faculty adviser, to clearly demonstrate fulfillment of the goals of the Development Studies certificate. Certificate candidates should apply to pursue the certificate early in their degree program, and must do so no later than their penultimate term of enrollment.

REQUIREMENTS

- Six courses in the area of Development Studies. Each year, the Development Studies faculty adviser will provide a list of courses that will count toward the six-course requirement. This list will draw primarily on Graduate School offerings in economics, political science, history, international relations, anthropology, and sociology, and on courses at the professional schools, including Forestry & Environmental Studies, Law, Management, and Public Health. Candidates may petition the faculty adviser to have other relevant courses count.
- 2. Candidates must demonstrate proficiency in one relevant language other than English. The language should be either a major world language relevant to development studies or the language of the region on which the candidate is focusing.

- 3. Candidates must demonstrate proficiency in the basic concepts of economic analysis, either by demonstrating substantial prior course work in economics or by taking a graduate- or professional-level economics course at Yale. Such a course may count toward the certificate with the approval of the faculty adviser.
- 4. Candidates must write a substantial research paper. The paper must demonstrate the ability to use interdisciplinary resources in development studies, including, where appropriate, primary sources, field research, data analysis, and non-English sources.

Graduate Certificate of Concentration in Global Health

Graduate and professional students at Yale may pursue the Graduate Certificate of Concentration in Global Health as part of their degree program. This certificate allows students to develop expertise and demonstrate competence in Global Health and provides recognition that a student has completed interdisciplinary study and integrative research to address fundamental and applied economic, political, social, cultural, and scientific issues relevant to Global Health.

Students are expected, in consultation with the Global Health faculty adviser, to develop a coherent plan of courses and research that focuses on a specific significant Global Health issue that requires an interdisciplinary perspective (e.g., health and human rights, the worldwide obesity epidemic, economic development and tropical diseases). Often this focal issue will be studied in the context of a particular region of the world (e.g., East Asia, Latin America, sub-Saharan Africa) or comparatively across countries or regions.

We expect that students pursuing the certificate will engage with the community of scholars and practitioners working on Global Health at Yale and around the world, demonstrating the ability and cultural sensitivity to work with them in languages beyond English. Overseas field experience in Global Health is also highly desirable. Application deadlines are November 1 and May 15 each year. Master's students in particular are advised to apply during the fall term of their first year.

REQUIREMENTS

- Six courses in the area of Global Health. Each year, the Global Health faculty adviser will provide a list of courses that will count toward the six-course requirement. Candidates must work with the adviser to organize their course selections around their chosen focal issue within Global Health. Two courses must be from the School of Public Health, one of which must provide a broad-based foundation in epidemiology.
- Candidates must demonstrate proficiency in one relevant language other than English. The language should be either a major world language relevant to global health or one of the main working languages of the region on which the candidate is focusing.
- 3. Candidates must write a substantial, interdisciplinary research paper. The paper must demonstrate the ability to use interdisciplinary resources in global health, including, where appropriate, field research, primary sources, data analysis, and non-English sources.

Graduate Certificate of Concentration in International Security Studies

The Graduate Certificate of Concentration in International Security Studies provides recognition that a graduate or professional student at Yale has completed interdisciplinary study and integrative research to address fundamental and applied economic, political, social, and cultural issues relevant to the study of international security.

The certificate in International Security Studies may be pursued only in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools. It allows students to develop and demonstrate their competence in this interdisciplinary field. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on successful completion of the candidate's Yale University degree program. The International Security Studies faculty adviser may set a limit on the number of applicants accepted into this certificate program in any given year.

The certificate courses and research should be planned, in consultation with the International Security Studies faculty adviser, to clearly demonstrate fulfillment of the goals of the International Security Studies certificate. Certificate candidates should apply to pursue the certificate early in their degree program, and must do so no later than their penultimate term of enrollment.

REQUIREMENTS

 Six courses in the area of International Security. Each year, the International Security Studies faculty adviser will provide a list of courses that will count toward the sixcourse requirement. This list will draw primarily on Graduate School offerings in anthropology, economics, history, international relations, political science, and sociology, and on courses at the professional schools, including Forestry & Environmental Studies, Law, Management, and Public Health. Candidates may petition the faculty adviser to have other relevant courses count.

One of these six courses must have a core focus on international security issues. The International Security Studies faculty adviser will provide a list of courses each year that meet this requirement.

Up to three courses may focus on a particular region.

- 2. Candidates must demonstrate proficiency in one relevant language other than English. The language should be either a major world language relevant to international security studies or the language of the region on which the candidate is focusing.
- 3. Candidates must write a substantial research paper. The paper must demonstrate the ability to use interdisciplinary resources in international security studies, including, where appropriate, primary sources, field research, data analysis, and non-English sources. If the paper is of sufficient quality, the faculty adviser may submit it for publication in the IAC International Security Studies Working Paper Series.

For more information, visit http://www.yale.edu/macmillan/grad_certificates.htm, e-mail jackson.institute@yale.edu, or call 203.432.3418.

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

Stuart B. Schwartz (History)

Professors Rolena Adorno (Spanish & Portuguese), Mark Ashton (Forestry & Environmental Studies), Ned Blackhawk (History; American Studies), Garry Brewer (School of Management), Richard Burger (Anthropology), Hazel Carby (African American Studies; American Studies), Amy Chua (Law), Carlos Eire (History; Religious Studies), Eduardo Engel (Economics), Robert Evenson (Economics), Paul Freedman (History), Aníbal González (Spanish & Portuguese), Roberto González Echevarría (Spanish & Portuguese), K. David Jackson (Spanish & Portuguese), Gilbert Joseph (History), Efstathios Kalyvas (Political Science), Enrique Mayer (Anthropology), Robert Mendelsohn (Forestry & Environmental Studies), María Rosa Menocal (Spanish & Portuguese), Mary Miller (History of Art), Florencia Montagnini (Forestry & Environmental Studies), Patricia Pessar (Adjunct; American Studies; African American Studies; Anthropology), Stephen Pitti (History), Susan Rose-Ackerman (Law; Political Science), T. Paul Schultz (Economics), Stuart B. Schwartz (History), Susan Stokes (Political Science), Robert Thompson (History of Art), Noël Valis (Spanish & Portuguese), Michael Veal (Music; American Studies; African American Studies), Elisabeth Wood (*Political Science*)

Associate Professors Moira Fradinger (Comparative Literature), Leonard Munstermann (Senior Research Scientist, Epidemiology & Public Health), Alicia Schmidt-Camacho (American Studies)

Assistant Professors Jafari Allen (Anthropology; African American Studies), Robert Bailiss (Forestry & Environmental Studies), P. Sean Brotherton (Anthropology), Susan Byrne (Spanish & Portuguese), Ana De La O Torres (Political Science), Thad Dunning (Political Science), Mariola Espinoza (Medicine), Ernesto Estrella (Spanish & Portuguese), Paulo Moreira (Spanish & Portuguese), Paulina Ochoa Espejo (Political Science), Kevin Poole (Spanish & Portuguese)

Senior Lectors I, II (Spanish & Portuguese) Sybil Alexandrov, Marta Almeida, Teresa Carballal, Mercedes Carreras, Sebastián Díaz, Oscar González-Barreto, María Jordán, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé, Terry Seymour, Margherita Tortora, Sonia Valle

Lectors (Spanish & Portuguese) Maria Pilar Asensio-Marinque, Yovanna Cifuentes, Ame Cividanes, Maria de La Paz García, Barbara Safille **Others** Jane Edwards (Associate Dean, Yale College), Nancy Ruther (Lecturer, Political Science), César Rodríguez (Curator, Latin American Collection, Sterling Memorial Library), John Sullivan (Instructor, Nahuatl)

Professors Emeriti Emilia Viotti da Costa (*History*), Josefina Ludmer (*Spanish & Portuguese*), Juan Linz (*Political Science; Sociology*), Gustav Ranis (*Economics*)

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, History of Art, Political Science, and Spanish and Portuguese. Latin Americanist faculty specialize in the Andes (Burger, Mayer), Brazil (Jackson, Moreira, Pessar, Schwartz), the Caribbean (Pessar, Thompson), Central America (Joseph, Miller, Wood), Mexico (Camacho, Joseph, Miller, Pitti), and the Southern Cone (Engel, Stokes). F&ES faculty (Anisfeld, Ashton, Clark, Doolittle, Dove, Mendelsohn, Montagnini) have tropical research interests or participate in educational exchanges with Argentina, Bolivia, Brazil, Costa Rica, Dominica, Ecuador, Guyana, Honduras, Mexico, Nicaragua, Panama, Peru, and Venezuela. Latin American content courses are also offered in the Divinity School, 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 Foreign Language and Area Studies fellowships and LAIS Summer Research grants, are available to graduate and professional school students.

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 522,000 printed volumes, 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; e-mail, latin.america@yale.edu; or telephone, 203.432.3422.

COUNCIL ON MIDDLE EAST STUDIES

The MacMillan Center 346 Rosenkranz Hall, 203.436.2553 www.yale.edu/macmillan/cmes Graduate Certificate of Concentration in Modern Middle East Studies

Chair

Marcia Inhorn (Anthropology and International Affairs)

Associate Chair

Frank Griffel (Religious Studies)

Professors Abbas Amanat (History), Harold Attridge (Divinity; Religious Studies), Gerhard Böwering (Religious Studies), Adela Yarbro Collins (Divinity), John J. Collins (Divinity), John Darnell (Near Eastern Languages & Civilizations), Stephen Davis (Religious Studies), Owen Fiss (Law), Benjamin Foster (Near Eastern Languages & Civilizations), Steven Fraade (Religious Studies), Eckart Frahm (Near Eastern Languages & Civilizations), Frank Griffel (Religious Studies), Beatrice Gruendler (Near Eastern Languages & Civilizations), Dimitri Gutas (Near Eastern Languages & Civilizations), Christine Hayes (Religious Studies), Frank Hole (Emeritus, Anthropology), Paula Hyman (History; Religious Studies), Marcia Inhorn (Anthropology), Stanley Insler (Linguistics), Anthony Kronman (Law), Bentley Layton (Religious Studies), James Leckman (Psychology; Pediatrics), Andrew March (Political Science; Religious Studies), Ivan Marcus (History), Robert Nelson (History of Art), Ashgar Rastegar (Medicine), W. Michael Reisman (Law), Lamin Sanneh (Divinity; History), Harvey Weiss (Near Eastern Languages & Civilizations), Robert Wilson (Divinity)

Associate Professors Ala Alryyes (Comparative Literature), Ellen Lust (Political Science)

Assistant Professors Narges Erami (Anthropology), Zareena Grewal (American Studies; Religious Studies), Kaveh Khoshnood (Epidemiology & Public Health), Adria Lawrence (Political Science), Colleen Manassa (Near Eastern Languages & Civilizations), Nikolay Marinov (Political Science), Alan Mikhail (History), Ahmed Mobarak (Economics), Hala Nassar (Near Eastern Languages & Civilizations), Kishwar Rizvi (History of Art), Edwige Tamalet (French), Jonathan Wyrtzen (Scociology)

Senior Lecturers and Lecturers Adel Allouche (History; Religious Studies), Karen Foster (Near Eastern Languages & Civilizations; History of Art), Tolga Köker (Economics), Marwan Muasher (Global Affairs), Kathryn Slanski (Near Eastern Languages & Civilizations)

Senior Lectors (I, II) and Lectors Sarab Al Ani (*Arabic*), Fereshteh Amanat-Kowssar (*Persian*), Muhammad Aziz (*Arabic*), Ayala Dvoretzky (*Hebrew*), Etem Erol (*Turkish*), Orna Goldman (*Hebrew*), Shiri Goren (*Hebrew*), Ghassan Husseinali (*Arabic*), Shady Nasser (*Arabic*)

Librarians and Curators Ulla Kasten (Babylonian Collection), Susan Matheson (Ancient Art, Yale University Art Gallery), 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.

The 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 309 Luce Hall, 203.432.5596 www.yale.edu/macmillan/southasia

Chair

Kalyanakrishnan Sivaramakrishnan (Anthropology)

Professors Akhil Amar (*Law*), Timothy Barringer (*History of Art*), Michael Dove (*Forestry & Environmental Studies*), Sara Suleri Goodyear (*English*), Phyllis Granoff (*Religious Studies*), Inderpal Grewal (*Women's, Gender & Sexuality Studies*), Stanley Insler (*Linguistics*), Gustav Ranis (*Emeritus, Economics*), T. N. Srinivasan (*Economics*), Shyam Sunder (*School of Management*), Kalyanakrishnan Sivaramakrishnan (*Anthropology*), Christopher Udry (*Economics*), Steven Wilkinson (*Political Science*)

Associate Professors J. Bernard Bate (Anthropology), Nihal deLanerolle (School of Medicine), Sarah Weiss (Music)

Assistant Professors Ashwini Deo (*Linguistics*), Mayur Desai (*Psychiatry/VAMC*), Ravi Durvasula (*School of Medicine*), Zareena Grewal (*Ethnicity, Race & Migration*), Karuna Mantena (*Political Science*), Shital Pravinchandra (*English*), Kishwar Rizvi (*History of Art*), Tamara Sears (*History of Art*), Tariq Thachil (*Political Science*)

Senior Lecturers Geetanjali Singh Chanda (Women's, Gender & Sexuality Studies), Koichi Shinohara (Religious Studies)

Lecturers Harry Blair (Political Science), Carol Carpenter (Forestry & Environmental Studies), Ian Desai, Hugh Flick (Religious Studies), El Mokhtar Ghambou (English), Gijs Kruijtzer, Mrinalini Rajagopalan

Senior Lector Seema Khurana (Hindi)

Lectors David Brick (Sanskrit), Swapna Sharma (Hindi), Blake Wentworth (Tamil)

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 Council on South Asian Studies 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 Tamil. 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

ANTH 619a^U/WGSS 685a^U, Language and the Public Sphere J. Bernard Bate Explores the relationship between language and the public sphere through consideration of theoretical perspectives of Jürgen Habermas and Benedict Anderson, along with ethnographic and historical examination of eighteenth- and nineteenth-century America and Europe, nineteenth- and twentieth-century Arabia, and India from the third to the twentieth century. T 1:30–3:20

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 computerbased 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: MWF 10:30–11:20; TTH 1:30–2:20

510a-2: MWF 10:30-11:20; TTH 10:30-11:20

HNDI 520b^U, **Elementary Hindi II** Seema Khurana, Swapna Sharma Continuation of HNDI 510a. 520b-1: MWF 10:30–11:20; TTH 1:30–2:20 520b-2: MWF 1:30–2:20; TTH 10:30–11:20

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.

530a-1: MWF 2:30-3:20 530a-2: TTH 9:30-10:20

HNDI 540b^U, Intermediate Hindi II Seema Khurana, Swapna Sharma Continuation of HNDI 530a, focusing on further development of proficiency in the four language skill areas. Prerequisite: HNDI 530a or equivalent. 540b-1: MWF 2:30-3:20 540b-2: TTH 9:30-10:20

HNDI 550a^U, Advanced Hindi Seema Khurana, Swapna Sharma

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 Munshi Premchand, Mannoo Bhandari, Sharat Chandra, Amrita Pritam, and others into popular media, e.g., cinema, theater, and television drama serial. Limited to 18 students. TTH 4–5:15

HNDI 598a^U or b^U, Advanced Tutorial

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, 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, 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, Advanced Sanskrit David Brick

The course is designed as an advanced tutorial offered in connection with the proposed seminar course Law and Religion in Ancient India. Its purpose is to introduce students to Sanskrit commentarial literature in general and to Dharmasastra in particular. Dharmasastra is a major genre of Brahmanical literature dedicated to the explication and analysis of everything falling under the broad rubric of dharma. Prerequisite: knowledge of Sanskrit equivalent to at least two years of college course work. TTH 1–2:15

TAML 510a^U, Introductory Tamil I Blake Wentworth

An in-depth introduction to modern Tamil, focusing on comprehension, speaking, reading, and writing skills as well as on cultural understanding. Course work includes graded texts, written assignments, audiovisual material, and computer-based exercises. No prior background in Tamil assumed. MTWTHF 10:30–11:20

TAML 520b^U, **Introductory Tamil II**Blake WentworthContinuation of TAML 510a. MTWTHF 10:30-11:20

TAML 530a^U, Intermediate Tamil I Blake Wentworth

First half of a two-term sequence designed to develop proficiency in the four language skill areas. Focus on improving comprehension, speaking, reading, and writing skills through the use of visual media, newspapers and magazines, modern fiction and poetry, and public communications such as pamphlets, advertisements, and government announcements. Prerequisite: TAML 520b or equivalent. MTWTHF 11:35–12:25

TAML 540b^U, Intermediate Tamil II Blake Wentworth

Continuation of TAML 530a, focusing on further development of proficiency in four language skill areas. Students are prepared to begin conducting field work in Tamil. Prerequisite: TAML 530a or equivalent. MTWTHF 11:35–12:25

TAML 598a or 598b, Advanced Tutorial Blake Wentworth

For students with advanced Tamil language skills who wish to engage in concentrated reading and research on material not otherwise included in the courses offered by the department. The work is supervised by the instructor and concludes with a term paper or its equivalent. Prerequisites: submission of a detailed proposal of study and its approval by the instructor and DGS. W 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 Benedict Kiernan (*History*)

Acting Chair, 2010–2011 Amity Doolitle (Forestry & Environmental Studies)

Professors William Burch (Forestry & Environmental Studies), Michael Dove (Forestry & Environmental Studies), J. Joseph Errington (Anthropology), William Kelly (Anthropology), Benedict Kiernan (History), James Scott (Political Science), Mimi Yiengpruksawan (History of Art)

Associate Professor Sarah Weiss (Music)

Assistant Professor Erik Harms (Anthropology)

Lecturers and Senior Lectors (I, II) 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. 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 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 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; or see our Web site, www.yale.edu/seas.

Courses

INDN 520^U, Elementary Indonesian Indriyo Sukmono

An introductory course in Standard Indonesian with emphasis on developing communicative skills through systematic survey of grammar and graded exercises. Introduction to reading in the second term, leading to mastery of language patterns, essential vocabulary, and basic cultural competence. 5 HTBA

INDN 527^U, Intermediate Indonesian Indriyo Sukmono

Continues practice in colloquial Indonesian conversation and reading and discussion of texts. 3 HTBA

INDN 560, Readings in Indonesian Indrivo Sukmono

For students with advanced Indonesian language skills working on modern Indonesian literature.

VIET 515^U, Elementary Vietnamese Quang Phu Van

Students acquire basic working ability in Vietnamese including sociocultural knowledge. Attention paid to integrated skills such as speaking, listening, writing (Roman script), and reading. No previous knowledge of or experience with Vietnamese language required. MTWTHF 10:30–11:20

VIET 530^U, Intermediate Vietnamese Quang Phu Van

An integrated approach to language learning aimed at strengthening students' listening, speaking, reading, and writing skills in Vietnamese. Students are thoroughly grounded in communicative activities such as conversations, performance simulation, drills, role playing, and games. Discussion of aspects of Vietnamese society and culture. Prior knowledge of Vietnamese required. MTWTHF 11:35–12:25

VIET 560, Readings in Vietnamese Quang Phu Van

For students with advanced Vietnamese language skills who wish to engage in concentrated reading and research.

ORGANISMAL AND INTEGRATIVE BIOLOGY (OIB)

122 Osborn Memorial Laboratories, 203.432.3837 www.biology.yale.edu/oib

Advisory Committee

Durland Fish (Vice Director; Epidemiology & Public Health), Leo Hickey (Geology & Geophysics), Andrew Hill (Anthropology), Richard Prum (Director; Ecology & Evolutionary Biology), Nancy Ruddle (Epidemiology & Public Health), Oswald Schmitz (Forestry & Environmental Studies), David Skelly (Forestry & Environmental Studies)

Organismal and Integrative Biology (OIB) was created in response to changing opportunities for cross-disciplinary research in the biological sciences. Our goal is to provide an environment for doctoral study utilizing Yale's diverse resources to encourage broad intellectual development. New theory, empirical findings, and technological developments promise unification of formerly disparate biological fields through research approaches that are actively synthetic, reaching across levels of organization to uncover fundamental organizing principles of biology.

Special Admissions Requirements

Based on their interests, students should seek admission to one of the participating departments: Anthropology, Ecology and Evolutionary Biology, Epidemiology and Public Health, Forestry & Environmental Studies, Geology and Geophysics. The Ph.D. and M.Phil. requirements are those of the participating departments.

WOMEN'S, GENDER, AND SEXUALITY STUDIES

315 William L. Harkness Hall, 203.432.0845 www.yale.edu/wgss

Chair Inderpal Grewal

Director of Graduate Studies Jill Campbell

Professors Elizabeth Alexander (African American Studies), Carol Armstrong (History of Art), Seyla Benhabib (Political Science), Hannah Brueckner (Sociology), Jill Campbell (English), Hazel Carby (African American Studies; American Studies), Kang-i Sun Chang (East Asian Languages & Literatures), George Chauncey (History), M. Kamari Clarke (Anthropology), Glenda Gilmore (History; American Studies; African American Studies), Inderpal Grewal (Women's, Gender & Sexuality Studies; American Studies; Anthropology), Dolores Hayden (Architecture; American Studies), Margaret Homans (English; Women's, Gender & Sexuality Studies), Paula Hyman (History; Religious Studies), Marianne LaFrance (Psychology; Women's, Gender & Sexuality Studies), Joanne Meyerowitz (History), Sally Promey (American Studies; Institute of Sacred Music; Religious Studies), Cynthia Russett (History), Alicia Schmidt Camacho (American Studies), Vicki Schultz (Law), Emilie Townes (Divinity), Michael Warner (English), Laura Wexler (American Studies; Women's, Gender & Sexuality Studies)

Associate Professors J. Bernard Bate (Anthropology), Shannon Craigo-Snell (Religious Studies), Naomi Rogers (History of Science & Medicine; Women's, Gender & Sexuality Studies), Ludger Viefhues-Bailey (Religious Studies)

Assistant Professors Jafari Allen (African American Studies; Anthropology), Rene Almeling (Sociology), Averil Clarke (Sociology), Moira Fradinger (Comparative Literature), Terri Francis (Film Studies), Lillian Guerra (History), Kathryn Lofton (American Studies; Religious Studies), Karen Nakamura (Anthropology), Sam See (English)

Lecturers Melanie Boyd (Women's, Gender & Sexuality Studies), Geetanjali Singh Chanda (Women's, Gender & Sexuality Studies), Kathleen Cleaver (African American Studies), Graeme Reid (Women's, Gender & Sexuality Studies; Anthropology), Maria Trumpler (Women's, Gender & Sexuality Studies)

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 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 Qualification by meeting with the director of graduate studies (DGS) during their first year. Students who wish to receive the Qualification must (1) complete the core course, WGSS 619b, Feminist and Queer Theory: National and Transnational Perspectives, or, with permission of the DGS, another course in the theory of gender and sexuality; (2) complete two electives to be determined in consultation with the DGS and their individual WGSS graduate adviser; (3) 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 (4) demonstrate readiness to teach basic and advanced courses in this field by serving as TF in a WGSS lecture course or teaching a seminar on a WGSS topic, or by preparing appropriate course syllabi. Students who fulfill these expectations will receive a letter from the DGS, indicating that they have completed the work for the Qualification.

Program information and the requirements for the Qualification are available on the Women's, Gender, and Sexuality Studies Web site, or by contacting 203.432.0845 or wgss@yale.edu.

Courses

[WGSS 619b, Feminist and Queer Theory: National and Transnational Perspectives]

WGSS 631b, Feminist Theory: State and Non-State Inderpal Grewal

An examination of the varied theorizations of the state in feminist and queer research, with particular focus on questions of race, postcoloniality, transnationalism, development, and neoliberalism. Attention to feminist and queer critiques of the state as patriarchal, heteronormative, and liberal; or as unmodern, traditional, and illiberal.

WGSS 660a^U/ANTH 684a^U, Men, Manhood, and Masculinity Graeme Reid Cultural and historic constructions of masculinity through an investigation of male bodies, sexualities, and social interactions. Examination of multiple masculinities and exploration of the relationships among hegemonic, non-hegemonic, and subordinate masculinities.

WGSS 662b^U, HIV and AIDS in Africa Graeme Reid

The social and cultural context in which the AIDS epidemic emerged and spread in southern Africa. How people and organizations experience, conceptualize, and respond to AIDS, and how AIDS is constructed through discourse and representation. TTH 1:30–3:20, 1 HTBA

WGSS 685a^U/ANTH 619a^U, Language and the Public Sphere J. Bernard Bate

Explores the relationship between language and the public sphere through consideration of theoretical perspectives of Jürgen Habermas and Benedict Anderson, along with ethnographic and historical examination of eighteenth- and nineteenth-century America and Europe, nineteenth- and twentieth-century Arabia, and India from the third to the twentieth century. T 1:30–3:20

WGSS 689b/AFAM 647b/ANTH 591b, Black Feminist Theory and Praxis

Jafari Allen

In this course we analyze black feminisms as both political space and scholarly choice. This framework enables us to examine the continuities between black feminist and womanist theorizing in diverse locations, and to explore how different embodied experiences – including genders, histories, geographies, and genealogies – condition divergent perspectives. Themes explored include slavery, colonialism, diaspora consciousness, multiple genders and sexualities, class difference and inequities of power within black communities; representation in popular culture; state violence; poetics and resistance. We employ a transdisciplinary perspective – including anthropology, history, sociology, literature, and film – and challenge notions of "theory" as the province of the West (and North) and the middle class. 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. T 1:30-3:20

[WGSS 705b^U/AFAM 731b^U, Theories of Black Women and Film]

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

George Chauncey, Joanne Meyerowitz

Selected topics in the history of sexuality. Emphasis on key theoretical works and recent historical literature. M 2:30-4:20

[WGSS 715b/AFAM 829b, American Legal History: Citizenship and Race]

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 colonialism and prostitution; repression and regulation of birth control; the teaching of sex education; the public celebration and denial of sexual difference; politics of sexually transmitted diseases, including HIV/ AIDS; public health and legal efforts to define and restrict abortion; the pathologizing and identity politics of transgendered people; and the development and regulation of artificial insemination and other methods of reproductive technology. W 1:30–3:20

[WGSS 732b/HSHM 919b, Research in Twentieth-Century U.S. Health, Medicine, and the Body]

[WGSS 745b^U/SOCY 610b^U, Race, Gender, and the African American Experience]

WGSS 769a/ENGL 742a, Fiction, Didacticism, and Political Critique: 1789–1818 Jill Campbell

A study of writings that seek a specific effect in their reader – whether didactic instruction and moral formation, or an instigation to take action toward political change – and their uneasy alliance in the late eighteenth and early nineteenth centuries with the literary genre of prose fiction. How do writings that seek to inform or reform the real person or the real world put fictional narratives to use? How is the genre of the novel shaped, explicitly or implicitly, by writing to a specific "end"? Texts include novels, tales for children, life-writing, poetry with a "cause," polemical essays; possible authors include Olaudah Equiano, Edmund Burke, William Godwin, Mary Wollstonecraft, Hannah More, Maria Edgeworth, Jane Austen, Anna Barbauld, and Mary Shelley. W 9:25–11:15

WGSS 770b^U/CHNS 501b^U, Women and Literature in Traditional China

Kang-i Sun Chang

The course focuses on major women writers in traditional China, as well as representations of women in works by male authors. Topics include the dichotomy of *yin* and *yang*, women and the fox spirits, the power of women's writing, women in exile, Daoist nuns, widow poets, courtesans and the literati culture, women's poetry clubs, women's script (*nushu*), the cross-dressing ladies, foot binding and representations of the female body, food and sexuality, notions of *qing* (love), aesthetics of illness, women and revolution, and the function of memory in women's literature. All readings in translation; no knowledge of Chinese required. TTH 1-2:15

WGSS 778a/AMST 676a/ENGL 865a, Walt Whitman Michael Warner

An intensive reading in Whitman. A central topic is sexuality, including the relations among Whitman's rhetoric of sex, his quasi-religious ambitions, and the rhetoric of critical worldliness. The course also attempts to situate Whitman's diverse writings in the landscape of genres and circulating forms in the transatlantic world of his day. Related topics include mid-nineteenth-century media shift; periodical verse; author cults; New York City literary culture and its emergent bohemian scene; nationalism, race, the state, and ambiguities of antislavery politics; stranger sociability, intimacy, and the pragmatics of "self" in Whitman. Seminar papers dealing with these broader topics are warmly invited, even if Whitman is not their primary focus. T 9:25–11:15

WGSS 779a/AMST 805a/HSAR 720a/REL 966a, Sensational Materialities: Sensory Cultures of Religion in History, Theory, and Method Sally Promey

This interdisciplinary seminar explores the process and practice of researching and writing sensory and material histories of religious images, objects, buildings, and performances. While the instructor's training and research concern American things and religions, the course considers broader geographical and categorical parameters in its readings so as to invite intellectual engagement with the most challenging and decisive developments in relevant fields. The goal is to study not only the *visual* cultures of religions but also to investigate possibilities for scholarly examination of a more robust human sensorium of sound, taste, touch, scent, and sight, the points where the senses meet material things (and vice versa) in religious life and practice. Topics for consideration include the cultural construction of the senses and sensory hierarchies; the course invites thinking beyond the "Western" five senses to other locations and historical possibilities for identifying the dynamics of sensing human bodies in (trans)national religious practices, experience, and ideas. Prerequisite: permission of the instructor. T 1:30–3:20

WGSS 781a/RLST 513a, Religion and Gender in the Philosophy of Stanley Cavell

Ludger Viefhues-Bailey

An introduction to the philosophy of Stanley Cavell with particular emphasis on gender and religion. W 3:30-5:20

YALE CENTER FOR THE STUDY OF GLOBALIZATION

Betts House, 203.432.1900, globalization@yale.edu YCSG Web site: www.ycsg.yale.edu *YaleGlobal Online* magazine: www.yaleglobal.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.

Included among the center's recent international activities are the following:

YCSG collaborated with the Commission on Modernization of World Bank Group Governance to explore ways in which the World Bank can operate more effectively, efficiently, dynamically, and legitimately in a transformed global political economy. This work concluded with the commission's final report, *Repowering the World Bank for the 21st Century*, presented to World Bank President Robert Zoellick in October of 2009.

The center is collaborating with the International Commission on Nuclear Non-Proliferation and Disarmament in an effort to reinvigorate at a high political level the global debate on the need for nuclear nonproliferation and disarmament, in the context both of the 2010 NPT Review Conference and beyond. The commission's report, *Eliminating Nuclear Threats: A Practical Agenda for Global Policymakers*, was launched in December of 2009. YCSG also collaborated with the International Atomic Energy Agency to produce a report on the future of the IAEA that has now become the primary reference for the institution's reform.

Through its collaboration with the Global Development Network, the center has been successful in networking with research development institutions in eleven regions in the developing world and more than 100 countries, and involved in the support of over 7,800 researchers and 800 development projects worldwide.

The center joined with the Commission on Growth and Development to compile the best contemporary understanding about the policies and strategies underlying rapid and sustained economic growth and poverty reduction.

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.

In order to multiply the effects of the internal and external dimensions of the center's strategy, YCSG has developed a global media instrument, *YaleGlobal Online* magazine (www.yaleglobal.yale.edu). *YaleGlobal* explores the growing interconnectedness of the world and aims to analyze and promote debate on all aspects of globalization. A Chinese-language edition, *YaleGlobal Fudan Edition*, was launched in September of 2009 with partner institution Fudan University. The magazine posts three original articles per week, republishes and archives articles from around the globe, and offers interviews with eminent visitors as well as video recordings of the center's events at Yale. With a vastly increased readership in over 160 countries, *YaleGlobal* now receives 1.5 to 2 million hits per week.

Policies and Regulations

ADMISSIONS

www.yale.edu/graduateschool/admissions

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 or 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 will have received a baccalaureate degree, or its international equivalent, prior to matriculation at Yale, from a college or university in which English is the primary language of instruction. The examination, 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.

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.

Application procedures and forms for the DSR are available online at www.yale.edu/ graduateschool/admissions/nondegreeprograms.html. In addition, applicants to the DSR must provide evidence of health care for the duration of their studies at Yale at the time of application.

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 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.

More advanced graduate students who are degree candidates at other universities and who wish to do full-time dissertation-level research or a combination of research and course work at Yale may be admitted to the DSR as Visiting Affiliated Research Graduate Students. Such students are charged full tuition. A limited amount of tuition assistance based on need may be available. Please refer to Financing Graduate School below for a schedule of tuition and fee charges. Applicants for admission as Visiting Affiliated Research Graduate Students should complete the Applicant's Financial Statement and must submit any other documentation that would clearly establish their need for tuition assistance. Support beyond tuition in the form of fellowship stipends, teaching fellowships, or research assistantships is not available.

In certain circumstances, advanced graduate students who are degree candidates 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. 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 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

www.yale.edu/graduateschool/academics/exchanges.html

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 Edward Barnaby (edward.barnaby@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

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

Economic Growth Center

Research Institute for Economics and Business Administration, Kobe University, Japan

Economics

Università Bocconi, Milan, Italy; Universität Mannheim, Germany

Graduate School

Royal Holloway College, University of London, England; the Connecticut Department of Education and the State of Baden-Württemberg Exchange, Germany; Universität Konstanz, Germany

French Ecole Normale Supérieure, Paris, France

German

Freie Universität, Berlin, Germany; Goethe-Universität, Frankfurt, Germany

History

University of Sussex, Brighton, England

History of Science and Medicine

Ecole des Hautes Etudes en Sciences Sociales, Paris, France; Ecole 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'Etudes Politiques de Paris ["Sciences Po"]; 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

Sociology 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 www.yale. edu/summer.

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.

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) 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 ninemonth 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. In exceptional circumstances, the director of graduate studies may petition the degree committee, through the appropriate dean, that a student who has not met the Honors requirement be permitted to continue study. Such a petition should be made before the end of the fourth term of study in time to be considered by the degree committee at its meeting that 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. 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:

- 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?
- 2. 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.
- 3. 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.
- 4. If the subject matter permits, a tentative proposal for the internal organization of the dissertation for example, major sections, subsections, sequence of chapters.
- 5. 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 the director of the TFP (Judith Dozier Hackman) or their associate dean. A student must be registered in the Graduate School 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. Even there, the grading may not count toward final grades, and the students may not grade exams. 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 ELI 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 director of graduate studies may require that students with an undergraduate degree from English-speaking institutions also pass the SPEAK test 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 request to 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.

A student who wishes to defer a teaching year must make arrangements to do so no later than the beginning of the fourth year. At the time the deferral is requested, the student and director of graduate studies should agree on the teaching the student will do in the fifth or sixth year. The assignment should be at the level normally expected in a regular teaching year, that is, a TF 3.5 or 4, depending on the department.

The deferral must be approved by the DGS and the associate dean. If the deferral is approved, the conditions associated with the formal teaching years will apply to the specified terms of study, including that the student will receive priority in terms of assignment; the assignment will not be changed unless the student, DGS, and instructor agree upon it; and the student will receive the standard departmental stipend. Under no circumstances may a student defer a teaching year beyond the sixth year, and all students must still complete the Dissertation Fellowship by the end of the sixth year.

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. Principal advisers of doctoral candidates must have appointments on the Graduate School faculty.

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 (available at www.yale.edu/graduateschool/academics/ forms/dissertationChecklist.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.

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./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 that must be met for award of the M.A. or M.S. en route are (1) completion of the first year of the program leading to the Ph.D., with grades that satisfy 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./M.S. DEGREES

The M.A./M.S. degrees are offered as terminal degrees in twenty-three departments and programs: African Studies, American Studies, Applied Mathematics, Applied Physics, Archaeological Studies, Biostatistics (Epidemiology and Public Health), Computational Biology and Bioinformatics, Computer Science, East Asian Studies, Engineering and Applied Science, English, European and Russian Studies, History, History of Science and Medicine, International and Development Economics (IDE), International Relations, Mathematics, Medieval Studies, Music, Near Eastern Languages and Civilizations, Slavic Languages and Literatures, Statistics, and Urban Education Studies.

The residence and tuition requirements for a terminal 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 twoyear 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 twoyear 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./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 a single 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./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, International Relations, 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. No more than two Law School courses may be counted toward the M.A.

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 jointdegree 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 firstyear 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

The Graduate School is committed to training its students in the importance of professional ethics. All graduate students are required to complete an online training module in professional ethics before they can register for the spring term of their first year. Additionally, students in the sciences are required to complete a training course in the responsible conduct of research by the end of their first year of study. These training opportunities are not necessarily independent of compliance work required by participation in certain externally administered grants. They are meant to establish a basis of understanding among graduate students at Yale concerning their participation in scholarship and research.

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). 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. Students in terminal M.A./M.S. programs may petition for their degrees in the term in which they expect to complete them.

Commencement

www.yale.edu/graduateschool/academics/commencement.html 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./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.

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 Required Immunizations, under Health Services).

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./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. Ph.D. students who have been admitted to candidacy must continue to demonstrate satisfactory progress toward the degree in the annual dissertation progress report. 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 dissertation progress report, 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 or May) 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 who have not yet submitted the dissertation by the end of the sixth year of study may do so subsequently without registering at the discretion of the department or may request a period of extended registration by submitting the petition for extended registration, which includes the standard Dissertation Progress Report 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. In addition to this requirement, students seeking an eighth year of registration must demonstrate 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 at least 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 (www.yale.edu/graduateschool/academics/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, 113 HGS, through the student's department, or online at www.yale. edu/graduateschool/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 stops attending a course in which he or she is enrolled for credit but does not file a course change form with the registrar, a permanent "Incomplete" will be recorded on the student's record for that course. Similarly, if a student attends a course, for credit or audit, that was not listed on the student's approved course enrollment form for that term, the course will not be entered in the student's record and credit for the course will not be given.

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 www.yale.edu/graduateschool/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.

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./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 www.yale.edu/graduateschool/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.

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.

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./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./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./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.
- 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 www.yale.edu/graduateschool/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 and the student's department, on the written recommendation of a physician on the staff of Yale Health. 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 place a student on a medical leave of absence when, on the recommendation of the director of Yale Health or the chief of the

Department of Mental Health and Counseling, the dean of the Graduate School determines that the student is a danger to self or others because of a serious medical problem.

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. Forms for requesting a medical leave of absence are available at the Graduate School Student Information Office and online at www.yale.edu/graduateschool/forms.

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 will have departmental academic expectations modified to 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.

Graduate students in terminal 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 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 www.yale.edu/graduateschool/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 fail to meet departmental or Graduate School requirements by the designated deadlines will be administratively withdrawn, unless an extension or exception has been granted by the appropriate dean or degree committee. 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.

A student who has withdrawn from the Graduate School in good standing and who wishes to resume study at a later date must 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 six weeks prior to the term 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. Ph.D. students who withdraw after completion of the full tuition requirement and who are subsequently readmitted will be charged the accumulated CRF up to a maximum of four terms. 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:

- 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 verbal 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.

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. Misuse of the materials or facilities of the University library.
- 4. Unauthorized use of University services, equipment, or facilities, such as telephones and photocopying equipment.
- 5. 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.)
- 6. 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.
- 7. 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").
- 8. 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.)
- 9. 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.
- 10. 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.
- 11. Misrepresentation or lying during a formal inquiry by University officials.
- 12. Misrepresentation in applying for admission or financial aid.
- 13. Theft, misuse of funds, or willful damage of University property.
- 14. Trespassing on University property to which access is prohibited.
- 15. Possession or use of explosives, incendiary devices, or weapons on or about the campus.

- 16. Interference with the proper operation of safety or security devices, including fire alarms, electronic gates, and sprinkler systems.
- 17. 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. Students found guilty of such violations will be subject to one or more of the following penalties:

Reprimand Probation Suspension Dismissal Fines 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 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. 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 (www.yale.edu/graduateschool/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: www.yale.edu/graduateschool/policies. The deans may be consulted for further information and advice.

COMPLAINTS OF SEXUAL HARASSMENT

A standing committee reviews complaints of sexual harassment brought by graduate students against administrators, faculty of the Graduate School of Arts and Sciences, other instructors of graduate students, postdoctoral appointees, or other graduate students.

THE GRADUATE SCHOOL PROCEDURE FOR STUDENT COMPLAINTS

This procedure governs any case in which a student has a complaint, including but not limited to a complaint of discrimination on the basis of race, sex, color, religion, national or ethnic origin, sexual preference, or handicap, 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.

provost's procedure

The Provost's Procedure governs cases in which a student has a complaint, including but not limited to a complaint of sexual harassment or of discrimination on the basis of race, sex, color, religion, national or ethnic origin, sexual preference, or handicap, 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.

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, 2010-2011

Tuition*

Full-time study, per term	\$16,750
Full-time study in IDE, per term	17,250
Full-time study in Urban Education, per term	16,850
Half-time study, per term	8,375
Master's programs, less than half time per term	
One-quarter time study, per term	4,188
Division of Special Registration (DSR, nondegree study)	
Course work, per course, per term (including audited courses)	4,188
Visiting Affiliated Research Graduate Students, per term	16,750
Visiting Assistants in Research, per term	2,104
Visiting Assistants in Research appointed for the summer only	1,052
Frant	

Fees†

Continuous Registration Fee (CRF), per term‡	\$360
Special in absentia registration, per term‡	360
Yale Health Hospitalization/Specialty Coverage, twelve months§	1,416
Yale Health Prescription Plus Coverage, twelve months	420

*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.

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, 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. Full-time faculty members and their spouses, emeritus faculty and their spouses, and University employees may audit courses without charge.

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.

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.

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 Standard 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. It is imperative that all students monitor their Yale e-mail accounts on an ongoing basis.

Bills for tuition, room, and board are available to the student 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.

Charge for Rejected 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 University eBill-ePay

There are a variety of options offered for making payments. Yale University eBill-ePay is the preferred means for payment of bills. It can be found at www.yale.edu/sis/ebep. Electronic payments are easy and convenient – no checks to write, no stamps, no envelopes, no hassle. Payments are immediately posted to the student's account. There is no charge to use this service. Bank information is password-protected and secure, and there

is a printable confirmation receipt. Payments can be made twenty-four hours a day, seven days a week, up to 4 p.m. Eastern Standard Time on the due date to avoid late fees. (The eBill-ePay system will not be available when the system is undergoing upgrade, maintenance, or repair.) Students can authorize up to three authorized payers to make payments electronically from their own computers to the student's account using Yale's system.

Use of the student's own bank payment service is not authorized by the University because it has no direct link to the student's Yale account. Payments made through such services arrive without proper account identification and always require manual processing that results in delayed crediting of the student's account, late fees, and anxiety. Students should use Yale eBill-ePay to pay online. For those who choose to pay by check, remittance advice with mailing instructions is available on the Web site.

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 18. For additional information, please contact Student Financial Services at 203.432.2700 and select "Press 3" from the Main Menu. The enrollment form can be found online in the Yale Payment Plan section of the Student Accounts Web site: www.yale.edu/sfas/financial/accounts.html#payment.

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 12-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, 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. Yale Health Prescription Plus Coverage is an option that eligible students may choose to purchase for themselves and their dependents. The Prescription Plus plan is not covered by the Health Award. (For further information regarding health care options through Yale Health, see Health Services, below.)

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 as part of its five-year financial aid package to eligible advanced graduate students in the humanities and social sciences once they have advanced to doctoral candidacy. These awards are made when a student's adviser and director of graduate studies certify that the student will be engaged full-time in research and writing, is making satisfactory progress toward the degree, and has a reasonable schedule for the timely completion of the dissertation. The University Dissertation Fellowship 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. With the permission of the Graduate School, it may be interrupted in certain circumstances when recommended by the department. 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. Prize dissertation fellowships awarded by the Graduate School, such as the Whiting and Leylan fellowships, replace the University Dissertation Fellowship. 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. Application materials and additional information can be obtained online at www.yale.edu/ graduateschool/funding or from the appropriate associate dean.
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 an associate dean and the director of graduate studies contingent on the student's satisfactory academic progress and on sufficient course enrollment.

When students are teaching as specified in their letters of admission, appointments for these students will change only if a course is canceled; if enrollment in any of their sections falls below six students; or if the student, course instructor, and director of graduate studies all agree upon a reassignment. The Graduate School provides a supplementary fellowship in cases where the teaching fellowship is less than the standard departmental stipend. If an 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.

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 (usually in years three and four in the humanities and social sciences). Students in their fifth or sixth year of study may teach if enrollments permit and as long as they have been admitted to candidacy and do not currently 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 should be given preference.

LIMITS ON TEACHING

Except when specified in their letters of admission, first-year and second-year doctoral students may be appointed as teaching fellows only in exceptional cases, and only after prior approval by their director of graduate studies, the appropriate associate dean, and the director of the Teaching Fellow Program (TFP). In any year of study, the maximum amount of teaching a student may do is four TF units or one PTAI per term. Students may not serve as faculty lecturers while registered in the Graduate School.

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 appointment letter has been reviewed and transmitted by the TFP and the student has responded affirmatively. This acceptance is required before teaching fellow appointments are processed.

TEACHING FELLOW LEVELS

There are five primary levels of TFs at Yale. They are distinguished from one another by several considerations, including the kind or kinds of activity required, the approximate hours per week, and the number of students taught. For example, courses in which TFs are expected to provide frequent and intensive writing criticism, to grade problem sets or vocabulary tests frequently, or to prepare especially complicated visual or laboratory materials may be accorded a higher-level teaching fellowship than courses that do not carry such an expectation. A graduate student's teaching assignment is measured in terms of teaching fellow units (one unit for a term as TF 1, two units for a term as TF 2, and so on).

Teaching Fellow 1 The responsibilities of a TF 1 are primarily (a) grading, (b) a combination of the following: attending class, reading, advising undergraduates, offering an occasional discussion section, helping to set up a lab, or assisting in the administrative details of the course, (c) in nonlanguage courses providing Language-across-the-Curriculum one-on-one language tutoring, or (d) in language courses providing one-on-one tutoring sessions. A TF 1 does not engage in regular classroom teaching. Approximate weekly effort, 5 hours. The 2010–2011 teaching fellowship is \$2,438 per term.

Teaching Fellow 2 A TF 2 typically leads and grades one discussion or laboratory section of up to 20 students in courses in the natural sciences and some social sciences, tutors in language courses, or combines responsibilities (a) and (b) as described under TF1. A TF2 also may lead a Language-across-the-Curriculum session for courses with fewer than 30 students and no other sections. Approximate weekly effort, 10 hours. The 2010–2011 teaching fellowship is \$4,876 per term.

Teaching Fellow 3 Depending on department policy, the duties of a TF 3 may include leading and grading one or two lab or discussion sections, as in Chemistry. Alternatively, a TF 3 may be appropriate for a combination of duties that might include attending lectures, office hours and consultations, and grading, as in Psychology. Approximate weekly effort, 15 hours. The 2010–2011 teaching fellowship is \$7,314 per term.

Teaching Fellow 3.5 This appointment is appropriate for TFs who lead and grade one section in English, History of Art, or the Literature major; in any literature course in the national language departments that may conform to the same mode of teaching; in courses double-titled with these departments and programs; and in a few designated courses. Discussion section leaders are appointed for lecture courses with 30 or more students; a section size is expected not to exceed 18 students, with 20 the absolute maximum. This appointment is also used for Writing Requirement TFs and Language-across-the-Curriculum section leaders. Approximate weekly effort, 17.5 hours. The 2010–2011 teaching fellowship is \$8,533 per term.

Teaching Fellow 4 This appointment is appropriate for TFs in humanities and social science departments in which teaching fellows usually lead and grade two sections. Discussion section leaders are appointed for lecture courses with 30 or more students; a section size is expected not to exceed 18 students, with 20 the absolute maximum. Approximate weekly effort, 20 hours. The 2010–2011 teaching fellowship is \$9,752 per term.

PART-TIME ACTING INSTRUCTORS

Graduate students appointed as part-time acting instructors (PTAIs) conduct sections of introductory courses or advanced seminars, normally seminars in their special fields. Even in the case of seminars, PTAIs are supervised by faculty. In the case of multisection introductory courses, this may include the use of a common syllabus and examinations. No student should teach more than one PTAI course per term. PTAIs who teach advanced seminars must have satisfied all predissertation requirements (including the dissertation prospectus) and must be registered full-time to be eligible for the appointment. Hours of effort for PTAIs will vary from one individual to another. The 2010–2011 teaching fellowship is \$9,852 per term.

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 fulltime 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 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

Study toward the Ph.D. degree is expected to be a full-time activity and is funded accordingly. Part-time employment for compensation, at the University or elsewhere, should not conflict with the obligations of the Ph.D. 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, who will inform 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 Financial Aid Office, 129 HGS.

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 parttime 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).

International and U.S. students are eligible to borrow from the GATE Y-Loan, which does not require a co-signer. This program will allow students to borrow the full cost of

their education less any other financial aid they receive. Features of the GATE Y-Loan include a low variable interest rate, no fees, a six-month grace period, a standard twentyyear level repayment stream, and no prepayment penalty. Information is available from the Office of Financial Aid, 129 HGS.

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. Verification of satisfactory progress is based on annual student evaluations from the directors of graduate studies and, for students in the dissertation stage, on a statement of progress from the student, the dissertation adviser, and the director of graduate studies.

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, 129 HGS.

University Services and Facilities

LIVING ACCOMMODATIONS

Graduate Housing – On Campus

www.yale.edu/gradhousing

The Graduate Housing Department has dormitory and apartment units for a small number of graduate and professional students. The Graduate Dormitory Office provides dormitory rooms of varying sizes and prices for single occupancy only. The Graduate Apartments Office provides unfurnished apartments consisting of efficiencies and one-, two-, and three-bedroom apartments for singles and families. Both offices are located in Helen Hadley Hall, a graduate dormitory at 420 Temple Street, and have office hours from 9 a.m. to 4 p.m., Monday through Friday.

Applications for 2010–2011 are available as of April 1 online and can be submitted directly from the Web site (www.yale.edu/gradhousing/incoming/application.html). For new students at the University, a copy of the letter of acceptance from Yale will need to be submitted to the address on the application form. The Web site is the venue for graduate housing information and includes procedures, facility descriptions, floor plans, and rates. For more dormitory information, contact grad.dorms@yale.edu, tel. 203.432.2167, fax 203.432.4578. For more apartment information, contact grad.apts@yale. edu, tel. 203.432.8270, fax 203.432.4578.

Off-Campus Listing Service

www.yale.edu/offcampushousing

The Yale Off-Campus Housing Service is available to the Yale community. A new system has been designed to allow incoming affiliates to the University access to the online database by visiting the Web site at www.yale.edu/offcampushousing. The use of your University NetID allows you immediate access to search the listings. Those who do not have their NetID can set themselves up as a guest by following the simple instructions. For answers to questions, please e-mail ofc@yale.edu or call 203.432.9756.

University Properties

www.yale.edu/up

University Properties owns and operates Yale University's nonacademic, off-campus properties in New Haven. The office is committed to enhancing the quality of life at Yale and in downtown New Haven through the development of unique 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 and provides high-quality commercial space to businesses. Properties are managed by contracted management companies chosen for their professionalism and ability to work effectively with the Yale community. Several apartment properties are leased exclusively to graduate students. Applications are accepted via the Web site listed above. As these properties are in high demand, early application is encouraged.

Dining

www.yale.edu/dining

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 *Any 10 Meal Plan* offers meal service at the Hall of Graduate Studies dining hall and University Commons. It provides ten meals per week, plus six bonus meals per year and \$75 per term in points to be used for additional meals during the week or at our retail locations on campus. Nonresident students may purchase a *5 Meal Plan* with three bonus meals, good Monday through Friday.

YD locations are a popular option for all members of the Yale community. In addition to Commons and the Hall of Graduate Studies, the following retail locations are available: Divinity School Café on Prospect Street, the Café at Kline Biology Tower, Donaldson Commons at the School of Management, Marigolds at the School of Medicine, the Thain Family Café at Bass Library, Triple E's at 221 Whitney Avenue, Triple E's at Payne Whitney Gymnasium, Durfee's Convenience Store at 200 Elm Street, and uncommon at Commons. For students and staff choosing to dine in any of Yale's residential college dining rooms, "all-you-care-to-eat" meals are offered at one affordable price for breakfast (\$5), lunch (\$10.25), and/or dinner (\$13.25) and require the diner to be accompanied by a host from that college.

Inquiries concerning food services should be addressed to Yale Dining, 246 Church Street, PO Box 208261, New Haven CT 06520-8261; tel. 203.432.0420.

HEALTH SERVICES

www.yale.edu/yhp

The new Yale Health Center opens on campus at 55 Lock Street in late summer 2010 (until then, services will be provided at the 17 Hillhouse Avenue location). 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 facility (ICF), 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 www.yale.edu/yhp.

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 Medicine, Internal Medicine, 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 premium. 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 form by the University's deadlines noted below.

YALE HEALTH HOSPITALIZATION/SPECIALTY COVERAGE

For a detailed explanation of this plan, see the *Yale Health Student Handbook*, which is available online at www.yale.edu/yhp/handbooks/documents/student_handbook.

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 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 premiums 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 nineteen 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. Yale Health Prescription Plus Coverage may be added at an additional cost. 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 (www. yale.edu/yhp) 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. Prescription Plus Coverage may also be added for an additional cost. Applications are available from the Member Services Department or can be downloaded from the Web site (www.yale.edu/yhp) and must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

YALE HEALTH PRESCRIPTION PLUS COVERAGE

This plan has been designed for Yale students who purchase Yale Health Hospitalization/ Specialty Coverage and student dependents who are enrolled in either the Two-Person Plan, the Student Family Plan, or Student Affiliate Coverage. Yale Health Prescription Plus Coverage provides protection for some types of medical expenses not covered under Yale Health Hospitalization/Specialty Coverage. Students are billed for this plan and may waive this coverage. The online waiver (www.yhpstudentwaiver.yale.edu) 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. For a detailed explanation, please refer to the *Yale Health Student Handbook*.

Eligibility Changes

Withdrawal A student who withdraws from the University during the first ten days of the term will be refunded the premium paid for Yale Health Hospitalization/Specialty Coverage and/or Yale Health Prescription Plus 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. 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 or to the last day of the term, whichever comes first. Premiums will not be prorated or refunded. Students who withdraw are not eligible to enroll in Yale Health Student Affiliate Coverage.

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, Yae 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. Premiums 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 (www.yale.edu/yhp). Premiums 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 and Yale Health Prescription Plus 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 (www.yale.edu/yhp). 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) and German measles (rubella) All students who were born after December 31, 1956, are required to provide proof of immunization against measles (rubeola) and German measles (rubella). Connecticut state law requires two doses of measles vaccine. The first dose must have been given after January 1, 1969, *and* after the student's first birthday. The second dose must have been given after January 1, 1980. These doses must be at least 30 days apart. Connecticut state law requires proof of one dose of rubella vaccine administered after January 1, 1969, *and* after the student's first birthday. 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 and rubella.

Meningococcus (meningitis) All students living in on-campus housing must be vaccinated against meningococcal disease. The law went into effect in September 2002, meaning that all returning students who plan to live in University housing must be immunized or show proof of immunization within the last five years. Students who are not compliant with this law will not be permitted to register for classes or move into the dormitories for the fall term, 2010. Please note that the State of Connecticut does not require this vaccine for students who intend to reside off campus.

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

www.yale.edu/its

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.

Academic Computing Services (ACS) and Student Technology Collaborative (STC), units of ITS, partner to furnish and support general purpose computing clusters at many locations on campus (www.yale.edu/cluster), including the Graduate School's McDougal Center and the graduate student residences (Helen Hadley Hall and HGS), where the computing facility is accessible to residents twenty-four hours a day (www.yale.edu/its/stc). Windows and Apple computers and laser printers are available for open use by the Yale community at Connecticut Hall, Bass Library, Dunham Laboratories, Kline Biology Tower, the Social Sciences Statistical Laboratory, and the Sterling Chemistry Laboratory.

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. See the student computing site (www.yale.edu/its/stc/purchase) for more information and recommendations for purchasing computer supplies. Up-to-date information on pricing and ordering can be found at the ePortal Web site (www. yale.edu/eportal).

Graduate students in Arts and Sciences receive free technical support on their personal computers through the Student Technology Collaborative (www.yale.edu/its/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

www.yale.edu/its/about/infrastructure/networkservices.html

ITS Network Services manages Yale's voice and data network services (www.yale.edu/ its/telecom). 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. All direct-dialed long-distance calls require a toll authorization number (TAN), which can be arranged through the telecommunications office, as well as through departmental offices. Prepaid phone cards and personal calling cards may also be used. Bulldog calling cards are available to address off-campus needs.

All on-campus residences, offices, and laboratories are equipped with wired Yale network outlets. Wireless network access is available in most of the buildings on campus (www.yale.edu/its/network/wireless). 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 can access network resources through wired or wireless connections.

Students need to register their computers to access services on the Yale network (www.yale.edu/netreg). To enhance support for graduate student research activities, the University provides network roaming access for laptop computers.

OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS

www.oiss.yale.edu

The Office of International Students and Scholars (OISS) coordinates services and support for Yale's international students, faculty, staff, and their dependents. OISS assists members of the Yale international community with all matters of special concern to them and serves as a source of referral to other University offices and departments. OISS staff provide assistance with employment, immigration, personal and cultural adjustment, and family and financial matters, as well as serve as a source of general information about living at Yale and in New Haven. In addition, as Yale University's representative for immigration concerns, OISS provides information and assistance to students, staff, and faculty on how to obtain and maintain legal status in the United States, issues the visa documents needed to request entry into the U.S. under Yale's immigration sponsorship, and processes requests for extensions of authorized periods of stay, school transfers, and employment authorization. All international students and scholars must register with OISS as soon as they arrive at Yale, at which time OISS will provide information about orientation activities for newly arrived students, scholars, and family members. OISS programs, like the international coffee hours, Community Friends hosting program, daily English conversation groups and conversation partners program, U.S. culture workshops, and receptions for newly arrived graduate students, postdoctoral associates, and visiting scholars, provide an opportunity to meet members of Yale's international

community and become acquainted with the many resources of Yale University and New Haven. OISS welcomes volunteers from the Yale community to serve as local hosts for international students and as English conversation partners. Interested individuals should contact OISS at 203.432.2305.

OISS maintains an extensive Web site (www.yale.edu/oiss) with useful information for students and scholars prior to and upon arrival in New Haven. As U.S. immigration regulations are complex and change rather frequently, we urge international students and scholars to visit the office and check the Web site for the most recent updates.

International students, scholars, and their families and partners can connect with OISS and the international community at Yale by subscribing to the following e-mail lists. OISS-L is the OISS electronic newsletter for Yale's international community. *YaleInternational E-Group* is an interactive list through which over 3,000 international students and scholars connect to find roommates, rent apartments, sell cars and house-hold goods, find companions, and keep each other informed about events in the area. Spouses and partners of international students and scholars will want to get involved with the organization called International Spouses and Partners at Yale (ISPY), which organizes a variety of programs for the spouse and partner community. To subscribe to any list, send a message to oiss@yale.edu.

Housed in the International Center for Yale Students and Scholars at 421 Temple Street, the Office of International Students and Scholars is open Monday through Friday from 8:30 a.m. to 5 p.m., except Tuesday, when the office is open from 10 a.m. to 5 p.m.; tel. 203.432.2305.

INTERNATIONAL CENTER FOR YALE STUDENTS AND SCHOLARS

The International Center for Yale Students and Scholars, located at 421 Temple Street, across the street from Helen Hadley Hall, offers a central location for programs that both support the international community and promote cross-cultural understanding on campus. The center, home to the Office of International Students and Scholars (OISS), provides 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 also provides office and meeting space for student groups, and a space for events organized by both student groups and University departments. In addition, the center has nine library carrels that can be reserved by academic departments for short-term international visitors. For more information, call 203.432.2305 or visit the center at 421 Temple Street.

INTERNATIONAL STUDENT LIFE

In addition to the standard funding package for Ph.D. candidates, the Graduate School provides a number of resources specifically to international students. Among the most important of these is improved language training, both oral and written. The Center for Language Study (www.cls.yale.edu) currently offers a six-week intensive summer language program in English as a Second Language (ESL). The center has also expanded

the total number of ESL courses available throughout the academic year, including a conversation partners program and an advanced writing program, as well as the number of language fellowships available to graduate students interested in this program.

The McDougal Graduate Student Center (www.yale.edu/graduateschool/mcdougal) provides services, programs, and facilities for all graduate students and facilitates student services that are particularly helpful for international students adjusting to life in New Haven. The center provides an extensive weeklong orientation program for all new students, including several events for new international students in cooperation with the Office of International Students and Scholars. The center's staff and McDougal graduate fellows also provide special programs of interest to international students throughout the year, including cultural and social events; family programs and events; arts and music outings; workshops on cultural adjustment, safety, and health; and professional development seminars on careers, teaching, and writing. The McDougal Graduate Student Life Office cosponsors and supports the activities of many graduate student nationality groups and intercultural performance groups.

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 accommodations at Yale University contact the Resource Office by June 4. 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 (judith.york@yale. edu) or through its Web site (www.yale.edu/rod).

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 write to the Office of Undergraduate Admissions, Yale University, PO Box 208234, New Haven CT 06520-8234; tel., 203.432.9300; e-mail, student.questions@yale.edu; Web site, www.yale.edu/admit

Graduate School of Arts and Sciences Est. 1847. Courses for college graduates. Master of Arts (M.A.), Master of Engineering (M.Eng.), Master of Science (M.S.), Master of Philosophy (M.Phil.), Doctor of Philosophy (Ph.D.).

For additional information, please visit www.yale.edu/graduateschool, write to graduate.admissions@yale.edu, or call the Office of Graduate Admissions at 203.432.2771. Postal correspondence should be directed to the Office of Graduate Admissions, Yale Graduate School of Arts and Sciences, PO Box 208323, New Haven CT 06520-8323.

School of Medicine Est. 1813. Courses for college graduates and students who have completed requisite training in approved institutions. Doctor of Medicine (M.D.). Postgraduate study in the basic sciences and clinical subjects. Combined program with the Graduate School of Arts and Sciences leading to Doctor of Medicine and Doctor of Philosophy (M.D./Ph.D.). Combined program with the Graduate School of Arts and Sciences leading to Doctor of Health Science (M.D./M.H.S.). Master of Medical Science (M.M.Sc.) from the Physician Associate Program.

For additional information, please write to the Director of Admissions, Office of Admissions, Yale School of Medicine, 367 Cedar Street, New Haven CT 06510; tel., 203.785.2643; fax, 203.785.3234; e-mail, medical.admissions@yale.edu; Web site, http://info.med.yale.edu/education/admissions

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 write to the Admissions Office, Yale Divinity School, 409 Prospect Street, New Haven CT 06511; tel., 203.432.5360; fax, 203.432.7475; e-mail, divinity.admissions@yale.edu; Web site, www.yale.edu/divinity. Online application, https://apply.divinity.yale.edu/apply

Law School Est. 1824. Courses for college graduates. Juris Doctor (J.D.). For additional information, please write to the Admissions Office, Yale Law School, PO Box 208215, New Haven CT 06520-8215; tel., 203.432.4995; e-mail, admissions.law@yale.edu; Web site, www.law.yale.edu

Graduate Programs: Master of Laws (LL.M.), Doctor of the Science of Law (J.S.D.), Master of Studies in Law (M.S.L.). For additional information, please write to Graduate Programs, Yale Law School, PO Box 208215, New Haven CT 06520-8215; tel., 203.432.1696; e-mail, gradpro.law@yale.edu; Web site, www.law.yale.edu School of Engineering & Applied Science Est. 1852. Courses for college graduates. Master of Science (M.S.), Master of Engineering (M.Eng.), and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please write to the Office of Graduate Admissions, Yale School of Engineering & Applied Science, PO Box 208267, New Haven CT 06520-8267; tel., 203.432.4250; e-mail, grad.engineering@yale.edu; Web site, http://seas.yale.edu

School of Art Est. 1869. Professional courses for college and art school graduates. Master of Fine Arts (M.F.A.).

For additional information, please write to the Office of Academic Affairs, Yale School of Art, PO Box 208339, New Haven CT 06520-8339; tel., 203.432.2600; e-mail, artschool. info@yale.edu; Web site, http://art.yale.edu

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 write to the Yale School of Music, PO Box 208246, New Haven CT 06520-8246; tel., 203.432.4155; fax, 203.432.7448; e-mail, gradmusic. admissions@yale.edu; Web site, www.music.yale.edu

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 write to the Office of Admissions, Yale School of Forestry & Environmental Studies, 195 Prospect Street, New Haven CT 06511; tel., 800.825.0330; e-mail, fesinfo@yale.edu; Web site, www.environment.yale.edu

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 write to the Director of Admissions, Yale School of Public Health, PO Box 208034, New Haven CT 06520-8034; tel., 203.785.2844; e-mail, ysph.admissions@yale.edu; Web site, http://publichealth.yale.edu

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 write to the Yale School of Architecture, PO Box 208242, New Haven CT 06520-8242; tel., 203.432.2296; e-mail, gradarch.admissions@yale.edu; Web site, www.architecture.yale.edu

School of Nursing Est. 1923. Courses for college graduates. Master of Science in Nursing (M.S.N.), Post Master's Certificate. Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please write to the Yale School of Nursing, PO Box 9740, New Haven CT 06536-0740; tel., 203.785.2389; Web site, http://nursing.yale.edu **School of Drama** Est. 1955. 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 write to the Admissions Office, Yale School of Drama, PO Box 208325, New Haven CT 06520-8325; tel., 203.432.1507; e-mail, ysd.admissions@yale.edu; Web site, www.drama.yale.edu

School of Management Est. 1976. Courses for college graduates. Master of Business Administration (M.B.A.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences.

For additional information, please write to the Admissions Office, Yale School of Management, PO Box 208200, New Haven CT 06520-8200; tel., 203.432.5635; fax, 203.432.7004; e-mail, mba.admissions@yale.edu; Web site, http://mba.yale.edu

YALE UNIVERSITY CAMPUS NORTH



Continued on next page



© Yale University. Map not to scale

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 back-grounds. 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 special disabled veteran, veteran of the Vietnam era, or other covered 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, special disabled veterans, veterans of the Vietnam era, and other covered veterans.

Inquiries concerning these policies may be referred to the Office for Equal Opportunity Programs, 221 Whitney Avenue, 203.432.0849.

In accordance with both federal and state law, the University maintains information concerning current security policies and procedures and prepares an annual crime report concerning crimes committed within the geographical limits of the University. In addition, in accordance with federal law, the University maintains information concerning current fire safety practices and prepares an annual fire safety report concerning fires occurring in on-campus student housing facilities. Upon request to the Office of the Vice President for Human Resources and Administration, PO Box 208322, New Haven CT 06520-8322, 203.432.8049, the University will provide such information to any applicant for admission.

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.

Offices Serving Graduate Students
POLICE EMERGENCY Dial 911 from any University telephone.
HEALTH EMERGENCY 203.432.0123
GRADUATE HOUSING OFFICE 203.432.2167, 420 Temple St.,
www.yale.edu/gradhousing
graduate-professional student center 203.432.2638, 204 York St.,
www.yale.edu/gpss/GPSCY_Bar/gryphons.html
GRADUATE-PROFESSIONAL STUDENT SENATE 204 York St., www.yale.edu/gpss
GRADUATE STUDENT ASSEMBLY 203.432.8893, www.yale.edu/gsa
graduate student dossier service 203.432.8850, 320 York St. (HGS),
www.yale.edu/graduateschool/careers/dossier.html
OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS 203.432.2305, 421 Temple St.,
www.yale.edu/oiss
STUDENT EMPLOYMENT OFFICE 203.432.0167, 246 Church St.,
www.yalestudentjobs.org
UNIVERSITY POLICE 203.432.4400, Headquarters–Rose Center, 101 Ashmun St.
YALE HEALTH 203.432.0246, 55 Lock St., www.yale.edu/yhp

BULLETIN OF YALE UNIVERSITY New Haven CT 06520-8227 Periodicals postage paid New Haven, Connecticut