

# Graduate School of Arts and Sciences

*Programs and Policies*

2006 – 2007



BULLETIN OF YALE UNIVERSITY

*Series 102 Number 10 August 20, 2006*

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# The President and Fellows of Yale University

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## *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*.

Gerhard Casper, LL.M., PH.D., LL.D., *Atherton, California*.

Donna Lee Dubinsky, B.A., M.B.A., *Portola Valley, California*.

Charles Daniel Ellis, B.A., M.B.A., PH.D., *New Haven, Connecticut*.

Jeffrey Powell Koplan, B.A., M.D., M.P.H., *Atlanta, Georgia (June 2009)*.

Maya Ying Lin, B.A., M.ARCH., D.F.A., *New York, New York (June 2008)*.

Margaret Hilary Marshall, B.A., M.ED., J.D., *Cambridge, Massachusetts (June 2010)*.

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 Daniel Parker, Jr., B.A., LL.B., *Stamford, Connecticut*.

Theodore Ping Shen, B.A., M.B.A., *Brooklyn Heights, New York (June 2007)*.

Margaret Garrard Warner, B.A., *Washington, D.C. (June 2012)*.

Fareed Zakaria, B.A., PH.D., *New York, New York*.

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# The Officers of Yale University

---

*President*

Richard Charles Levin, B.A., B.LITT., PH.D.

*Provost*

Andrew David Hamilton, B.SC., PH.D., F.R.S.

*Vice President and Secretary*

Linda Koch Lorimer, B.A., J.D.

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Dorothy Kathryn Robinson, B.A., J.D.

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

*Vice President for Development*

Ingeborg Theresia Reichenbach, STAATSEXAMEN

*Vice President for Finance and Administration*

Shauna Ryan King, B.S., M.B.A.

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# The Administration of the Graduate School

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Jon Butler, PH.D., *Dean of the Graduate School*

Pamela Schirmeister, PH.D., *Associate Dean of the Graduate School*

Richard Sleight, PH.D., *Associate Dean of the Graduate School*

Edward Barnaby, PH.D., *Assistant Dean of the Graduate School*

Lisa Brandes, PH.D., *Assistant Dean for Student Affairs and Director, Student Life,  
McDougal Graduate Student Center*

Liza Cariaga-Lo, ED.D., *Assistant Dean of the Graduate School and Director,  
Office for Diversity and Equal Opportunity*

John Mangan, PH.D., *Assistant Dean for Administration*

Jennifer Brinley, B.S., *Associate Director; Finance and Financial Aid*

Jill Carlton, PH.D., *Registrar; Faculty of Arts and Sciences*

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

Kathryn Douglas, M.F.A., *Assistant Director; McDougal Graduate Student Center*

Howard el-Yasin, B.A., *Assistant Director; Teaching Fellow Program*

Lisa Furino, *Assistant Director of Admissions*

Stephen Goot, M.A., *Deputy Registrar; Faculty of Arts and Sciences*

Judith Dozier Hackman, PH.D., *Director; Teaching Fellow Program*

Alice Oliver, *Director; Finance and Administration*

William C. Rando, PH.D., *Director; Graduate Teaching Center, McDougal Center and Dean's  
Adviser on Teaching and Learning*

TBA, *Assistant Dean of the Graduate School*

TBA, *Associate Director; Science Education, Graduate Teaching Center*

TBA, *Director; Graduate Career Services, McDougal Center and Dean's Adviser on Career  
Education*

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# Schedule of Academic Dates and Deadlines

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## FALL TERM 2006

<b>Monday, August 28</b>	New student orientation week begins.
<b>Wednesday, August 30</b>	SPEAK test for new international students in Ph.D. programs.
<b>Thursday, August 31</b>	Matriculation ceremony.
<b>Friday, September 1</b>	Fall-term Online Course Selection (OCS) begins. Orientation in departments for all new students begins.
<b>Monday, September 4</b>	Labor Day. Administrative offices closed.
<b>Tuesday, September 5</b>	Orientation for all new teaching fellows. Registration for returning students begins.
<b>Wednesday, September 6</b>	Fall-term classes begin, 8.30 A.M.
<b>Friday, September 8</b>	Final day to pick up registration materials from academic departments.
<b>Friday, September 15</b>	Final day to apply for a fall-term <i>personal leave of absence</i> .  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 <i>leave of absence</i> effective on or before this date.
<b>Wednesday, September 20</b>	Fall-term online course selection (OCS) ends. Final day for registration. <i>A fee of \$25 is assessed for course schedules submitted after this date.</i>
<b>Friday, September 29</b>	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 <i>medical leave of absence</i> effective on or before this date <i>The CRF is not prorated.</i>
<b>Monday, October 2</b>	Final date for the faculty to submit grades to replace Temporary Incompletes (TIs) awarded during the 2005–2006 academic year.

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	Due date for dissertations to be considered by the degree committees for award of the Ph.D. in December.
	Final day to file petitions for degrees to be awarded in December.
<b>Friday, October 27</b>	Midterm.  Final day to add a fall-term course.  One-quarter of the fall-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>medical leave of absence</i> effective on or before this date. <i>The CRF is not prorated.</i>  Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date.
<b>Friday, November 3</b>	Readers' reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in December.  Final day to change enrollment in a fall-term course from Credit to Audit or from Audit to Credit.  Final day to withdraw from a fall-term course.
<b>Friday, November 10</b>	Departmental recommendations are due for candidates for December degrees.  Final day to withdraw a degree petition for degrees to be awarded in December.
<b>Thursday, November 16</b>	SPEAK test for international students in Ph.D. programs.
<b>Friday, November 17</b>	Fall recess begins, 5.20 P.M.
<b>Monday, November 27</b>	Classes resume, 8.30 A.M.
<b>Friday, December 8</b>	Classes end, 5.20 P.M.  Final grades for fall-term courses are due for candidates for terminal M.A. and M.S. degrees to be awarded in December.
<b>Friday, December 22</b>	Fall term ends; winter recess begins.

**SPRING TERM 2007**

<b>Wednesday, January 10</b>	Final grades for fall-term courses due.
<b>Monday, January 15</b>	Martin Luther King, Jr. Day. Administrative offices closed. Classes do not meet.
<b>Tuesday, January 16</b>	Registration and spring ID validation begin.  Spring-term classes begin, 8.30 A.M.
<b>Thursday, January 25</b>	Final day to apply for a spring-term <i>personal leave of absence</i> .  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 <i>leave of absence</i> effective on or before this date.
<b>Friday, January 26</b>	Registration and spring ID validation end. Spring-term online course selection (OCS) ends. Final day for registration. <i>A fee of \$25 is assessed for forms submitted after this date.</i>
<b>Friday, February 9</b>	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 <i>medical leave of absence</i> effective on or before this date. <i>The CRF is not prorated.</i>
<b>Friday, March 9</b>	Midterm.  Spring recess begins, 5.20 P.M.  Final day to add a spring-term course.  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 <i>medical leave of absence</i> effective on or before this date. <i>The CRF is not prorated.</i>  Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date.

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<b>Friday , March 16</b>	Due date for dissertations to be considered by the Degree Committees for award of the Ph.D. in May.  Final day to file petitions for degrees to be awarded in May.
<b>Monday, March 26</b>	Classes resume, 8.30 A.M.
<b>Monday, April 2</b>	Final day to change enrollment in a spring-term course from Credit to Audit <i>or</i> from Audit to Credit.  Final day to withdraw from a spring-term course.
<b>Friday, April 6</b>	Good Friday. Classes meet. Administrative offices closed.
<b>Monday, April 16</b>	Readers' reports are due for dissertations to be considered by the degree committees for award of the Ph.D. in May.
<b>Friday, April 20</b>	SPEAK test for international students in Ph.D. programs.
<b>Wednesday, April 25</b>	Departmental recommendations are due for candidates for May degrees.
<b>Friday, April 27</b>	Final day to withdraw a degree petition for degrees to be awarded in May.
<b>Monday, April 30</b>	Classes end, 5.20 P.M.  Final day to submit Dissertation Progress Reports and Petitions for Extended Registration.
<b>Tuesday, May 15</b>	Spring term ends.
<b>Friday, May 18</b>	Final grades for spring-term courses are due for candidates for M.A. and M.S. degrees to be awarded at Commencement.
<b>Sunday, May 27</b>	Graduate School Convocation.
<b>Monday, May 28</b>	University Commencement.
<b>Monday, June 4</b>	Final grades for spring-term courses and full-year courses are due.

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## A Message from the Dean

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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 book, *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 and elsewhere. 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 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.

Jon Butler  
*Dean, Graduate School of Arts and Sciences*  
*William Robertson Coe Professor of American Studies*  
*and History*  
*Professor of Religious Studies*



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# The Graduate School of Arts and Sciences

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The Yale Graduate School of Arts and Sciences is one of twelve 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-three 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 500 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.

## 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 non-degree 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. Please see International Student Life for additional information regarding international student life at Yale.

### *A Global University*

In celebrating the Yale Tercentennial in 2001, President Richard C. Levin gave special weight to “Yale’s intention to become a truly global institution” by building on existing relationships and international activity. Since that time, the University has made great strides to intensify and broaden its efforts in the international arena. Exchanges of students, faculty, researchers, and fellows have grown significantly. Programs of study and research across the University increasingly incorporate international subject matter. To enhance all its initiatives in this direction, the administration has created a number of organizations and other specialized resources.

#### **OFFICE OF INTERNATIONAL AFFAIRS**

The most recently established organizational unit, inaugurated in 2003–2004, is the Office of International Affairs, which serves as an administrative resource to support the international activities of all schools, departments, offices, centers, and organizations at Yale; to promote Yale and its faculty to international audiences; and to increase the visibility of Yale’s international activities around the globe. Web site: [www.yale.edu/oia/](http://www.yale.edu/oia/).

The Office of International Affairs joins a range of other institutional resources, including the following, which are discussed elsewhere in this bulletin:

MacMillan Center for International and Area Studies

Yale Center for the Study of Globalization

Office of International Students and Scholars (OISS)

#### **YALE WORLD FELLOWS PROGRAM**

[www.yale.edu/worldfellows/](http://www.yale.edu/worldfellows/)

As Yale marked its 300th year, the University extended its worldwide reach by launching the Yale World Fellows Program. The program hosts twelve to eighteen Fellows at a time for a term of concentrated study and close contact on the Yale campus. The Fellows Program is a unique opportunity for individuals from outside the U.S. with experience and outstanding leadership qualities to broaden their grasp of global challenges, update their professional expertise and leadership skills, and join a network of people who share an interest in enhancing international cooperation and development.

## **“YALE AND THE WORLD” ON THE WEB**

<http://world.yale.edu/>

“Yale and the World” is a compilation, on the Yale Web site, of resources for international students, scholars, and other Yale affiliates interested in the University’s global initiatives.

## **RESOURCES FOR RESEARCH AND STUDY**

Yale’s outstanding facilities for research and study include a university library system of nearly eleven million volumes, the Beinecke Rare Book and Manuscript Library, the Yale University Art Gallery, the Yale Center for British Art, the Office of Information Technology Services, departmental libraries and collections, and the extensive resources of the professional schools. The collections and services of the Research Libraries Group, which consists of Columbia, Harvard, and Yale universities and the New York Public Library, are also available to students.

Special research facilities for the sciences include the Bass Center for Molecular and Structural Biology, Josiah Willard Gibbs Research Laboratories, Kline Geology Laboratory, Sterling Chemistry Laboratory, Kline Biology Tower, Becton Engineering and Applied Science Center, the Class of 1954 Environmental Science Center, the Peabody Museum of Natural History, the Arthur W. Wright Nuclear Structure Laboratory, Arthur K. Watson Hall for computer science, the Boyer Center for Molecular Medicine, and the many other science laboratories throughout the campus.

## **THE DEAN**

Jon Butler, 112 HGS, 432.2733, [grad.dean@yale.edu](mailto: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.

## **THE ASSOCIATE AND ASSISTANT DEANS**

Pamela Schirmeister, Associate Dean, 136 HGS, 432.7598, [pamela.schirmeister@yale.edu](mailto:pamela.schirmeister@yale.edu)

Richard G. Sleight, Associate Dean, 132 HGS, 432.2744, [richard.sleight@yale.edu](mailto:richard.sleight@yale.edu)

Edward Barnaby, Assistant Dean, 135 HGS, 436.2628, [edward.barnaby@yale.edu](mailto:edward.barnaby@yale.edu)

TBA, Assistant Dean, 133 HGS, 432.1884

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; 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 Medicine and Science; 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 his assistant dean oversee Ph.D. and terminal master's programs in Anthropology; Applied Mathematics; 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 (Applied Physics, 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

Lisa Brandes, Assistant Dean for Student Affairs; Director, Office of Student Life,  
122 HGS, 432.2583, [lisa.brandes@yale.edu](mailto:lisa.brandes@yale.edu)

The assistant dean for student affairs directs programs organized by the McDougal Fellows and supervises events such as New Student Orientation and Commencement. She coordinates graduate student services; serves as the students' advocate and liaison for University services; and provides confidential consultations to address student questions and complaints.

Liza Cariaga-Lo, Assistant Dean; Director, Office for Diversity and Equal  
Opportunity, 127 HGS, 432.0763, [liza.cariaga-lo@yale.edu](mailto:liza.cariaga-lo@yale.edu)

The assistant dean and director of the Office for Diversity and Equal Opportunity oversees all aspects of recruiting and retaining a diverse student body in the Graduate School. Please see the description of this office below for additional details.

John Mangan, Assistant Dean for Administration, [john.mangan@yale.edu](mailto:john.mangan@yale.edu)

Dean Mangan administers programs, grants, and special projects related to the Graduate School. He serves as a liaison between the Graduate School and other University offices, including Development, the Registrar, Information Technology Services, and the Association of Yale Alumni. He participates in the development of strategic and long-range plans, as well as the overall management of offices and facilities in the Hall of Graduate Studies.

## 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 department 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.

## OFFICE FOR DIVERSITY AND EQUAL OPPORTUNITY

Liza Cariaga-Lo, Assistant Dean, Director, 127 HGS, 432.0763,  
liza.cariaga-lo@yale.edu  
[www.yale.edu/graduateschool/diversity](http://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, Post-Baccalaureate Research Education Program (PREP), 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.

## TEACHING

### *The Teaching Fellow Program*

Judith Dozier Hackman, Director, 139 HGS, 432.2757, [judith.hackman@yale.edu](mailto:judith.hackman@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.

## THE MCDUGAL GRADUATE STUDENT CENTER

Hall of Graduate Studies, 432.BLUE (2583)  
[www.yale.edu/graduateschool/mcdougal/](http://www.yale.edu/graduateschool/mcdougal/)

### *Facilities and Services*

A generous gift from Mr. Alfred McDougal '53, a Yale alumnus, and his wife, Ms. Nancy Lauter, enabled Yale to create the McDougal Graduate Student Center in 1997. The McDougal Center provides space and programs for building intellectual, cultural, and social community, as well as facilitating professional development activities across the departments of the Graduate School.

The facilities of the McDougal Center, which is housed in HGS, enhance student life in many ways. The restored Common Room has a lounge with comfortable furnishings and the student-run Blue Dog Cafe, which serves coffee and light foods. Other center facilities include large meeting rooms, a recreation room with children's corner, an ITS student computing cluster with printer and copier, telephones, information kiosks, lockers, and vending machines, a music room, and the Resource Library. The Center also has offices for the McDougal Fellows, Diversity Fellows, and Graduate Teaching Center student staff, the Graduate Student Assembly, as well as the directors and staff of Graduate Student Life, Graduate Career Services, and Graduate Teaching Center, described below.

The McDougal Center, which is open days, evenings, and weekends during the academic term, provides members of the Graduate School community with a place of their own on campus. The Center also welcomes postdoctoral appointees, faculty, staff, and alumni/ae of the Graduate School, as well as members of the larger Yale graduate and professional school community. Graduate student groups and departments may request to reserve space by contacting the Center office.

### *Graduate Student Life*

Lisa Brandes, Director, Graduate Student Life, and Assistant Dean for Student Affairs  
122 HGS, 432.2583  
[mcdougal.center@yale.edu](mailto:mcdougal.center@yale.edu)  
[www.yale.edu/mcdougal/studentlife](http://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 coffeehouses, arts, music, sports and cultural events, health and wellness sessions, outings, family activities and resources, international student events, literary and academic writing programs, community service opportunities, 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 Notes* ([www.yale.edu/graduateschool/mcdougal](http://www.yale.edu/graduateschool/mcdougal)), through spe-

cialized e-mail lists, and on the McDougal Center Student Life Web calendar at the site listed above.

The Office of Graduate Student Life also coordinates general campus services for graduate students, serving as the student advocate and departmental liaison for graduate housing, dining services, health services, athletics, security, and parking and transit. The director 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 Student Life office also organizes recruitment activities, new student orientation, dean's events, Commencement, and other events for the Graduate School community.

### *The McDougal Graduate Teaching Center*

William C. Rando, Director, Graduate Teaching Center, and Dean's Adviser on Teaching and Learning  
125 HGS, 432.2583, [william.rando@yale.edu](mailto:william.rando@yale.edu), [mcdougal.teaching@yale.edu](mailto:mcdougal.teaching@yale.edu)  
TBA, Associate Director, Science Education, Graduate Teaching Center  
[www.yale.edu/mcdougal/teaching](http://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 and sign up for the GTC listserv, *TeachingNotes*.

### *Graduate Career Services*

TBA, Director, Graduate Career Services, and Dean's Adviser on Career Education.  
Kathryn Douglas, Assistant Director, McDougal Center, and Recruiting Coordinator  
124 HGS, 432.2583, [mcdougal.careers@yale.edu](mailto:mcdougal.careers@yale.edu)  
[www.yale.edu/mcdougal/careers](http://www.yale.edu/mcdougal/careers)

Graduate Career Services (GCS) is a comprehensive career center for students and alumni/ae of the Graduate School and for postdoctoral fellows. Through individual counseling, a full schedule of programs each term, on-campus recruiting, videotaped interview practice, and a library of print resources as well as career-related Web links, the office assists graduate students and alumni/ae with career education, decision making, and planning. It helps them think about what they want to do, know what is out there, make career decisions, and know how to search for a job. 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 nonacademic careers, the director initiates programs and develops links with employers who seek graduate students' skills. GCS encourages students to begin using the services of the office early in their graduate careers in order to increase their opportunities upon the completion of their degree.

### *Dossier Service*

126 HGS, McDougal Center, 432.8850, fax 432.8356, [dossier@yale.edu](mailto:dossier@yale.edu)  
[www.yale.edu/graduateschool/careers/dossier.html](http://www.yale.edu/graduateschool/careers/dossier.html)

Students and alumni/ae applying for academic or nonacademic positions may use the dossier service. The dossier contains students' letters of recommendation and an official transcript of Yale graduate work. On request, a dossier will be sent to employers, agencies, and schools considering a student or alumnus/a for permanent or short-term positions, and for grants and fellowships. The director of Graduate Career Services oversees the Dossier Service.

### *Resource Library*

McDougal Center  
[www.yale.edu/graduateschool/mcdougal/resourcelibrary.html](http://www.yale.edu/graduateschool/mcdougal/resourcelibrary.html)

Located in the McDougal Center offices, the Resource Library is a collection of books, other documentation, and Web resources for graduate students and postdoctoral appointees regarding careers (both academic and non-academic), teaching, writing and research, graduate student life and diversity, and funding opportunities. Materials may be checked out for use in the center or be copied in the ITS computer cluster.

## **OFFICE OF FINANCE AND ADMINISTRATION**

Alice Oliver, Director, 131 HGS, 432.2739, [alice.oliver@yale.edu](mailto:alice.oliver@yale.edu)

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 and providing guidance about procedures, reporting, and interactive systems.

## **OFFICE OF FINANCIAL AID**

Jennifer Brinley, Associate Director, 130 HGS, 432.7980, [jennifer.brinley@yale.edu](mailto:jennifer.brinley@yale.edu)  
[www.yale.edu/graduateschool/financial](http://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.

## **OFFICE OF GRADUATE ADMISSIONS**

Robert Colonna, Director, 117B HGS, 203.432.2771, [graduate.admissions@yale.edu](mailto:graduate.admissions@yale.edu)  
[www.yale.edu/graduateschool/admissions/](http://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 of Graduate Admissions also works with the associate deans and academic departments to provide relevant information and decisions to applicants.

## **REGISTRAR'S OFFICE**

Stephen Goot, Deputy Registrar, 142 HGS, 432.2743, [stephen.goot@yale.edu](mailto:stephen.goot@yale.edu)

The Registrar's Office maintains the academic records of all students in the Graduate School. In addition, the Registrar's 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](http://www.yale.edu/sis).

## **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 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 student members, 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, 432.8893  
graduate.student.assembly@yale.edu  
www.yale.edu/assembly

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/](http://www.yale.edu/gpss/)

Founded in 1971, the Graduate-Professional Student Senate (GPSS) fosters discussion and the exchange of ideas among the graduate and professional student population. All graduate and professional students are eligible to become senators. Senators are chosen each year by their respective schools. The GPSS meets every two weeks throughout the academic year, and meetings are open to the graduate and professional school community. Members serve on and make appointments to University committees, meet with University officials and Yale Corporation members, sponsor informational workshops and conferences, organize lectures and social events, and assist in community service events. Additionally, the GPSS oversees operation of the Graduate-Professional Student Center at Yale (GPSCY), at 203 York Street, which includes office and meeting spaces for graduate-professional student organizations, and the Gryphon's Pub.

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## Degree-Granting Departments and Programs

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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/courseinfo/](http://www.yale.edu/courseinfo/) 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. Course information is also available at [www.yale.edu/courseinfo](http://www.yale.edu/courseinfo).

## AFRICAN AMERICAN STUDIES

493 College, 432.1170  
M.A., M.Phil., Ph.D.

### *Chair*

Robert Stepto

### *Director of Graduate Studies*

Gerald Jaynes (493 College, gerald.jaynes@yale.edu)

### *Professors*

Elizabeth Alexander, David Blight, Hazel Carby, William Foltz, Glenda Gilmore, Ezra Griffith, Jonathan Holloway, Matthew Jacobson, Gerald Jaynes, Serene Jones, Christopher L. Miller, Patricia Pessar, Joseph Roach, Robert Stepto, John Szwed, Robert Thompson, Emilie Townes

### *Associate Professors*

Kamari Clarke, David Krasner, Susan Lederer

### *Assistant Professors*

Jennifer Baszile, Khalilah Brown-Dean, Terri Francis, Ange-Marie Hancock, Kellie Jones, Alondra Nelson, Naomi Pabst, Diana Paulin, Lloyd Pratt, Michael Veal

### *Lecturers*

Kathleen Cleaver, Flemming Norcott

### *Fields of Study*

African American Studies offers a combined Ph.D. in conjunction with several other departments and programs. Departments and programs which 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 four designated core courses in African American Studies. Core courses are (1) Theorizing the Racial Formation of the United States in the Early Twenty-First Century (AFAM 505a/AMST 643a/HIST 772a), which is a required course for all *first-year* graduate students in the combined program; (2) Transnational Imaginaries (AFAM 749b/AMST 648b) and/or The Problem of Diversity in American Culture (AFAM 762a/AMST 707a/HIST 774a); (3) Transnationalism, Modernities, and Diasporas (AFAM 573b/AFST 695b/ANTH 595b); (4) Research Workshop (AFAM 895). After completion of course work, students will be required to attend the one-year research workshop during their third year. This research workshop is intended to support preparation of the dissertation proposal. Each student will be expected to present his or her dissertation prospectus during that year. The research workshop will also feature seminars in which students present chapters of their dissertations-in-progress. The expectation is that this workshop will be voluntarily attended by students even during terms when they are not required to register for it. The workshop will be an important part of each graduate student's professionalization and will serve as a vital stimulus to intellectual activity.

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. For details of these requirements see the special requirements of the combined Ph.D. for the particular department printed in this publication. Students will be required to meet the foreign language requirements of the participating department (see Policies and Regulations: Degree Requirements in this publication). 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 Graduate School requirements.

*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 Research Workshop, which is taken in the student's third year of study. See also Graduate School requirements.

Program materials are available upon request to the Director of Graduate Studies, African American Studies, Yale University, PO Box 203388, New Haven CT 06520-3388.

### *Courses*

**AFAM 505a, Theorizing the Racial Formation of the United States in the Early Twenty-First Century.** Jonathan Holloway.

T 1.30–3.20

A designated core course for students in the joint Ph.D. program; also open to students in American Studies and History. The interdisciplinary seminar includes readings from the fields of critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AMST 643a, HIST 772a.*

**AFAM 525b<sup>U</sup>, Psychosocial Study of Black Autobiography.** Ezra Griffith.

W 2.30–4.20

Autobiographies of black men and women analyzed especially for an understanding of their coping mechanisms, with attention to problems, satisfactions, disappointments, grief, and fulfillments.

**AFAM 554a, New Orleans: Rebuilding the Musical City.** John Szwed.

Th 1.30–3.20

This seminar/workshop, devoted to the causes and consequences of the flooding of New Orleans in 2005, explores ideas for rebuilding a city unlike any other. Discussions and proposals range over the historical, ethnographic, architectural, aesthetic, and political dimensions of the problem. Students are welcome from all relevant disciplines, but enrollment is limited. *Also AMST 744a, ANTH 512a.*

[**AFAM 557a<sup>U</sup>, Introduction to Jazz Studies.**]

**AFAM 563b<sup>U</sup>, Ralph Ellison in Context.** Robert Stepto.

M 1.30–3.20

This seminar pursues close readings of Ralph Ellison's essays, short fiction, and novels, *Invisible Man* and *Juneteenth*. The "in context" component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African America Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. The texts include *Ellison, The Collected Essays, Flying Home and Other Stories, Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison's Invisible Man*; A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. *Also AMST 921b<sup>U</sup>.*

**AFAM 573b, Transnationalism, Modernities, and Diasporas. M. Kamari Clarke.**

T 2.30–4.20

As anthropologists continue to grapple with changing notions of “the field” from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic contexts. Drawing on a range of ideas from world systems theories of globalization to analyses of gender and globalization to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes and the ways that scholars are transforming the discipline as they attempt to understand contemporary flows of people, capital, ideas, legal regimes, and resources. These processes disrupt the once homogenizing tendencies of ethnography and instead push us to examine different factors involved in understanding locality and globality. *Also AFST 695b, ANTH 595b, WGS 707b.*

[AFAM 588b<sup>U</sup>, Autobiography in America.]

[AFAM 595b, Intersections in American Literature.]

**AFAM 596a, African American Poets of the Modern Era. Robert Stepto.**

T 1.30–3.20

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic, 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. *Also AMST 641a, ENGL 947a.*

[AFAM 637a, Improvisation.]

[AFAM 687a, Race and Races in American Studies.]

[AFAM 706a, Readings in Twentieth-Century United States History.]

[AFAM 709b, Research in Twentieth-Century United States History.]

[AFAM 710a, Readings in African American History since 1865.]

[AFAM 721b, Readings in Southern History since 1865.]

**AFAM 722b, Theorizing “Black” and “Asian” Intersectionalities in the U.S.**

Sanda Lwin, Diana Paulin.

W 12.30–2.20.

This graduate seminar approaches racial formation and racial representation through the lens of Asian American and African American literary and cultural production. We read theoretical and primary texts from various fields, including performance studies, literary studies, psychoanalytic theory, cultural studies, gender studies, legal studies, and postcolonial studies, in order to construct a critical apparatus for understanding race relationally rather than as strictly defined categories of identity that have, traditionally, been studied in segregated disciplines (such as black studies, whiteness studies, Asian and Asian American studies). We address the following topics: performance of identity, racial/sexual minorities and the politics of inclusion/exclusion, alliances across racial and national boundaries, diasporic identities, history and memory. We consider how a comparative approach might produce new methodologies for thinking about Asian American and African American representation comparatively. In doing so, we interrogate conventional black/white paradigms of race by looking at intersectionalities that unsettle binaries. Along these lines, we also account for the ways in which race intersects with other categories of identity, such as sexuality, gender, nation, and class. We study works by authors/artists such as Homi Bhaba, Judith Butler, W.E.B. DuBois, David Eng, Frantz Fanon, Kobena Mercer, Jose Munoz, Vijay Prashad, Mira Nair, Anna Devereaux Smith, and Claudia Tate. *Also AMST 673b.*



**[AFAM 723a, Black Intellectuals of the Caribbean Diaspora.]****AFAM 728b<sup>U</sup>, From West Africa to the Black Americas: The Black Atlantic Visual Tradition. Robert Thompson.**

TTH 11.30–12.45

Art, music, and dance in the history of key classical civilizations south of the Sahara — Mali, Asante, Dahomey, Yoruba, Ejagham, Kongon — and their impact on the rise of New World art and music. *Also AFST 778b<sup>U</sup>, HSAR 778b<sup>U</sup>.*

**AFAM 729a<sup>U</sup>, New York Mambo: Microcosm of Black Creativity. Robert Thompson.**

TTH 11.30–12.45

Rise, development, and philosophic achievement of the world of New York mambo and salsa. Emphasis on Palmieri, Cortijo, Roena, Harlow, and Colon. Examination of parallel traditions, e.g., New York Haitian art, Dominican merengue, reggae and rastas of Jamaican Brooklyn, and the New York school of Brazilian capoeira. *Also HSAR 779a<sup>U</sup>.*

**AFAM 731b<sup>U</sup>, Black Women's Film and Video. Terri Francis.**

W 3.30–5.20, screenings M 9.30 P.M.

Study of films and videos made by women of African descent during the twentieth and twenty-first centuries. Focus on filmmaking as a critical practice and an art form, particularly how it engages cinematic perceptions of black womanhood. Films placed in a matrix of African American film history, feminist film theory, and legacies of black feminist writing and image-making. Topics include film language, authorship, performance, and the question of audience. *Also FILM 717b<sup>U</sup>, WGSS 705b.*

**[AFAM 732a<sup>U</sup>, Film and the Harlem Renaissance.]****AFAM 739a, Problem and Theory in Afro-Atlantic Architecture I: Africa.****Robert Thompson.**

TH 3.30–5.20

The seminar addresses a new frontier — rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture. Topics include the architecture of Djenne, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of African influence on the architecture of the Americas — the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Columbia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Columbia. *Also AFST 781a, HSAR 781a.*

**AFAM 739b, Problem and Theory in Afro-Atlantic Architecture II: The Black Americas. Robert Thompson.**

TH 3.30–5.20

A continuation of AFAM 739a. *Also AFST 781b, HSAR 781b.*

**AFAM 742b, Black Religion in the Public Square. Emilie Townes.**

T 1.30–3.20

This course explores the theo-ethical perspectives of selected Black Christian thinkers with special attention to how their thought intersects with and also responds to contemporary public policy issues. The challenge is to relate the essentials of Christian ethics to contemporary personal and social issues, identify basic elements of Christian ethical reflection in public discourse, consider a variety of ethical perspectives for decision making, and evaluate black ethical thinkers as they respond to concrete social issues and public policy statements. *Also REL 746b.*

[AFAM 747b, Performativity.]

[AFAM 748a<sup>U</sup>, Rethinking the African American Literary Canon.]

**AFAM 749b, Transnational Imaginaries. Hazel Carby.**

W 1.30–3.20

This interdisciplinary seminar discusses what is meant by globalization and the new world order. If globalization is a process currently dominated by the United States as empire, how do critical and dissenting intellectuals imagine alternative structures of citizenship and belonging? Final paper. *Also* AMST 648b, WGSS 735b.

**AFAM 755a<sup>U</sup>, Africa and the Disciplines. Kamari Clarke, Christopher L. Miller.**

T 1.30–3.20

An exploration of how the different academic disciplines reconceptualize the study of Africa and the ways in which the disciplines draw on each others' techniques and results in the process. *Also* AFST 764a<sup>U</sup>, ANTH 622a<sup>U</sup>.

[AFAM 757a, Research Seminar in Nineteenth-Century United States History.]

[AFAM 758a, Readings in African American History to Emancipation.]

[AFAM 761b, Readings in Nineteenth-Century American History, 1820–1877.]

**AFAM 762a, The Problem of Diversity in American Culture. Jennifer Baszile.**

T 10.30–12.20

This reading seminar examines diversity's conception and practice in American culture. In addition to exploring the intellectual origins of diversity, the course surveys the effect of diversity on academic disciplines, politics, and public policy. This course seeks to understand how diversity shapes the approach to difference in American life. *Also* AMST 707a, HIST 774a.

[AFAM 763b, Methods and Practices in U.S. Cultural History.]

[AFAM 768b, Issues in Performance Art.]

[AFAM 783b, Colonizer and Colonized in Africa.]

[AFAM 792a<sup>U</sup>, The Jazz Avant-Garde, 1955–1980.]

[AFAM 809a, Intersecting Identities: Nation, Race, and Gender.]

[AFAM 812b, Women and Politics.]

[AFAM 814a, Race and Ethnicity.]

[AFAM 819a, Research in African American History and Culture to Emancipation.]

**AFAM 829b, American Legal History: Citizenship and Race. Kathleen Cleaver.**

Th 2.30–4.20

The seminar examines the evolution of U.S. citizenship as defined and interpreted by courts during the nineteenth and twentieth centuries, with particular attention to the way historical events that defined race have affected citizenship. Topics of study include the Thirteenth, Fourteenth, and Fifteenth Amendments to the U.S. Constitution, the 1866 Civil Rights Act, Reconstruction legislation, immigration restrictions imposed on Asians, legislation impacting the racial classification of Mexicans, statutes governing the citizenship of indigenous native peoples, racially based prohibitions against voting, education, and employment, and efforts to reduce them by civil rights legislation culminating with the 1964 Civil Rights Act. Each seminar participant has to research several topics and make a presentation to the class on at least one topic. Engagement in seminar discussion and the drafting of research papers are the basis for grading. This seminar is open to seniors. *Also* WGSS 715b.

**AFAM 831b<sup>u</sup>, August Wilson and His Contexts. Elizabeth Alexander.**

T 3.30–5.20

In this course we examine August Wilson's monumental contribution to twentieth-century American theater. We read his ten-play cycle, also discussing the work in the context of Wilson's multiple fields of influence, including blues and blues aesthetics; Lorraine Hansberry; Amiri Baraka; Romare Bearden; Pittsburgh's Hill District. Students conduct archival research at the Yale School of Drama, where many of the plays were first produced.

[AFAM 840a, *Africa in American Theater, Drama, and Performance.*]

[AFAM 843a, *Theory and Practice of Ethnomusicology.*]

[AFAM 846a, *Postcolonial Theory and Its Literature.*]

[AFAM 847a, *African-Caribbean Connections in French.*]

[AFAM 848b, *African American Studies Graduate Research Seminar in Diasporic Cultural Studies.*]

**AFAM 854a, The French Atlantic Triangle: Literature and Culture of the Slave Trade. Christopher L. Miller.**

Th 10.30–12.20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene. Taught in English. *Also AFST 739a, CPLT 723a, FREN 939a.*

**AFAM 880a or b, Directed Reading.**

By arrangement with faculty.

**AFAM 895, Research Workshop. Gerald Jaynes.**

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 for International and Area Studies

142 Luce Hall, 34 Hillhouse, 432.3436

[www.yale.edu/macmillan/african](http://www.yale.edu/macmillan/african)

M.A.

### *Chair*

Christopher Udry (*Economics*)

### *Director of Graduate Studies*

Ann Biersteker (*Linguistics*) (432.9902, [ann.biersteker@yale.edu](mailto:ann.biersteker@yale.edu))

### *Director of Program in African Languages*

Sandra Sanneh (432.1179, [sandra.sanneh@yale.edu](mailto:sandra.sanneh@yale.edu))

### *Professors*

Lea Brilmayer (*Law*), Owen Fiss (*Law*), Robert Harms (*History*), Andrew Hill (*Anthropology*), Christopher L. Miller (*French; African American Studies*), Lamin Sanneh (*History; Divinity*), Ian Shapiro (*Political Science*), Robert Thompson (*History of Art*), Christopher Udry (*Economics*), David Watts (*Anthropology*)

### *Associate Professors*

Ann Biersteker (*Adjunct, Linguistics*), M. Kamari Clarke (*Anthropology*), Michael Mahoney (*History*), Michael Veal (*Music*)

### *Senior Lectors*

Sandra Sanneh (*African Languages*), Kiarie Wa'Njogu (*African Languages*)

### *Lecturers*

Oluseye Adesola (*African Languages*), Anne-Marie Foltz (*Epidemiology & Public Health*)

## *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 in this bulletin). Joint degrees are possible with the approval of the M.A. in African Studies and the relevant officials in the schools of Forestry & Environmental Studies, Epidemiology and Public Health, Law, and Management.

The African collections of the Yale libraries together represent one of the largest holdings on Africa found in North America. The University now possesses over 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; economics; sociology; arts and literatures; languages and linguistics; religion; environmental and developmental studies.

The program requires sixteen courses: two compulsory introductory interdisciplinary seminars, Research Methods in African Studies (AFST 501a) and Africa and the Disciplines (AFST 764a), four courses of instruction in an African language, four courses in one of the above areas of concentration, four other approved courses offered in the Graduate School or professional schools, and two terms of directed reading and research (AFST 900a or b) 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 director of graduate studies, Ann Biersteker, and students should consult with her as soon as possible in the first term.

### *The Master's Thesis*

The master's thesis is based upon 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 Language 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](mailto:african.studies@yale.edu).

### *Courses*

#### **AFST 501a, Research Methods in African Studies. Ann Biersteker.**

W 1.30–3.20

This 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.

#### **AFST 541b<sup>U</sup>, Comparative Perspectives on African Literatures. Ann Biersteker.**

W 1.30–3.20

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.

#### **AFST 598a<sup>U</sup>, Introduction to an African Language I. Sandra Sanneh and staff.**

MTWThF 9.30–10.20

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. Permission of instructor required.

#### **AFST 599b<sup>U</sup>, Introduction to an African Language II. Sandra Sanneh and staff.**

5 HTBA

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. After AFST 598a. Students may also study an African language through the noncredit Directed Independent Language Study program. Permission of instructor required.

#### **AFST 618b, Communication and Healing. Sandra Sanneh.**

HTBA

This 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.

**AFST 630b<sup>U</sup>, Language Planning in Sub-Saharan Africa. Kiarie Wa'Njogu.**

W 1.30–3.20

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.

**AFST 650, Second Year in an African Language.**

By arrangement with faculty. After AFST 599.

**AFST 660, Third Year in an African Language.**

By arrangement with faculty. After AFST 650.

**AFST 670, Fourth Year in an African Language.**

By arrangement with faculty.

**AFST 695b, Transnationalism, Modernities, and Diasporas. M. Kamari Clarke.**

T 2.30–4.20

As anthropologists continue to grapple with changing notions of “the field” from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic contexts. Drawing on a range of ideas from world systems theories of globalization to analyses of gender and globalization notions of the invention of diasporas, to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes and the ways that scholars are transforming the discipline as they attempt to understand contemporary flows of people, capital, ideas, legal regimes, and resources. These processes disrupt the once homogenizing tendencies of ethnography and instead push us to examine different factors involved in understanding locality and globality criteria for analyzing and construction communities. *Also AFAM 573b, ANTH 595b, WGSS 707b.*

**AFST 734a<sup>U</sup>, Anthropology of the Postcolonial State. Staff.**

Th 1.30–3.20

Ethnographic and interpretive approaches to the postcolonial state and the forms of public culture to which it gives rise. Topics include the formation of state structures and citizen subjects; nationalism in relation to discourses of gender, race, marginality, and modernity; corruption and moral discourse in the public sphere; ritual and aesthetic dimensions of rule and resistance; tensions among popular, civic, and global culture. *Also ANTH 634a<sup>U</sup>.*

**AFST 739a, The French Atlantic Triangle: Literature and Culture of the Slave Trade.**

**Christopher L. Miller.**

Th 10.30–12.20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene, T. Mandeleau. In English. *Also AFAM 854a, CPLT 723a, FREN 939a.*

**AFST 764a<sup>U</sup>, Africa and the Disciplines. M. Kamari Clarke, Christopher L. Miller.**

T 1.30–3.20

A broad survey of Africa's relation to academic discourse, as seen in a variety of disciplines. This course examines how Africa is represented and discussed in different fields; how disciplinary formations, language, popular conceptions, and related intellectual practices of the

various disciplines have affected academic approaches to studies of Africa; and how these approaches have reinvented particular African geographies (e.g., sub-Saharan vs. North African, francophone vs. anglophone, South Africa vs. the rest of Africa, and contemporary diasporic articulations). Attention to questions surrounding the management of “The New World Order.” After a general context is established over the first four weeks of the term, scholars representing various fields in the humanities, social and political sciences, and the professional schools visit the seminar to discuss their work in relation to the ways that their respective discipline(s) have explored related themes. Throughout the term, attention is given to issues of interdisciplinarity. *Also AFAM 755a<sup>u</sup>, ANTH 622a<sup>u</sup>.*

**AFST 778b<sup>u</sup>, From West Africa to the Black Americas: The Black Atlantic Visual Tradition. Robert Thompson.**

TH 11.30–12.45

Art, music, and dance in the history of key classical civilizations south of the Sahara – Mali, Asante, Dahomey, Yoruba, Ejagham, Kongon – and their impact on the rise of New World art and music. *Also AFAM 728b<sup>u</sup>, HSAR 778b<sup>u</sup>.*

**AFST 781a, Problem and Theory in Afro-Atlantic Architecture I: Africa. Robert Thompson.**

TH 3.30–5.20

The seminar addresses a new frontier – rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture. Topics include the architecture of Djenné, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of African influence on the architecture of the Americas – the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Columbia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Columbia. *Also AFAM 739a, HSAR 781a.*

**AFST 781b, Problem and Theory in Afro-Atlantic Architecture II: The Black Americas. Robert Thompson.**

A continuation of AFST 781a. *Also AFAM 739b, HSAR 781b.*

**AFST 806a<sup>u</sup>, Sexual Violence and War. Elisabeth Wood.**

T 7–8.50

Analysis of patterns of sexual violence in war. Assessment of how well the relevant literatures in sociology, political science, criminology, psychology, biology, and gender studies account for these patterns. *Also PLSC 720a<sup>u</sup>.*

**AFST 814a, Christian-Muslim Dialogue. Lamin Sanneh.**

An introduction 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. *Also REL 814a.*

**AFST 816b, World Christianity. Lamin Sanneh.**

The course explores the worldwide Christian movement from the perspective of the current post-Western resurgence and the accompanying shift of the religion's center of gravity from the north Atlantic world to the south Atlantic and Pacific world. Employing primary historical sources and critical secondary literature, the course examines the characteristic features and patterns of Christianity as a world religion now surging in diverse cultures and societies. *Also REL 816b.*



**AFST 819b, African Religions: A Theological Inquiry. Lamin Sanneh.**

Based primarily on Evans-Pritchard's classic text, *Nuer Religion*, the course is an introduction to phenomenology of religion with particular reference to the role and meaning of sacrifice in non-Western religious traditions. Looking at a diverse range of sources and examples, the course explores the phenomenon of religion in terms of ideas of God and the central rituals of gifts, offerings, and sacrifice as representations of the human response to the transcendent. *Also REL 819b.*

**AFST 849b, Agrarian History of Africa. Robert Harms.**

W 1.30–3.20.

This course examines changes in African rural life from precolonial times to the present. Issues to be examined include land use systems, rural modes of production, gender roles, markets and trade, the impact of colonialism, cash cropping, rural-urban migration, and development schemes. *Also HIST 849b.*

**AFST 900a or b, Master's Thesis. Ann Biersteker and faculty.**

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

**AFST 951a or b, Directed Reading and Research. Ann Biersteker and faculty.**

By arrangement with faculty.

**SWAH 610a<sup>U</sup>, Elementary Kiswahili I. Kiarie Wa'Njogu.**

MTWThF 9.30–10.20

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.

**SWAH 620b<sup>U</sup>, Elementary Kiswahili II. Kiarie Wa'Njogu.**

MTWThF 9.30–10.20

Continuation of SWAH 610a. Texts provide an introduction to the basic structure of Kiswahili and to the culture of the speakers of the language.

**SWAH 630a<sup>U</sup>, Intermediate Kiswahili I. Kiarie Wa'Njogu.**

MTWThF 11.30–12.20

Further development of students' 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. After SWAH 620b.

**SWAH 640b<sup>U</sup>, Intermediate Kiswahili II. Kiarie Wa'Njogu.**

MTWThF 11.30–12.20

Continuation of SWAH 630a. After SWAH 630a.

**SWAH 650a<sup>U</sup>, Advanced Kiswahili I. Kiarie Wa'Njogu.**

TTh 4–5.15

Development in 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. After SWAH 640b.

**SWAH 660b<sup>U</sup>, Advanced Kiswahili II. Kiarie Wa'Njogu.**

TTh 4–5.15

Continuation of SWAH 650a. After SWAH 650a.

**YORU 610au, Elementary Yorùbá I. Oluseye Adesola.**

MTWThF 10.30 – 11.20

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 62ob.

**YORU 62ob<sup>u</sup>, Elementary Yorùbá II. Oluseye Adesola.**

MTWThF 10.30 – 11.20

Continuing practice in using and recognizing tone through dialogues. More emphasis is placed on simple cultural texts and role playing.

**YORU 630a<sup>u</sup>, Intermediate Yorùbá I. Oluseye Adesola.**

MTWThF 12.30 – 1.20

Refinement of students' 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. After YORU 62ob.

**YORU 640b<sup>u</sup>, Intermediate Yorùbá II. Oluseye Adesola.**

MTWThF 11.30 – 12.20

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. After YORU 630a.

**YORU 650a<sup>u</sup>, Advanced Yorùbá I. Oluseye Adesola.**

3 HTBA

An advanced course intended to improve the students' 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. After YORU 640b.

**YORU 660b<sup>u</sup>, Advanced Yorùbá II. Oluseye Adesola.**

3 HTBA

Continuing development of students' 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. After YORU 650a.

**ZULU 610a<sup>u</sup>, Elementary isiZulu I. Sandra Sanneh.**

MTWThF 11.30 – 12.20

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 62ob.

**ZULU 620b<sup>u</sup>, Elementary isiZulu II. Sandra Sanneh.**

MTWThF 11.30 – 12.20

Introduction to the noun class and marker system of isiZulu; 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.

**ZULU 630a<sup>u</sup>, Intermediate isiZulu I. Sandra Sanneh.**

MTWThF 9.30–10.20

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. After ZULU 620b.

**ZULU 640b<sup>u</sup>, Intermediate isiZulu II. Sandra Sanneh.**

MTWThF 9.30–10.20

Students read longer texts from popular media as well as myths and folktales. Prepares students for initial research involving interaction with speakers of isiZulu in South Africa, and for the study of oral and literary genres. After ZULU 630a.

**ZULU 650a<sup>u</sup>, Advanced isiZulu I. Sandra Sanneh.**

3 HTBA

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. After ZULU 640b.

**ZULU 660b<sup>u</sup>, Advanced isiZulu II. Sandra Sanneh.**

3 HTBA

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. After ZULU 650a.

## AMERICAN STUDIES

230 Hall of Graduate Studies, 432.1186

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

### *Chair*

Matthew Jacobson (230 HGS, 432.1186)

### *Director of Graduate Studies*

Joanne Meyerowitz [F] (230 HGS, 432.1186)

Kathryn Dudley [Sp] (230 HGS, 432.1186)

### *Professors*

Jean-Christophe Agnew, David Blight (*on leave*), Jon Butler, Hazel Carby, Edward Cooke, Jr. (*on leave*), John Demos (*on leave*), Michael Denning, Wai Chee Dimock, Kathryn Dudley (*on leave* [F]), John Mack Faragher (*on leave* [F]), Glenda Gilmore (*on leave*), Dolores Hayden (*on leave*), Jonathan Holloway, Matthew Jacobson, Daniel Kevles, Joanne Meyerowitz, Charles Musser, Alexander Nemerov (*on leave*), Patricia Pessar (*Adjunct*), Stephen Pitti, Michael Roemer (*Adjunct*), Stephen Skowronek, Robert Stepto, Harry Stout, John Szwed, John Harley Warner, Laura Wexler

### *Associate Professors*

Elizabeth Dillon, Amy Hungerford, Susan Lederer, Mary Lui (*on leave* [F])

### *Assistant Professors*

Jennifer Baszile, Seth Fein, Sanda Lwin, Alyssa Mt. Pleasant, Diana Paulin (*on leave* [F]), Alicia Schmidt Camacho, Steven Stoll, Kariann Yokota

### *Lecturers*

Wes Davis, 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. The student's program will be decided in consultation with the adviser and the director of graduate studies. 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 will be required to show proficiency in a language other

than English by conducting research in that language as a component of one of the courses taken during the first two years. 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. Students are admitted to candidacy for the Ph.D. at the end of the third year, upon completion of all predisseration requirements, including the prospectus. Students in American Studies teach in the third and fourth years of study.

### *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. For further details, see African American Studies.

#### AMERICAN STUDIES AND FILM STUDIES

The Department of American Studies also offers, in conjunction with the Program in Film Studies, 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 Film Studies and to American Studies. All documentation within the application should include this information.

### *Master's Degrees*

*M.Phil.* See Degree Requirements.

*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.

*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](http://www.yale.edu/amstud).

## *Courses*

### **AMST 600a, American Scholars. Hazel Carby.**

W 10.30–12.20

“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 on Wednesday mornings. 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. First-year American Studies graduate students are expected to register for the colloquium and to attend regularly; other American Studies graduate students are welcome. There is no writing assignment, and students receive a credit for participating.

### **AMST 622a/623b, Working Group on Globalization and Culture.**

**Michael Denning.**

M 1.30–3.20

The Working Group on Globalization and Culture is 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](mailto:michael.denning@yale.edu).

### **AMST 635b, Cultural Studies in the Americas. Alicia Schmidt Camacho.**

Th 10.30–12.20

A bilingual seminar with readings from Latin America, the Caribbean, and the United States devoted to culture, popular movements, and social theory. The course pairs cultural texts with theoretical readings and historical monographs. We consider questions of global political and economic transformations in the region; discourses and practices of migration and displacements; nationalism and transnational movements; processes of racial, gender, class, and sexual

formation; and vernacular and official discourses of rights and justice. We address these themes through an examination of popular movements and expressive cultures, and mass media. Students need basic familiarity with the Spanish language to participate fully. *Also WGSS 706b.*

**[AMST 639a, Rethinking the African American Literary Canon.]**

**AMST 641a, African American Poets of the Modern Era. Robert Stepto.**

T 1.30–3.20

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic, 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. *Also AFAM 596a, ENGL 947a.*

**AMST 643a, Theorizing the Racial Formation of the United States in the Early Twenty-First Century. Jonathan Holloway.**

T 1.30–3.20

A designated core course for students in the joint Ph.D. program; also open to students in American Studies and History. The interdisciplinary seminar includes readings from the fields of critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AFAM 505a, HIST 772a.*

**AMST 648b, Transnational Imaginaries. Hazel Carby.**

W 1.30–3.20

This interdisciplinary seminar discusses what is meant by globalization and the new world order. If globalization is a process currently dominated by the United States as empire, how do critical and dissenting intellectuals imagine alternative structures of citizenship and belonging? Final paper. *Also AFAM 749b, WGSS 735b.*

**[AMST 651b, Intersections in American Literature.]**

**AMST 673b, Theorizing “Black” and “Asian” Intersectionalities in the U.S.**

**Sanda Lwin, Diana Paulin.**

W 12.30–2.20

This graduate seminar approaches racial formation and racial representation through the lens of Asian American and African American literary and cultural production. We read theoretical and primary texts from various fields, including performance studies, literary studies, psychoanalytic theory, cultural studies, gender studies, legal studies, and postcolonial studies, in order to construct a critical apparatus for understanding race relationally rather than as strictly defined categories of identity that have, traditionally, been studied in segregated disciplines (such as black studies, whiteness studies, Asian and Asian American studies). We address the following topics: performance of identity, racial/sexual minorities and the politics of inclusion/exclusion, alliances across racial and national boundaries, diasporic identities, history and memory. We consider how a comparative approach might produce new methodologies for thinking about Asian American and African American representation comparatively. In doing so, we interrogate conventional black/white paradigms of race by looking at intersectionalities that unsettle binaries. Along these lines, we also account for the ways in which race intersects with other categories of identity, such as sexuality, gender, nation, and class. We study works by authors/artists such as Homi Bhaba, Judith Butler, W.E.B. DuBois, David Eng, Frantz Fanon, Kobena Mercer, Jose Munoz, Vijay Prashad, Mira Nair, Anna Devereaux Smith, and Claudia Tate. *Also AFAM 722b.*

**AMST 700a, Introduction to the Historiography of the United States.****Stephen Pitti.**

TTh 10.30–12.20

Readings and discussion of a 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. *Also HIST 700a.*

**AMST 705b, Readings in Religion and American History, 1600–1990. Jon Butler, Harry Stout.**

M 9–11

This introductory graduate readings course assesses interrelations between religion and American society from 1600 to 1990. Concentration on religion's successes and failures in shaping American society from the Puritans to modern neoconservative fundamentalism. Readings in primary and secondary sources; development of bibliographical skills. *Also HIST 720b, RLST 705b.*

**AMST 707a, The Problem of Diversity in American Culture. Jennifer Baszile.**

T 10.30–12.20

This reading seminar examines diversity's conception and practice in American culture. In addition to exploring the intellectual origins of diversity, the course surveys the effect of diversity on academic disciplines, politics, and public policy. This course seeks to understand how diversity shapes the approach to difference in American life. *Also AFAM 762a, HIST 774a.*

**[AMST 731b, Methods and Practices in U.S. Cultural History.]****AMST 732b, Material Culture in Historical Research. Kariann Yokota.**

W 10.30–12.20

The material objects people produce and consume provide rich texts for historical analysis. This seminar explores how the cultural meanings of objects have been analyzed and understood from various perspectives. Readings are interdisciplinary including works by historians, anthropologists, cultural theorists, sociologists, postcolonial scholars, writers, museum curators, and archaeologists. Topics of discussion include the role of material culture in the formation of national, ethnic, gender, and class identities. *Also HIST 783b.*

**AMST 738b, Research in Western and Frontier History. John Mack Faragher, George Miles.**

W 10.30–12.20

The goal of this seminar is that each participant research and write a publishable essay on some aspect of the history of North American frontiers and the region of the American West, broadly conceived, from the sixteenth to the twentieth century. We focus on the process of historical research and writing — framing a topic, raising historical questions, conducting systematic research, constructing a historical argument, and writing a historical narrative. We meet in the Beinecke Library, with direct access to rare books and manuscripts drawn from Yale's outstanding collection of Western Americana. *Also HIST 738b.*

**AMST 744a, New Orleans: Rebuilding the Musical City. John Szwed.**

Th 1.30–3.20

This seminar/workshop, devoted to the causes and consequences of the flooding of New Orleans in 2005, explores ideas for rebuilding a city unlike any other. Discussions and proposals range over the historical, ethnographic, architectural, aesthetic, and political dimensions of the problem. Students are welcome from all relevant disciplines, but enrollment is limited. *Also AFAM 554a, ANTH 512a.*



**AMST 745b<sup>U</sup>, American Communities. Kathryn Dudley.**

W 1.30–3.20

Considers the concept of community as a theoretical idea and 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. Special focus on communities in crisis in order to understand the value Americans place on community and how the pull of individualism exacts a toll on that commitment. Reading materials drawn from recent and classic studies of American society and culture, most of which partake of anthropology's fieldwork tradition of participant-observation. *Also ANTH 604b<sup>U</sup>.*

**AMST 763b<sup>U</sup>, The Anthropology of Sound. John Szwed.**

Th 1.30–3.20

The socially mediated nature of sound, and the cultural consequences of technologies of sound transmission, modification, and recording. Topics include the pre- and postindustrial soundscapes; audio ethnography; the art of noise; synesthesia; problems of originality and plagiarism (covers, sampling, mixing, machine music, etc.); world music; audio imperialism and terrorism; musical utopias; imaginary soundscapes. *Also ANTH 587b<sup>U</sup>.*

**AMST 764b, Histories of Latinas/os in the Twentieth Century. Stephen Pitti.**

T 10.30–12.20

Readings on topics such as community formation, cultural politics, racialization, and the international migration of Mexican American (Chicana/o), Puerto Rican, Cuban American, and other Latina/os in the United States since roughly 1898. Attention to recently published works in these fields, to the connections with broader concerns in American Studies and Latin American history, and to the intersections between Latina/o history and current scholarship in African American Studies and Asian American Studies. *Also HIST 764b.*

**AMST 768b, Asian American History and Historiography. Mary Lui.**

T 1.30–3.20

This reading and discussion seminar examines new trends in Asian American history through a selection of recently published texts and other “classics” from the field. Major topics include the racial formation of Asian Americans in U.S. culture, politics, and law; U.S. imperialism; U.S. capitalist development and Asian labor migration; and transnational and local ethnic community formations. The class considers both the political and academic roots of the field as well as its evolving relationship to “mainstream” American history. *Also HIST 768b.*

**AMST 769a, Research Seminar in U.S. Cultural History. Matthew Jacobson.**

M 1.30–3.20

Each student's primary focus throughout the term is on the design and execution of an original, highly polished piece of scholarship (30–40 pages) on any aspect or period of U.S. cultural history. Sessions treat the various elements that go into any large-scale project in historiography: articulating workable research questions; engaging the existing scholarship without duplicating it; identifying and locating sources appropriate to the task; writing proposals; the craft of argumentation; editing and rewriting. We entertain some of the broader philosophical questions that dog the field, such as “why study culture?” *Also HIST 769a.*

**AMST 775a, Culture in U.S. International and Transnational Histories. Seth Fein.**

T 7–8.50

This reading seminar examines interdisciplinary approaches to the study of “culture” in relations between, within, and among the United States and other nations (mainly since 1900). Discussions and papers focus on comparing methodologies, using theory, doing research,

writing history. Topics include globalization, Americanization, transnationalism, and hybridity; gender, national identity, international relations, and state formation; imperialism, post-colonialism, hegemony, and resistance; mass culture, political economy, foreign policy, and postmodernity. *Also HIST 757a.*

**AMST 778b, Reconstruction from the Right. Daniel Kevles, Michael Graetz.**

W 2.10–4

Research seminar centering on the 1970s, an examination of changes in policy and society that moved the United States from the liberalism of the Kennedy-Johnson years to the conservatism of the Reagan era. Topics to be considered include the backlash against the women's and civil rights movements; deregulation, tax, and economic policies; the rise of the religious right; the federalization of crime; the new immigration and regional migrations; the emergence of the personal computer, biotechnology, and reproductive technologies industries; and energy, environment, and globalization. *Also HIST 778b, LAW 21178, PLSC 814b.*

**AMST 780b, Class and Capitalism in the Twentieth-Century United States.**

Jennifer Klein.

Th 10.30–12.20

Readings course on class formation, labor, and political economy in the twentieth-century U.S.; 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). *Also HIST 776b.*

**AMST 781a, American Conservatism in the Twentieth Century. Beverly Gage.**

Th 3.30–5.20

An examination of historical and historiographical problems in the study of American conservatism. Topics include mass politics, free-market ideology, neoconservatism, anticommunism, and the Christian right. *Also HIST 748a.*

**AMST 793b, Power: Historical and Theoretical Approaches.**

Jean-Christophe Agnew.

W 10.30–12.20

An introduction to the widely different ways in which power and its correlative concepts (domination, coercion, oppression, authority, legitimacy, hegemony, resistance, etc.) have been treated by historians, sociologists, anthropologists, and political theorists. Case studies test the various approaches in different contexts. *Also HIST 793b.*

**AMST 798a, The Culture of the Gilded Age. Cynthia Russett.**

Th 1.30–3.20

Although the politics of the Gilded Age may seem somewhat jejune (who today has lively memories of Chester A. Arthur or James Garfield?), its society and culture were undergoing dramatic and challenging developments. Industrialization and urbanization brought new immigrants to our shores; labor unions grew and flexed their muscle in a series of major strikes. In the world of thought the impact of Darwinism was still being absorbed, especially in the new academic disciplines of the social sciences: sociology, economics, and psychology. Some important names from the period: William James, Charlotte Perkins Gilman, Henry George, Andrew Carnegie, W.E.B. DuBois, Jane Addams, Edward Bellamy, Samuel Gompers (and, of course, many more). Research seminar. *Also HIST 726a.*

**AMST 802b, Readings in Early National American History. Joanne Freeman.**

T 1.30–3.20

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 a national culture, and the evolution of political cultures. *Also HIST 703b.*

**AMST 813a<sup>u</sup>, Contemporary Documentary Film and Video. Charles Musser.**

M 7–10.30

Examination of documentary and related nonfiction forms in the last three decades. Issues include film truth, performance, ethics, race and gender, and the filmmaker as participant-observer. Filmmakers include Frederick Wiseman, William Greaves, Chris Choy, Errol Morris, Lourdes Portillo, Trin T. Minh-Ha, Sue Friedrich, and Marlon Riggs. *Also FILM 724a<sup>u</sup>.*

**AMST 814a, Historical Methods in Film Study. Charles Musser.**

W 1.30–3.20, screenings T 7

A range of historiographic issues in film studies, including the roles of technology, exhibition, and spectatorship. Topics include intermediality and intertextuality. Consideration of a range of methodological approaches through a focus on international early cinema and American race cinema of the silent period. Particular attention to the interaction between scholars and archives. *Also FILM 603a.*

**AMST 815b<sup>u</sup>, Documentary and War. Charles Musser.**

W 1.30–3.20

Examines the ways that armed conflict has been represented in nonfiction film from the Spanish-American War to the present. Emphasis is on the Vietnam War and the current war in Iraq. Films include *Let There Be Light*, *Why Vietnam?*, *Year of the Pig*, *Fog of War*, *Fahrenheit 9/11*, *Off to War*. *Also FILM 726b<sup>u</sup>.*

**AMST 866a, Readings in the History of Sexuality. George Chauncey, Joanne Meyerowitz.**

W 1.30–3.20

Selected topics in the history of sexuality. Emphasis on key theoretical works and recent historical literature. *Also HIST 775a, WGSS 712a.*

**AMST 870b<sup>u</sup>, Visuality and Violence. Laura Wexler.**

Th 3.30–5.20

Examination of different sets of photographic images — documentary, medical, and digital images; family snapshots; stereotypes and anti-stereotypes of race and gender; portraiture; advertising; industrial images; and art — in light of major writings on photographic representation. Study of how different ways of making and displaying images of the body invest it with culturally specific and historically informative meanings. *Also WGSS 750b<sup>u</sup>.*

**AMST 883a, Race and Medicine in America, 1800–2000. Susan Lederer.**

Th 1.30–3.20

An examination of race and medicine in America, primarily but not exclusively focused on African Americans' encounters with the health care system. Topics include slavery and health; doctors, immigration, and epidemics; the Tuskegee Syphilis Study and the use of minorities as research subjects; and race and genetic diseases. *Also HIST 761a, HSHM 637a<sup>u</sup>, WGSS 725a.*

**AMST 898a, Hawthorne to Mukherjee. Wai Chee Dimock.**

T 10.30–12.20

American literary history as instances of rewriting. *The Scarlet Letter* read against Updike's *S* and Bharati Mukherjee's *The Holder of the World*; Whitman's *Leaves of Grass* and *Specimen Days* against Michael Cunningham's *Specimen Days*; *Uncle Tom's Cabin* and Poe's short stories against Ishmael Reed's *Flight to Canada*; Faulkner's *As I Lay Dying* against Suzan-Lori Parks's *Getting Mother's Body*. Also ENGL 860a.

**AMST 900, Independent Research.**

**AMST 901, Directed Reading.**

**AMST 921b<sup>U</sup>, Ralph Ellison in Context. Robert Stepto.**

M 1.30–3.20

This seminar pursues close readings of Ralph Ellison's essays, short fiction, and novels, *Invisible Man* and *Juneteenth*. The "in context" component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African America Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. The texts include Ellison, *The Collected Essays, Flying Home and Other Stories, Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison's Invisible Man*; A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. Also AFAM 563b<sup>U</sup>.

**AMST 925a, American Literature and World Religions. Wai Chee Dimock.**

Th 10.30–12.20

What is the relation between American literature and world culture? How important are cross-time translations, and what does it mean for Emerson, Thoreau, Margaret Fuller, Ezra Pound, Robert Lowell, and W.S. Merwin to be practitioners in this genre? How important are global roots to authors such as Maxine Hong Kingston, Toni Morrison, and Leslie Silko? This course explores "globalism" as the broadest possible frame for American literature, bringing together authors across centuries, across racial divisions, and across the customary division between poetry and prose.

## ANTHROPOLOGY

51 Hillhouse, Rm 6B, 432.3670  
M.A., M.Phil., Ph.D.

### *Chair*

William Kelly

### *Director of Graduate Studies*

J. Joseph Errington (Rm 9, 51 Hillhouse, 432.3672)

### *Professors*

Elayaperumal Annamalai, Richard Burger, Michael Dove (*Forestry & Environmental Studies*), Kathryn Dudley, J. Joseph Errington, Andrew Hill, Frank Hole, William Kelly, Roderick McIntosh, Enrique Mayer, Patricia Pessar (*Adjunct; American Studies*), Harold Scheffler, James Scott (*Political Science*), Helen Siu, John Szwed, David Watts, Harvey Weiss (*Near Eastern Languages & Civilizations*)

### *Associate Professors*

Richard Bribiescas, M. Kamari Clarke, Nora Groce (*Adjunct; Epidemiology & Public Health*)

### *Assistant Professors*

J. Bernard Bate, Marcello Canuto, Mike McGovern, Karen Nakamura, Eric Sargis

### *Lecturers*

Stephanie Anestis, Robert Brubaker, Carol Carpenter (*Forestry & Environmental Studies*), Britt Hartenberger, Jennifer Jackson, Dhooleka Raj (*South Asian Studies*), Christophe Robert (*Southeast Asia Studies*), Renzo Taddei

### *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, feminist discourse. Physical anthropology focuses on paleoanthropology, evolutionary theory, human functional anatomy, race and human biological diversity, 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.

*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; 203.432.3665; e-mail, [anthropology@yale.edu](mailto:anthropology@yale.edu); Web site, [www.yale.edu/anthropology](http://www.yale.edu/anthropology).

## Courses

### **ANTH 500a, Seminar in Sociocultural Anthropology. William Kelly, Mike McGovern.**

W 10–12

This 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.

### **ANTH 500b, Seminar in Social and Cultural Anthropology. Harold Scheffler.**

W 10–12

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 500 in the fall.

### **ANTH 505a<sup>U</sup>, Kinship, Descent, and Alliance. Harold Scheffler.**

F 1.30–3.20

The role of kinship in the organization of social life, with emphasis on tribal societies. Topics include regulation of sexual behavior and marriage, varieties of group organization, modes of kin classification and their social significance, and so on.

### **ANTH 508b<sup>U</sup>, Queer Ethnographies. Karen Nakamura.**

MW 1–2.15

This course engages in a broad reading of classic and contemporary ethnographies of non-mainstream genders and sexualities. Our emphasis is on understanding anthropology's contribution to and relationship with gay and lesbian studies and queer theory. Over the course of the term, we read and talk about what constitutes a queer ethnography and the history and future of an anthropology of sexuality. *Also WGSS 701b.*

### **ANTH 512a, New Orleans: Rebuilding the Musical City. John Szwed.**

Th 1.30–3.20.

This seminar/workshop is devoted to the causes and consequences of the flooding of New Orleans in 2005, and explores ideas for rebuilding a city unlike any other. Discussions and proposals range over the historical, ethnographic, architectural, aesthetic, and political dimensions of the problem. Students from all relevant disciplines are welcome, but enrollment is limited. *Also AFAM 554a, AMST 744a.*

### **ANTH 513a<sup>U</sup>, Language, Culture, and Ideology. J. Joseph Errington.**

M 1.30–3.20

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

### **ANTH 515a<sup>U</sup>, Culture, History, Power, and Representation. Helen Siu.**

T 1.30–3.20

This seminar is a critical introduction to anthropological formulations of the junctures of meaning, interest, and power. Readings include classical and contemporary ethnographies that are theoretically informed and historically situated.

**ANTH 541a, Agrarian Societies: Culture, Society, History, and Development.**

**Steven Stoll, James Scott, Michael Dove.**

M 1.30–5.20

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. *Also F&ES 80054a, HIST 965a, PLSC 779a.*

**ANTH 546a, Anthropology and Contemporary Social Theory. Dhooleka Raj.**

W 1.30–3.20

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.

**ANTH 548b<sup>U</sup>, Gender and Media in India. J. Bernard Bate.**

T 1.30–3.20

Examination of narratives of gender in India. Folkloristic and anthropological approaches to gendered performance in story, song, and theater. Recent feminist examinations of television, film, advertising, and literature. Topics include classical epic (*Ramayana, Shilapatbigaram*). *Also WGSS 615b.*

**ANTH 554a<sup>U</sup>, Ideas of Development in Latin America. Renzo Taddei.**

M 1.30–3.20

This seminar explores the ways in which development discourses and processes transform the cultural panoramas of Latin America. Discussions include reading ethnographies of development encounters, complemented by debates on the epistemologies of development, the reorganization of cultural landscapes, and their implications for issues of gender, religion, governance, and the natural environment in the region.

**ANTH 567b<sup>U</sup>, The Anthropology of Uncertainty. Renzo Taddei.**

Th 1.30–3.20

This seminar explores how different cultures and social dynamics deal with ambiguity and uncertainty: from regimenting discourses so as to eliminate the uncertain (as in many religious narratives on natural disasters, for instance) to crises in which collective semiosis is left without resources to make sense of unbearable situations, to the situations in which uncertainty is strategically produced so as to bring social change and renovation.

**ANTH 568a, Ethnography of Speech. Jennifer Jackson.**

HTBA

Comparative, case-study work in particular types of socially significant language use. Problems and methods of description to be discussed, and students are encouraged to pursue topics of personal interest.

**ANTH 569b<sup>U</sup>, Economic Anthropology. Enrique Mayer.**

Th 1.30–3.20

An introduction to understanding economic systems in other cultures and societies. How work and leisure are organized, who gets what and how, and how economic concerns tie into other aspects of social life. Major debates and controversies are examined, and examples from different parts of the world are presented. No prior training in economics or anthropology necessary.



**ANTH 570b<sup>U</sup>, Language, Politics, and Society in Colonial India.**

**Elayaperumal Annamalai.**

Th 2.30–4.20

Study of British colonial politics and society in India and of the changes they effected within and between languages. Topics include the use and status of languages in society, the role of languages in politics, elite formation, creation of knowledge systems, rivalry between ethnic communities, and the reformulation of ethnic and political boundaries and of ethnic identities.

**ANTH 575b, Urban Anthropology and Global History. Helen Siu.**

W 1.30–3.20

Urbanization processes in different historical times and places. Using a combination of literary works, historical narratives, and ethnographies, this seminar analyzes how migrants and urbanites with their unique cultural histories confront changes in the macropolitical economies that encapsulate them. The seminar focuses on the nature of migration, adaptive strategies, ethnicity, and political symbolism, the myth of marginality, the language of class, and culture conflict.

**ANTH 576b<sup>U</sup>, Anthropology of the Object. Staff.**

TTh 2.30–3.45

An exploration of the culturally variable means through which value and significance are attributed to objects. Topics for discussion include gift-giving and commodity exchange; the classification, collection, and display of art and artifacts; the gendered and racialized body as object for self and other; advertising, consumption, and commodity fetishism; concepts of property; the politics of value.

**ANTH 581a, Society and Environment: Introduction to Theory and Method.**

**Michael Dove.**

Th 2.30–5.20

Critical issues in the analysis of relations between society and environment. Topics include (1) the identification of environmental “problems” focusing on the rationale of development intervention and failure, and the study of environmental discourse; (2) conceptual boundaries in resource-use systems and in conceptions of nature and culture; (3) conceptual boundaries in environmental relations between center and periphery and between the local and the global; (4) the sociology of science of environmental relations, encompassing views of indigenous knowledge, objective distance, scientific “forgetfulness,” and relations between the natural and social sciences; and (5) the implications of the foregoing for current critiques of science. *Also F&ES 83050a.*

**ANTH 587b<sup>U</sup>, The Anthropology of Sound. John Szwed.**

T 1.30–3.20

The socially mediated nature of sound, and the cultural consequences of technologies of sound transmission, modification, and recording. Topics include the pre- and postindustrial soundscapes; audio ethnography; the art of noise; synesthesia; problems of originality and plagiarism (covers, sampling, mixing, machine music, etc.); world music; audio imperialism and terrorism; musical utopias; imaginary soundscapes. *Also AMST 763b<sup>U</sup>.*

**ANTH 595b, Transnationalism, Modernities, and Diasporas. M. Kamari Clarke.**

T 2.30–4.20

As anthropologists continue to grapple with changing notions of “the field” from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic contexts. Drawing on a range of ideas from world systems theories of globalization to analyses of gender

and globalization to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes and the ways that scholars are transforming the discipline as they attempt to understand contemporary flows of people, capital, ideas, legal regimes, and resources. These processes disrupt the once homogenizing tendencies of ethnography and instead push us to examine different factors involved in understanding locality and globality. *Also AFAM 573b, WGSS 707b.*

**ANTH 597a, Social Science of Development and Conservation. Carol Carpenter.**

T 2.30–5.20

This course provides a fundamental understanding of the social aspects involved in implementing sustainable development and conservation projects. Social science has two things to contribute 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 80153b and F&ES 80157b. Three hours' lecture/seminar. *Also F&ES 83056a.*

**ANTH 602a<sup>U</sup>, Visual Anthropology and Ethnographic Film. Karen Nakamura.**

MW 1–2.15

Intensive seminar workshop on visual anthropology production and analysis. Reads core texts in the analysis of visual culture as well as visual anthropology field methods. Students produce a short ethnographic film, ethnophotographic essay, or article on visual culture.

**ANTH 604b<sup>U</sup>, American Communities. Kathryn Dudley.**

W 1.30–3.20

Consideration of the concept of community and an examination of various kinds of communities — ranging from those defined by social proximity to those defined by a common experience or ideology — that are part of the American experience, in order to understand the value Americans place on community itself and the ways in which the pull of individualism exacts a toll on that commitment. *Also AMST 745b<sup>U</sup>.*

**ANTH 610b, Society and Environment: Advanced Readings. Michael Dove, Carol Carpenter.**

Th 10–12.50

This is an advanced seminar on the relationship between society and environment, examining key theoretical developments and current issues in social, political, and historical ecology and ecological anthropology. The course explores the wider conceptual and institutional contexts of resource use and environmental relations. It focuses on discourses and debates about nature and culture, and examines the paradigm shift from modernity to postmodernity in theorizing about the environment. The relationship between society and the environment is examined through both contemporary theory and ethnographic examples. The course is an opportunity for students to plumb critical issues, place their work in a wider theoretical context, and develop their own research and writing. Prerequisite: F&ES 83050a or F&ES 83056a. Team-taught. Limited enrollment. Three hours' lecture/seminar. Taught alternate years. *Also F&ES 80153b.*

**ANTH 619a<sup>U</sup>, Language and the Public Sphere. J. Bernard Bate.**

T 1.30–3.20

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.

**ANTH 622a<sup>U</sup>, Africa and the Disciplines. M. Kamari Clarke, Christopher L. Miller.**

TH 1.30–3.20

An exploration of how the different academic disciplines reconceptualize the study of Africa and the ways in which the disciplines draw on each other's techniques and results in the process. *Also AFAM 755a<sup>U</sup>, AFST 764a<sup>U</sup>.*

**ANTH 634a<sup>U</sup>, Anthropology of the Postcolonial State. Staff.**

TH 1.30–3.20

Ethnographic and interpretive approaches to the postcolonial state and the forms of public culture to which it gives rise. Topics include the formation of state structures and citizen subjects; nationalism in relation to discourse in the public sphere; ritual and aesthetic dimensions of rule and resistance; tensions among popular, civic, and global culture. *Also AFST 734a<sup>U</sup>.*

**ANTH 635b<sup>U</sup>, Vietnam: War, Memory, Forgetting. Christophe Robert.**

TH 9.30–11.20

This course deals with the "Vietnamese Conflict" (1960–1975) not just from an historical but also a comparative anthropological viewpoint. We examine it first as one among the series of anticolonial wars of Indochina, together with the cultural formations within which war emerged as a privileged mode of opposition in Southeast Asia against imperialism, colonialism, and communism, as well as the United States in particular. In this way a context is developed to deal with broader questions about the character of war and its aftereffects: dimensions of nationalism and revolution; trauma and forgetting in nationalist historiography; the relationship among violence, war, and the idea of law; and the work of fiction in both culture and its analysis.

**ANTH 701b<sup>U</sup>, Foundations of Modern Archaeology. Richard Burger.**

TTH 1–2.15

Discusses how method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. This course assumes a background in the basics of archaeology equivalent to one of the introductory courses. *Also ARCG 701b<sup>U</sup>.*

**ANTH 705Lb<sup>U</sup>, Archaeology Laboratory II. Marcello Canuto.**

W 1–4

Practical experience in preparation, analysis, and interpretation of artifacts and nonartificial archaeological data. Students undertake term projects. *Also ARCG 705Lb<sup>U</sup>.*

**ANTH 706b<sup>U</sup>, Mesopotamia from Sumer to Saddam. Harvey Weiss.**

TH 11.30–12.45

Archaeological, historical, and literary analysis of Mesopotamian/Iraqi social development, from agricultural villages and cities and empires in the context of changing natural environments from prehistory to the Persian empire, and the subsequent European encounters, Islamicization, nationalism, and American invasions. *Also ARCG 706b<sup>U</sup>.*

**ANTH 712a<sup>U</sup>, Ancient Civilizations of Mesoamerica. Marcello Canuto.**

MW 2.30–3.45

The Indian civilizations of Mexico and Central America from earliest times through the Spanish conquest. *Also ARCG 712a<sup>U</sup>.*

**ANTH 719a<sup>U</sup>, Ethnohistory and Archaeology. Roderick McIntosh.**

MW 1–2.15

Review of the major problems and methodologies associated with the use of ethnohistory by archaeologists. How do archaeologists construct a historical imagination? Looks at a variety

of sources: colonial and “visitor” documents, peoples’ written descriptions of themselves, oral traditions, classic ethnographies, and art history. *Also ARCG 719a<sup>u</sup>.*

**ANTH 723b<sup>u</sup>, Origins of Andean Complex Societies. Richard Burger.**

F 2.30–4.20

The development of early complex society in Peru during the Early Horizon is examined along with its antecedent during the Preceramic and Initial periods. This seminar focuses on the problems of elucidating the sociopolitical organization of these societies and the factors responsible for their transformation. General theories of the origins of complex society are critically reviewed in light of the Peruvian case. *Also ARCG 723b<sup>u</sup>.*

**ANTH 732a<sup>u</sup> and 733La<sup>u</sup>, Archaeological Field Techniques and Archaeology Lab I. Marcello Canuto.**

MW 4–5.15, Lab SA 8.30–5

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. *Also ARCG 732a<sup>u</sup> and 733La<sup>u</sup>.*

**ANTH 741b<sup>u</sup>, Archaeology of Communities. Marcello Canuto.**

T 2.30–4.20

An examination of households and of their integration into communities in ancient complex societies. Heavily emphasizing theoretical perspectives from cultural anthropology, this course studies archaeological approaches to a holistic study of everyday life in ancient societies. Reading is drawn from diverse fields of ethnography, ethnoarchaeology, ethnohistory, and archaeology. *Also ARCG 741b<sup>u</sup>.*

**ANTH 745a<sup>u</sup>, Landscape Archaeology. Staff.**

TTh 2.30–3.45

Examination of landscape as a powerful concept in archaeology, and the basis of a thriving research agenda within the discipline. The course traces the intellectual development of landscape perspectives in archaeology, from a primary concern with adaptive and economic aspects of human environment interactions to more recent interest in cognitive and culturally constructed landscapes. Case studies reveal a multiplicity of archaeological approaches. Permission of instructor required for non-archaeology/anthropology undergraduates. *Also ARCG 745a<sup>u</sup>.*

**ANTH 761a<sup>u</sup>, Analysis of Archaeological Ceramics. Britt Hartenberger.**

Th 1.30–3.20

This course covers theoretical and practical approaches used to generate cultural information from ceramics recovered in archaeological contexts. Students are exposed to the ways in which ceramic data aid in establishing chronology, provide functional and stylistic information, as well as reconstruct production, distribution, and consumption patterns for prehistoric cultures. *Also ARCG 761a<sup>u</sup>.*

**ANTH 763a<sup>u</sup>, Archaeologies of Empire. Harvey Weiss.**

Th 2.30–4.20

Comparative study of origins, structures, efficiencies, and limitations of imperialism, ancient and modern, in the Old and New World, from Akkad to “Indochine,” and from Wari to Aztec. The contrast between ancient and modern imperialisms examined from the perspectives of nineteenth- and twentieth-century archaeology and political economy. *Also ARCG 763a<sup>u</sup>.*

**ANTH 771a, Early Complex Societies. Richard Burger.**

T 10.30–12.20

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. *Also ARGC 771a.*

**ANTH 773b<sup>U</sup>, Civilizations and Collapse. Harvey Weiss.**

Th 2.30–4.20

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. *Also ARCG 773b<sup>U</sup>, NELC 588b<sup>U</sup>.*

**ANTH 777a<sup>U</sup>, Origins of Agriculture. Britt Hartenberger.**

TTh 2.30–3.45

The concepts and processes of domestication are examined in the context of archaeological examples from several regions of the world. *Also ARCG 777a<sup>U</sup>.*

**ANTH 803b, Reproductive Ecology of Humans and Nonhuman Primates.**

**Richard Bribiescas.**

T 1.30–3.20

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.

**ANTH 808b, Topics and Issues in Evolutionary Morphology. Eric Sargis.**

T 1.30–3.20

The discipline of morphology is considered in historical context. Topics include pre-Darwinian morphology, the primacy of form or function, the paradigm method, historical analysis of form, and constructional morphology. Current phylogenetic and biomechanical applications to the study of form are evaluated.

**ANTH 841a, Behavioral Biology of Human Males. Richard Bribiescas.**

T 1.30–3.20

This course examines the biology and evolution of human male behavior and life histories. Topics to be covered include the evolution and underlying biology of aggression, libido, competition, senescence, and sexuality. Readings are drawn from the current and historical literature of behavioral endocrinology and neurobiology with some discussion of the utility of comparative models drawn from nonhuman primates and other organisms.

**ANTH 851a, Topics and Issues in Evolutionary Theory. David Watts, Eric Sargis.**

T 1.30–3.20

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.

**ANTH 875b<sup>U</sup>, Primate Behavioral Ecology. David Watts.**

W 10.30–12.20

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.

**ANTH 891b, Advanced Laboratory Methods in Reproductive Ecology and Behavioral Endocrinology. Stephanie Anestis.**

M 10.30–1.30

The assessment of hormones and other biological agents is central to research into the proximate mechanisms that govern the evolution of life history traits in all vertebrates, including humans and nonhuman primates. This course introduces students to contemporary laboratory methods pertaining to human and nonhuman primate reproductive biology and endocrinology. Training includes the assessment of steroid and protein hormones in a variety of mediums including blood, urine, and saliva, using radioimmunoassay (RIA) and enzyme immunoassay (EIA) methods. Collection, storage, and preservation of biological samples collected under field conditions as well as proper safety protocols are also included in the training regimen. Laboratory; enrollment limited; undergraduates allowed with permission of instructor.

**ANTH 941a and b, Research Seminar in Japan Anthropology. William Kelly.**

HTBA

This seminar offers professional preparation for doctoral students in Japan anthropology through systematic readings and analysis of the anthropological literature, in English and in Japanese. Permission of the instructor required.

**ANTH 942a and b, Research Seminar in South Asia Anthropology. Staff.**

HTBA

This ongoing research seminar explores critical texts in the anthropology and ethnography of South Asia. The seminar is designed for doctoral students specializing in some aspect of South Asia. Others with appropriate backgrounds and interests may be admitted in consultation with the instructor.

**ANTH 943a and b, Research Seminar: Historical Anthropology of China. Helen Siu.**

HTBA

This seminar offers professional preparation for doctoral students in Chinese anthropology, history, and possibly other disciplines. Readings and analysis of the anthropological and historical literature are in English and in Chinese. Permission of the instructor required.

**ANTH 951a, Directed Research in Ethnology and Social Anthropology.**

By arrangement with faculty.

**ANTH 951b, Directed Research in Ethnology and Social Anthropology.**

By arrangement with faculty.

**ANTH 952a, Directed Research in Linguistics.**

By arrangement with faculty.

**ANTH 952b, Directed Research in Linguistics.**

By arrangement with faculty.

**ANTH 953a, Directed Research in Archaeology and Prehistory.**

By arrangement with faculty.

**ANTH 953b, Directed Research in Archaeology and Prehistory.**

By arrangement with faculty.

**ANTH 954a, Directed Research in Physical Anthropology.**

By arrangement with faculty.

**ANTH 954b, Directed Research in Physical Anthropology.**

By arrangement with faculty.

## APPLIED MATHEMATICS

A. K. Watson Hall, 432.1278

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

*Chair and Director of Graduate Studies*

Steven Zucker (AKW 107A, 432.1278, [zucker@cs.yale.edu](mailto:zucker@cs.yale.edu))

### *Professors*

James Aspnes (*Computer Science*), 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*), John Hartigan (*Statistics*), Roger Howe (*Mathematics*), Peter Jones (*Mathematics*), Ravindran Kannan (*Computer Science; Applied Mathematics*), Steven Orszag (*Mathematics; Applied Mathematics*), David Pollard (*Statistics*), Vladimir Rokhlin (*Computer Science; Mathematics*), Herbert Scarf (*Economics*), Martin Schultz (*Computer Science*), Mitchell Smooke (*Mechanical Engineering; Applied Physics*), Katepalli Sreenivasan (*Adjunct, Mechanical Engineering*), Steven Zucker (*Computer Science; Biomedical Engineering*)

### *Assistant Professors*

John Emerson (*Statistics*), Hannes Leeb (*Statistics*), Mauro Maggioni, Sekhir Tatikonda (*Electrical Engineering*)

### *Gibbs Assistant Professors*

Yoel Shkolnisky, Amit Singer, Mark Tygert

## *Fields of Study*

The graduate program in Applied Mathematics comprises mathematics and its applications to a range of areas, to the mathematical sciences (including computer science and statistics), and to the other sciences and engineering. 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 computational biology, computational neuroscience, fluid mechanics, combustion, and other scientific and engineering problems.

## *Special Requirements for the Ph.D. Degree*

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; (3) submit a dissertation prospectus; (4) participate in the instruction of undergraduates; (5) be in residence for at least three

years; and (6) complete a dissertation that clearly advances understanding of the subject it considers. The normal time for completion of the Ph.D. program is four years. Requirement (1) normally includes four core courses in each of 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 second 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.

*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 (see page 464).

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.



## APPLIED PHYSICS

Dunham Laboratory, 432.4250

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

### *Chair*

Daniel Prober

### *Professors*

Sean Barrett, William Bennett, Jr. (*Emeritus*), Richard Chang, Michel Devoret, Joseph Dillon, Jr. (*Adjunct*), Paul Fleury, Steven Girvin, Robert Grober, Victor Henrich, Arvid Herzenberg (*Emeritus*), Marshall Long, Tso-Ping Ma, Daniel Prober, Nicholas Read, Mark Reed, Robert Schoelkopf, Ramamurty Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*)

### *Associate Professors*

Charles Ahn, Janet Pan

### *Assistant Professor*

Sohrab Ismail-Beig

### *Fields of Study*

Fields include areas of theoretical and experimental condensed-matter physics, optical and laser physics, and material physics. Specific programs include surface science, microlithography and quantum transport, optical properties of micro-cavities, spectroscopy at the nanoscale, near-field microscopy, atomic force microscopy and ferro-electronic materials, molecular beam epitaxy, mesoscopic physics, first principles electronic structure methods, and medical instrumentation.

## ARCHAEOLOGICAL STUDIES

51 Hillhouse, 432.3772  
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*), Robert Gordon (*Geology & Geophysics*), Andrew Hill (*Anthropology*), Diana Kleiner (*Classics; History of Art*), Roderick McIntosh (*Anthropology*), Mary Miller (*History of Art*), Ronald Smith (*Geology & Geophysics*), Karl Turekian (*Geology & Geophysics*), Harvey Weiss (*Near Eastern Languages & Civilizations*)

### *Assistant Professors*

Marcello Canuto (*Anthropology*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Milette Gaifman (*History of Art; Classics*), Lan-ying Tseng (*History of Art*)

### *Lecturers*

Karen Foster (*Near Eastern Languages & Civilizations*), Britt Hartenberger (*Anthropology*)

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 groups: Anthropology; Classics, History of Art, or Near Eastern Languages & Civilizations; 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 course requirements in one academic year, and all students are expected to complete the program within a maximum period of three academic years.

Program materials are available upon request to the Director of Graduate Studies, Archaeological Studies, Department of Anthropology, Yale University, PO Box 208277, New Haven CT 06520-8277; e-mail, [anthropology@yale.edu](mailto:anthropology@yale.edu); Web site, [www.yale.edu/archaeology](http://www.yale.edu/archaeology).

### Courses

#### **ARCG 701b<sup>u</sup>, Foundations of Modern Archaeology. Richard Burger.**

TTH 1–2.15

Discusses how method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. This course assumes a background in the basics of archaeology equivalent to one of the introductory courses. *Also ANTH 701b<sup>u</sup>.*

#### **ARCG 705Lb<sup>u</sup>, Archaeology Laboratory II. Marcello Canuto.**

W 1–4

Practical experience in preparation, analysis, and interpretation of artifacts and nonartificial archaeological data. Students undertake term projects. *Also ANTH 705Lb<sup>u</sup>.*

#### **ARCG 706b<sup>u</sup>, Mesopotamia from Sumer to Saddam. Harvey Weiss.**

TTH 11.30–12.45

Archaeological, historical, and literary analysis of Mesopotamian/Iraqi social development, from agricultural villages and cities and empires in the context of changing natural environments from prehistory to the Persian empire, and the subsequent European encounters, Islamicization, nationalism, and American invasions. *Also ANTH 706b<sup>u</sup>.*

#### **ARCG 712a<sup>u</sup>, Ancient Civilizations of Mesoamerica. Marcello Canuto.**

MW 2.30–3.45

The Indian civilizations of Mexico and Central America from earliest times through the Spanish conquest. *Also ANTH 712a<sup>u</sup>.*

#### **ARCG 719a<sup>u</sup>, Ethnohistory and Archaeology. Roderick McIntosh.**

MW 1–2.15

Review of the major problems and methodologies associated with the use of ethnohistory by archaeologists. How do archaeologists construct a historical imagination? Looks at a variety of sources: colonial and “visitor” documents, peoples’ written descriptions of themselves, oral traditions, classic ethnographies, and art history. *Also ANTH 719a<sup>u</sup>.*

#### **ARCG 723b<sup>u</sup>, Origins of Andean Complex Societies. Richard Burger.**

F 2.30–4.20

The development of early complex society in Peru during the Early Horizon is examined along with its antecedent during the Preceramic and Initial periods. This seminar focuses on the problems of elucidating the sociopolitical organization of these societies and the factors responsible for their transformation. General theories of the origins of complex society are critically reviewed in light of the Peruvian case. *Also ANTH 723b<sup>u</sup>.*

#### **ARCG 732a<sup>u</sup> and 733La<sup>u</sup>, Archaeological Field Techniques and Archaeology Lab I.**

Marcello Canuto.

MW 4–5.15, Lab SA 8.30–5

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. *Also ANTH 732a<sup>u</sup> and 733La<sup>u</sup>.*

**ARCG 735b, Art and Text in Ancient Greece. Milette Gaifman.**

W 2.30–4.20

Since the rise of the Greek *polis*, Greek visual culture explored the relationship between art and text: in images of mythological scenes, in written descriptions of works of art, and in combining inscribed texts with pictorial representations. The course examines the relationship between word and image and between the visual and the literary in the Archaic and Classical periods. Taking Lessing's *Laokoon* of 1776 as a point of departure, the seminar considers the themes of pictorial narratives, the literary genre of *ekphrasis*, as well as the role and significance of inscriptions in Greek artistic representations. *Also CLSS 826b, HSAR 562b.*

**ARCG 741b<sup>U</sup>, Archaeology of Communities. Marcello Canuto.**

T 2.30–4.20

An examination of households and of their integration into communities in ancient complex societies. Heavily emphasizing theoretical perspectives from cultural anthropology, this course studies archaeological approaches to a holistic study of everyday life in ancient societies. Reading is drawn from diverse fields of ethnography, ethnoarchaeology, ethnohistory, and archaeology. *Also ANTH 741b<sup>U</sup>.*

**ARCG 744b<sup>U</sup>, The Age of Akhenaton. John Darnell, Karen Foster.**

MW 11.30–12.45

Study of the unique period of Egyptian Pharaoh Akhenaton (reigned ca. 1353–1336 BCE), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives, considered within their wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. The course examines the international diplomacy and solar theology of the period, and places the famous artistic developments of Akhenaton in context. Reading of primary source material in translation. *Also NELC 509b<sup>U</sup>.*

**ARCG 745a<sup>U</sup>, Landscape Archaeology. Staff.**

TR 2.30–3.45

Examination of landscape as a powerful concept in archaeology, and the basis of a thriving research agenda within the discipline. The course traces the intellectual development of landscape perspectives in archaeology, from a primary concern with adaptive and economic aspects of human environment interactions to more recent interest in cognitive and culturally constructed landscapes. Case studies reveal a multiplicity of archaeological approaches. Permission of instructor required for non-archaeology/anthropology undergraduates. *Also ANTH 745a<sup>U</sup>.*

**ARCG 749a, Becoming Hadrian: Autobiography and Art in the Second Century A.D.**

Diana Kleiner.

T 1.30–3.20

Marguerite Yourcenar's famed fictional *Memoirs of Hadrian* serves as the starting point for an exploration of Hadrian and the art he commissioned in Rome and abroad. Hadrian's passion for life, quest after peace, romantic wanderlust, veneration of Greek culture, and craving for love, along with his acceptance of death's inexorableness, led him to commission some of Rome's greatest monuments. The emperor's flair for leadership and talent as an amateur architect inform student projects on the sculpture, mosaics, and buildings of the age, among them the portraiture of Hadrian's lover Antinous, the Pantheon, and Hadrian's Wall in Britain. Special attention is paid to Hadrian's Villa at Tivoli, an empire unto itself where Hadrian's autobiography was fully realized. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. *Also CLSS 846a, HSAR 570a.*

**ARCG 761a<sup>u</sup>, Analysis of Archaeological Ceramics. Britt Hartenberger.**

Th 1.30–3.20

This course covers theoretical and practical approaches used to generate cultural information from ceramics recovered in archaeological contexts. Students are exposed to the ways in which ceramic data aid in establishing chronology, provide functional and stylistic information, as well as reconstruct production, distribution, and consumption patterns for prehistoric cultures. *Also ANTH 761a<sup>u</sup>.*

**ARCG 762b<sup>u</sup>, Remote Sensing: Observing the Earth from Space. Ronald Smith and staff.**

TTh 9–10.15

Topics include the spectrum of electromagnetic radiation; satellite-borne radiometers; data transmission and storage; computer image analysis; and GIS analysis of satellite imagery with applications to weather and climate, oceanography, surficial geology, snow and ice, forestry, agriculture, and watershed management. *Also F&ES 77001b, G&G 562b<sup>u</sup>.*

**ARCG 763a<sup>u</sup>, Archaeologies of Empire. Harvey Weiss.**

Th 2.30–4.20

Comparative study of origins, structures, efficiencies, and limitations of imperialism, ancient and modern, in the Old and New Worlds, from Akkad to “Indochine,” from Wari to Aztec. The contrast between ancient and modern imperialisms examined from the perspectives of nineteenth- and twentieth-century archaeology and political economy. *Also ANTH 763a<sup>u</sup>.*

**ARCG 765a<sup>u</sup>, Archaeometallurgy. Robert Gordon.**

TTh 9–10.15

Evidence of the winning and use of metals by people in different cultures from earliest to modern times. The role of science; environmental consequences. Interpretation of artifacts and of smelting and metalworking sites. Laboratory demonstrations and field trips. *Also G&G 565a<sup>u</sup>.*

**ARCG 771a, Early Complex Societies. Richard Burger.**

T 10.30–12.20

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. *Also ANTH 771a.*

**ARCG 773b<sup>u</sup>, Civilizations and Collapse. Harvey Weiss.**

Th 2.30–4.20

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. *Also ANTH 773b<sup>u</sup>, NELC 588b<sup>u</sup>.*

**ARCG 777a<sup>u</sup>, Origins of Agriculture. Britt Hartenberger.**

TTh 2.30–3.45

The concepts and processes of domestication are examined in the context of archaeological examples from several regions of the world. *Also ANTH 777a<sup>u</sup>.*

**ARCG 789a, Materiality of Death in Chinese Art.** Lan-ying Tseng.

T 1.30–3.20

This seminar examines how the abstract notion of death was materialized in early China, focusing on major archaeological discoveries in the second half of the twentieth century. Special attention is given to the analysis of burial context and funerary furnishing to address how a tomb can be read as a place. Issues developed from case studies include replication, ritual, body, fantasy, gender, and patronage. Chinese is not required. *Also HSAR 789a.*

**ARCG 953a or b, Directed Research in Archaeology and Prehistory.** Faculty.  
By arrangement.

*Related Courses*

**ARCG 001a, Egypt and Northeast Africa: A Multidisciplinary Approach.**

John Darnell.

*Also NELC 001a.*

**ARCG 100a, Genesis and Collapse of Old World Civilizations.** Harvey Weiss.

*Also ANTH 150a, HUMS 100b.*

**ARCG 163b, From Pictograph to Pixel: Changing Ways of Human Communication.**

John Darnell, Michael Fisher, Beatrice Gruendler.

*Also CPSC 209b, HUMS 338b, NELC 163b.*

**ARCG 171b, Great Discoveries in Archaeology.** Britt Hartenberger.

**ARCG 202a, Pre-Columbian Architecture.** Mary Miller.

*Also HSAR 202a<sup>G</sup>.*

**ARCG 212a, Art and Archaeology in China.** Lan-ying Tseng.

*Also HSAR 351a.*

**ARCG 232a, Ancient Civilizations of the Andes.** Richard Burger.

*Also ANTH 232.*

**ARCG 238b, Buried Cities: Thera, Pompeii, and Herculaneum.** Karen Foster.

*Also HSAR 238b, NELC 107b.*

**ARCG 239a, Art of the Ancient Near East and Aegean.** Karen Foster.

*Also HSAR 239a<sup>G</sup>, HUMS 104a, NELC 104a.*

**ARCG 252a, Roman Architecture.** Diana Kleiner.

*Also HSAR 252a, CLCV 175a.*

**ASTR 135b, Archaeoastronomy.** Michael Faison.

**CLSS 835b, Early Roman Religion.** Celia Schultz.

**HSAR 243b, Greek Art and Architecture.** Milette Gaifman.

*Also CLCV 160b.*

**HSAR 586a, Icons.** Robert Nelson.

## ASTRONOMY

J.W. Gibbs Laboratories, 432.3000

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

### *Chair*

Jeffrey Kenney

### *Director of Graduate Studies*

Sarbani Basu (274 JWG, 432.3028, sarbani.basu@yale.edu)

### *Professors*

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

### *Associate Professors*

Priyamvada Natarajan, Pieter van Dokkum

### *Assistant Professors*

Richard Easther (*Physics*), Steven Furlanetto

### *Lecturers*

Michael Faison, Gordon Drukier

### *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 should have a strong undergraduate preparation in physics and mathematics. Although some formal training in astronomy is useful, it is by no means required for admission. Applicants should take the GRE Subject Test in Physics.

### *Special Requirements for the Ph.D. Degree*

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

Computational Methods in Astrophysics and Geophysics (ASTR 520), Observational Techniques (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 Early Universe (ASTR 565).

Students require the permission of the instructor and the DGS to drop 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 drop 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 a written 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. The students must consult with the DGS and prospective advisers before selecting the other classes; the prospective advisers may require the students to attend specific 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). 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 the 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 9 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 6 TF units. The additional 3 TF units will normally be carried out after the fourth term of study.

### *Honors Requirement*

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see page 464).



## 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 HP in the courses taken and a grade of HP 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 510a<sup>U</sup>, Stellar Populations. Robert Zinn.**

The stellar populations 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 518, Stellar Dynamics.]

**ASTR 520a, Computational Methods in Astrophysics and Geophysics.**

**Gordon Drukier.**

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. *Also G&G 538a.*

**ASTR 530a<sup>U</sup>, Galaxies. Staff.**

The structure, contents, dynamics, and evolution of galaxies. The properties and evolution of active galactic nuclei.

[ASTR 540, Radiative Processes in Astrophysics and Geophysics.]

**ASTR 550a<sup>U</sup>, 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.

**ASTR 555b<sup>U</sup>, Observational Techniques. Robert Zinn.**

MW 1–2.15

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. Richard Larson.**

Observations of interstellar matter at optical, infrared, radio, and X-ray wavelengths. Dynamics and evolution of the interstellar medium including interactions between stars and interstellar matter. Molecular clouds and processes of star formation.

[ASTR 565, The Early Universe.]

[ASTR 570, High-Energy Astrophysics.]

**ASTR 580a or b, Research.**

By arrangement with faculty.

**ASTR 585b, Radio Astronomy. Michael Faison.**

Introduction to radio astronomy theory and techniques.

**ASTR 590b, Solar Physics. Sabatino Sofia.**

The very detailed observations of the sun have uncovered properties and variabilities not explainable in terms of standard models of stellar structure and evolution. This course describes these observations and develops a theoretical framework to address them.

[ASTR 600, Cosmology.]

**ASTR 666b, Statistical Thermodynamics for Astrophysics and Geophysics.**

**John Wettlaufer.**

TRH 2.30–3.45

Classical thermodynamics is derived from statistical thermodynamics. We then develop kinetics, transport theory, and reciprocity from the linear thermodynamics of irreversible processes. Emphasis is placed on phase transitions, including novel states of matter, nucleation theory, and the thermodynamics of atmospheres. We explore phenomena that are of direct relevance to problems in astrophysical settings, atmospheres, oceans, and the Earth's interior. No quantum mechanics is necessary as a prerequisite. *Also G&G 666b.*

**ASTR 705a, Research Seminar in Stellar Population. Robert Zinn.**

**ASTR 710a or b, Professional Seminar. Faculty.**

A seminar covering science and professional issues in astronomy.

[ASTR 715a, Research Seminar in High-Energy Astrophysics.]

[ASTR 720b, Research Seminar in Solar Physics.]

## BIOMEDICAL ENGINEERING

Dunham Laboratory, 432.4250

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

### *Chair*

Mark Saltzman

### *Professors*

Richard Carson, James Duncan, Douglas Rothman, Mark Saltzman, Steven Segal,  
Fred Sigworth, Steven Zucker (*Computer Science*)

### *Associate Professors*

Jacek Cholewicki, Todd Constable, Fahmeed Hyder, Lawrence Staib, Hemant Tagare

### *Assistant Professors*

Francesco d'Errico, Robin de Graaf, Tarek Fahmy, Themis Kyriakides, Mark Laubach,  
Erin Lavik, Michael Levene, Xenios Papademetris

### *Fields of Study*

Fields include the physics of image formation (MRI, ultrasound, nuclear medicine, and X-ray), NMR spectroscopy, PET and modeling, digital image analysis and processing, computer vision, biological signals and sensors, biomechanics, physiology and human factors engineering, drug delivery, biotechnology, biomechanics of the spine, and tissue engineering.

## CELL BIOLOGY

C-207 Sterling Hall of Medicine, 785.4320

[www.cellbiology.yale.edu](http://www.cellbiology.yale.edu)

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

### *Chair*

Ira Mellman

### *Director of Graduate Studies*

Carl Hashimoto (C-223 SHM, 737.2746, [carl.hashimoto@yale.edu](mailto:carl.hashimoto@yale.edu))

[www.cellbiology.yale.edu/cellbio/html/graduate/index.shtml](http://www.cellbiology.yale.edu/cellbio/html/graduate/index.shtml)

### *Professors*

Norma Andrews (*Microbial Pathogenesis*), Roland Baron (*Orthopaedics*), Michael Caplan (*Physiology*), Lynn Cooley (*Genetics*), Peter Cresswell (*Immunobiology*), Pietro De Camilli, Susan Ferro-Novick, Jorge Galán (*Microbial Pathogenesis*), Fred Gorelick (*Internal Medicine/Digestive Diseases*), James Jamieson, Thomas Lentz, Vincent Marchesi (*Pathology*), Ira Mellman, Mark Mooseker (*Molecular, Cellular & Developmental Biology*), Michael Nathanson (*Internal Medicine/Digestive Diseases*), Peter Novick, Thomas Pollard (*Molecular, Cellular & Developmental Biology*), Elisabetta Ullu (*Internal Medicine/Infectious Diseases*), Graham Warren

### *Associate Professors*

Carl Hashimoto, Gero Miesenböck, Sandra Wolin

### *Assistant Professors*

Karin Reinisch, Elke Stein (*Molecular, Cellular & Developmental Biology*), Peter Takizawa, Derek Toomre

### *Fields of Study*

Fields include membrane biology of eukaryotic cells (molecular mechanisms of membrane biogenesis, traffic, and fusion; organelle biogenesis), intracellular transport of membrane and secretory proteins, receptor-mediated endocytosis, generation of trans-membrane signals, epithelial cell polarity and the extracellular matrix, protein folding, membrane function in the nervous system (synapse formation and function), neural networks, axon guidance, developmental genetics, virus-cell interactions, cell biology of protozoan parasites and of pathogen/host interactions, cell biology of the immune response, mRNA biogenesis and localization, RNA folding, the role of RNA-protein particles, structural biology, cell biology of bone remodeling and of the cytoskeleton. Approaches to these topics include biochemistry, molecular biology, and macromolecular crystallography; bacterial, yeast, *Drosophila*, and mouse genetics; immunocytochemistry and electron microscopy; cell fractionation; and live cell imaging.

### *Special Admissions Requirements*

An undergraduate major in biology, biophysics, molecular biology, or biochemistry is recommended. MCAT scores may be substituted for the GRE General Test; GRE Subject Test recommended.

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 602a (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 603a (Seminar in Molecular Cell Biology) or CBIO 606b (Advanced Seminar Course), 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 are also required to 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 a written and oral qualifying examination at the end of the fourth 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, and submitted an approved prospectus. 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 level. 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.

### *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 602a, 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 ([info.med.yale.edu/bbs](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, 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 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; and endocrine and reproductive cell biology. 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 the light microscope for exploring cell and tissue structure. This course is offered only to M.D. and M.D./Ph.D. students. This course runs from September to mid-May and is equivalent to three graduate credits.

**CBIO 503a/b, Histology Laboratory. Thomas Lentz and staff.**

Histophysiology laboratory provides practical experience with the light microscope for exploring cell and tissue structure. This course is offered only to Ph.D. students.

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

M 4.30–6

This 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 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. Several special sessions are dedicated to technologic advances. In addition, three 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 Cell Biology 502a,b. Student evaluations are based on attendance, participation in group discussions, formal presentations, and a written review of an NIH proposal. This course runs from September to mid-May and is equivalent to three graduate credits.

**CBIO 602a, Molecular Cell Biology. Sandra Wolin, Thomas Pollard, Graham Warren, and faculty.**

MW 1.45–3

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. *Also MB&B 602a, MCDB 602a.*

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**CBIO 603a, Seminar in Molecular Cell Biology. Sandra Wolin, Thomas Pollard, Graham Warren, and faculty.**

603a-1: Th 9–10.30

603a-2: Th 10.30–12

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. *Also MCDB 603a.*

**CBIO 604b, Systems Cell Biology. Carl Hashimoto 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.

**CBIO 606b, Advanced Seminar Course. Susan Ferro-Novick, Peter Novick.**

This seminar course, which meets once a week, covers several topics suggested by the second-year cell biology students. It should serve to introduce students to areas they might not have considered in prior courses. Each topic is spread over three to four sessions, starting with an introductory overview and followed by a detailed analysis of key papers. This course is run on alternate years with CBIO 727b.

**CBIO 701b, Illuminating Cellular Function. Gero Miesenböck, Derek Toomre, 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 and 901b, First-Year Introduction to Research. Carl Hashimoto, Shirleen Roeder, Michael Stern, and faculty.**

Lab rotations, grant writing, and ethics for Molecular Cell Biology, Genetics, and Development track students. *Also GENE 900a and 901b, MCDB 900a and 901b.*

## CELLULAR AND MOLECULAR PHYSIOLOGY

B-147 Sterling Hall of Medicine, 737.2215

M.Phil., Ph.D.

### *Chair*

Steven Hebert

### *Director of Graduate Studies*

Emile Boulpaep (B-142 SHM, 785.4055, emile.boulpaep@yale.edu)

### *Professors*

Peter Aronson (*Internal Medicine/Nephrology*), Henry Binder (*Internal Medicine/Digestive Disease*), Walter Boron, Emile Boulpaep, Thomas Brown (*Psychology*), Michael Caplan, W. Knox Chandler, Lawrence Cohen, Barbara Ehrlich (*Pharmacology*), Bliss Forbush III, John Geibel (*Surgery*), Steven Hebert, Leonard Kaczmarek (*Pharmacology*), Patricia Preisig (*Internal Medicine/Nephrology*), George Richerson (*Neurology*), 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*)

### *Associate Professors*

Angelique Bordey (*Neurosurgery*), Cecilia Canessa, Lloyd Cantley (*Internal Medicine/Nephrology*), Marie Egan (*Pediatrics*), Gero Miesenböck (*Cell Biology*)

### *Assistant Professors*

Michael Nitabach, Susumu Tomita, David Zenisek, Yufeng Zhou

### *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, vascular 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.



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### *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 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 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 second year, 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.

After satisfying the departmental pre-dissertation 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 (see page 464).

### *Master's Degrees*

No students are admitted for master's degrees. A student leaving the Ph.D. program after one year of residence in good standing, and having completed a full two-term curriculum of courses with grades that satisfy departmental requirements, may elect to receive a terminal Master of Science (M.S.) degree. Any student who has fulfilled all the requirements for the Ph.D. except the prospectus and dissertation may elect to receive the Master of Philosophy (M.Phil.) degree, normally at the end of the second year. See Degree Requirements under Policies and Regulations.

Program materials are available upon request to the Department Registrar, Department of Cellular and Molecular Physiology, Yale University, School of Medicine, 333 Cedar Street, PO Box 208026, New Haven CT 06520-8026.

## Courses

### **C&MP 520a, Current Perspectives in Physiology. David Zenisek.**

TTh 2.30–3.45

This seminar course 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 exercise physiology. 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.

### **C&MP 550a, Physiological Systems. W. Mark Saltzman, Emile Boulpaep.**

MWF 9.30–10.20

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. *Also ENAS 550a<sup>II</sup>, MCDB 550a<sup>II</sup>.*

### **C&MP 560b, Cellular and Molecular Physiology: Molecular Machines in Human Disease. Emile Boulpaep, Michael Caplan, Mark Mooseker, Fred Sigworth.**

MWF 9.30–10.20

This 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 upon the relationship between the molecular structures of membrane proteins, their normal function, and abnormal function in human disease. The interactions among transport proteins in determining the physiologic 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. *Also ENAS 570b<sup>II</sup>, MCDB 560b<sup>II</sup>.*

### **C&MP 710b, Electron Cryo-Microscopy for Protein Structure Determination. Vinzenz Unger, Fred Sigworth.**

TTh 9–10.15

Understanding cellular function requires structural and biochemical studies at an ever-increasing level of complexity. The course is an introduction into the concepts and applications of high-resolution electron cryo-microscopy. This rapidly emerging new technique is the only tool known to date that allows biological macromolecules to be studied at all levels of resolution ranging from their cellular organization to near-atomic detail. *Also MB&B 710b4.*

**CHEMICAL ENGINEERING**

Dunham Laboratory, 432.4250

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

*Chair*

Menachem Elimelech

*Professors*

Eric Altman, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Michael Loewenberg, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, L. Lee Wikstrom (*Adjunct*), Kurt Zilm

*Associate Professor*

Paul Van Tassel

*Assistant Professors*

Eric Dufresne, William Mitch, Jordan Peccia

*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.

## CHEMISTRY

Sterling Chemistry Laboratory, 432.3913  
M.S., Ph.D.

### *Chair*

Gary Brudvig (Rm 1, SCL, 432.3912, chemistry.chair@yale.edu)

### *Director of Graduate Studies*

Charles Schmittenmaer [F] (Rm 1, SCL, 432.3913, chemistry.dgs@yale.edu)

John Faller [Sp] (Rm 228, CRB, 432.3954, chemistry.dgs@yale.edu)

### *Professors*

Sidney Altman (*Molecular, Cellular & Developmental Biology*), Jerome Berson (*Emeritus*), Gary Brudvig, William Chupka (*Emeritus*), Robert Crabtree, R. James Cross, Jr., Donald Crothers (*Emeritus*), John Faller, Gary Haller (*Engineering & Applied Science*), Andrew Hamilton, Francesco Iachello (*Physics*), Mark Johnson, William Jorgensen, Philip Lyons (*Emeritus*), J. Michael McBride, Scott Miller, Peter Moore, Lynne Regan (*Molecular Biophysics & Biochemistry*), Martin Saunders, Alanna Schepartz, Charles Schmittenmaer, Dieter Söll (*Molecular Biophysics & Biochemistry*), Thomas Steitz (*Molecular Biophysics & Biochemistry*), Scott Strobel (*Molecular Biophysics & Biochemistry*), John Tully, Patrick Vaccaro, Harry Wasserman (*Emeritus*), Kenneth Wiberg (*Emeritus*), Frederick Ziegler (*Emeritus*), Kurt Zilm

### *Associate Professors*

Victor Batista, Craig Crews (*Molecular, Cellular & Developmental Biology*), J. Patrick Loria

### *Assistant Professors*

Glenn Micalizio, Ann Valentine

### *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).

### *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. The student must obtain at least one term grade of Honors or three of High Pass in graduate-level 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 518a<sup>U</sup>, Advanced Organic Chemistry. William Jorgensen.**

MWF 9.30–10.20

Concise overview of structure, properties, thermodynamics, kinetics, reactions, and intermolecular interactions for organic molecular systems.

#### **CHEM 521b<sup>U</sup>, Introduction to Chemical Biology. Alanna Schepartz.**

TTh 9–10.15

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.

#### **[CHEM 522a<sup>U</sup>, Chemical Biology II.]**

#### **CHEM 523a<sup>U</sup>, Synthetic Methods in Organic Chemistry. Glenn Micalizio.**

MWF 10.30–11.20

A discussion of modern methods. Topics include 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 other students, CHEM 518a is more appropriate.

**CHEM 524b, Advanced Synthetic Methods in Chemistry. Scott Miller.**

MWF 10.30–11.20

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.

**CHEM 525b<sup>U</sup>, Spectroscopic Methods of Structure Determination.****Martin Saunders.**

MWF 9.30–10.20, 1 HTBA

The background and use of spectroscopic methods emphasizing NMR in organic chemistry are presented. The course includes the use of programs for simulating spin-spin coupling and rapid rearrangement reactions in NMR. All methods commonly used by organic chemists for determining molecular structures of species in solution, in the gas phase, and in solids are included.

**[CHEM 526a<sup>U</sup>, Computational Chemistry and Biochemistry.]****CHEM 530b<sup>U</sup>, Statistical Methods and Thermodynamics. Victor Batista.**

MWF 9.30–10.20

The fundamentals of statistical mechanics are 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.

**[CHEM 535a, Chemical Dynamics.]****CHEM 540a<sup>U</sup>, Molecules and Radiation I. Kurt Zilm.**

MWF 8.30–9.20

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, lineshapes, and NMR spectroscopy.

**CHEM 542b<sup>U</sup>, Molecules and Radiation II. Mark Johnson.**

TTh 11.30–12.45

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.

**[CHEM 546b<sup>U</sup>, Principles of Magnetic Resonance Spectroscopy.]****[CHEM 547b, Electron Paramagnetic Resonance.]****CHEM 548b, Nuclear Magnetic Resonance in Liquids. J. Patrick Loria.**

TTh 10.30–11.45

A theoretical treatment of solution NMR spectroscopy with emphasis on applications to proteins and biological macromolecules. This includes classical and quantum mechanical descriptions of NMR, product operator formalism, multidimensional NMR, phase cycling, gradient selection, relaxation phenomena, and protein resonance assignments.

**[CHEM 549b<sup>U</sup>, Biophysical Chemistry].**

**CHEM 550b<sup>U</sup>, Theoretical and Inorganic Chemistry. John Faller.**

TTH 9–10.15

Covers the major physical methods used in the determination of molecular structure, bonding, and physical properties of metal complexes. Aimed at advanced undergraduate and first-year graduate students. Students should be familiar with both inorganic coordination chemistry and physical chemistry.

**CHEM 552a<sup>U</sup>, Organometallic Chemistry. Robert Crabtree.**

TTH 9–10.15

A survey of the organometallic chemistry of the transition elements and of homogeneous catalysis.

**[CHEM 554b, Bio-Inorganic Chemistry.]****[CHEM 555b, Inorganic Mechanisms.]****CHEM 556a, Biochemical Kinetics and Dynamics. J. Patrick Loria.**

MWF 9.30–10.20

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.

**CHEM 557a<sup>U</sup>, Modern Coordination Chemistry. John Faller.**

TTH 11.30–12.45

The principles of modern inorganic chemistry. Main group and transition element chemistry: reactions, bonding, structure, and spectra.

**CHEM 560L, Advanced Physical Methods in Molecular Science.**

Patrick Vaccaro [F], R. James Cross [Sp].

F 3–4

A laboratory course introducing physical chemistry tools used in the experimental and theoretical investigation of large and small molecules. Modules include machining materials, electronics, vacuum technology, magnetic resonance, optical spectroscopy and lasers, computational aids, and molecular modeling.

**CHEM 562L, Laboratory in Instrument Design and the Mechanical Arts.**

Kurt Zilm, David Johnson.

Familiarization with modern machine shop practices and techniques. Use of basic metal-working machinery and instruction in techniques of precision measurement and properties of commonly used metals, alloys, and plastics.

**CHEM 564L, Advanced Mechanical Instrumentation. Kurt Zilm, David Johnson.**

A course geared for both the arts and sciences that goes beyond the basic introductory shop courses, offering an in-depth foundation study utilizing hands-on instructional techniques that must be learned from experience. Prerequisite: CHEM 562L.

**CHEM 565L, Introduction to Glass Blowing. Patrick Vaccaro, Daryl Smith.**

This course provides a basic introduction to the fabrication of scientific apparatus from glass. Topics covered include laboratory set-up, the fundamental skills and techniques of glass blowing, the operation of glass fabrication equipment, and requisite safety procedures.

**CHEM 570a<sup>U</sup>, Introductory Quantum Chemistry. R. James Cross.**

TTH 9–10.15

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.

**CHEM 572a, Advanced Quantum Mechanics. John Tully.**

TTh 9–10.15

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

**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, 432.0977  
M.A., M.Phil., Ph.D.

### *Chair*

Christina Kraus

### *Director of Graduate Studies*

John Matthews (*Acting* [F]) (john.matthews@yale.edu)  
Egbert Bakker [Sp] (404 Phelps, 432.0980, egbert.bakker@yale.edu)

### *Professors*

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

### *Associate Professors*

Michael Anderson, Corinne Pache (*on leave*)

### *Assistant Professors*

Milette Gaifman (*Classics; History of Art*), John Fisher, Celia Schultz

### *Lecturers*

Serena Connolly, Veronika Grimm, Joseph Solodow

### *Visiting Faculty*

James John (*Beinecke Library*), Tessa Rajak (*Judaic Studies*)

### *Affiliated Faculty*

Robert Babcock (*Curator Early Books, Beinecke Library*), Susanne Bobzien (*Philosophy*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Bentley Layton (*Religious Studies*), Dale Martin (*Religious Studies*), David Quint (*Comparative Literature*), Barbara Shailor (*Deputy Provost for the Arts*)

## *Classical Philology*

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) Diagnostic 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 French and German by the beginning of the third term in residence; (4) oral examinations in Greek and Roman history by the end of the fourth term in residence; (5) 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 in classical art and archaeology; (6) Greek and Latin composition (this requirement may but need not be satisfied by courses taken under (5) above); (7) translation examinations in Greek and Latin, based on the Classics Ph.D. reading list, by the beginning of the fifth term in residence; (8) oral examinations in Greek and Latin literature, based on the Classics Ph.D. reading list, by the end of the fifth term in residence; (9) special fields oral examinations by the end of the sixth term, consisting of two areas of special concentration in each language selected by the candidate in consultation with the director of graduate studies; (10) a dissertation prospectus by the end of the seventh term in residence; (11) 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 pre-dissertation 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) Diagnostic 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 French and German by the beginning 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, and 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 or Latin, based on the Classics Ph.D. reading list, by the beginning of the fifth term in residence; (6) an oral examination in Greek or Latin literature, based on the Classics Ph.D. reading list, by the end of the fifth term in residence; (7) a translation examination in the other ancient language based on a 1,000-page reading list approved by the director of graduate studies, by the beginning of the fifth term in residence; (8) oral examinations in Greek and Roman history on topics approved by the director of graduate studies, by the end of the sixth term in residence; (9) a dissertation prospectus by the end of the seventh term in residence; (10) a dissertation.

#### CLASSICAL ART AND ARCHAEOLOGY

The program is offered in collaboration with the Department of the History of Art and is designed to give a general knowledge of the development of art in Greece and Italy from the Bronze Age to late antiquity, combining this with a detailed study of one particular period and area; and an acquaintance with the contribution made by field archaeology to our understanding of the classical world. It is expected that each student will be given the opportunity to visit the major sites and monuments. Students are required to pass fourteen term courses, to include three seminars, divided between the two departments; distribution may be adjusted to suit the interests of individual students. Students must demonstrate a competence in Greek and Latin, usually by passing at least one 400/700-level course in each language. They must also pass departmental examinations in German and one other modern language, usually Italian or French, by the beginning of the second year in residence. They will be admitted to candidacy for the Ph.D. after passing a written and oral comprehensive examination in classical art and archaeology and by securing approval of their dissertation prospectus. Further details should be obtained from the director of graduate studies.

Prerequisites for admission: a year's course in Greek and Roman art or archaeology; a minimum of two years of college training in one classical language and one in the other (more preferred).

#### 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 director of graduate studies 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.

*Degree Requirements*

(1) Diagnostic 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 post-classical European literature and two courses on literary theory or methodology; (4) literary proficiency in German and one other modern language 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 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***Admission Requirements*

For students seeking admission in the Department of Classics, the same as for Classical Philology. For admission requirements in the Department of Philosophy, consult the director of graduate studies of that department. After admission to either department, qualified students may apply to the interdepartmental committee for admission to the program in Ancient Philosophy.

*Degree Requirements*

(1) Diagnostic 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 French and German by the beginning of the second year in residence; (4) a minimum of fourteen term graduate-level courses including at least seven in Classics; these should include at least two seminars in Greek, two terms of history of Greek literature, and one term course on the structure or history of the Greek language (composition, stylistics, linguistics); of the minimally seven courses in the Department of Philosophy at least one must be in the history of post-classical philosophy; (5) a translation examination in Greek, based on the Classics Ph.D. reading list, by the beginning of the fifth term in residence; (6) an oral examination in Greek literature, based on the Classics Ph.D. reading list, by the end of the fifth term in residence; (7) a translation examination in Latin based on a reading list of 1,000 pages, by the beginning of the fifth term in residence, made up in consultation with advisers and the director of graduate studies in Classics; (8) one of the two qualifying papers required for the Ph.D. in Philosophy, by the end of the fifth term in residence; (9) oral examinations in two areas of concentration, one of which must be in ancient philosophy, while the other must cover a topic other than ancient philoso-

phy, by the end of the sixth term in residence; (10) a dissertation prospectus, by the end of the seventh term in residence; (11) a dissertation.

A similar program, emphasizing Latin instead of Greek, can be arranged for students interested in medieval or Renaissance philosophy. For further details consult the director of graduate studies of either department.

## 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.

### *Degree Requirements*

(1) Diagnostic 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 set 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 seven or eight 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 710b<sup>U</sup>, Plato's *Republic* 10. Verity Harte.**

TTH 2.30–3.45

The class reads and discusses the Greek text of Book Ten of Plato's *Republic*. Of interest both in its own right and as the closing book of Plato's most famous philosophical work, Book Ten contains Plato's notorious criticism of art, discussion of the true nature of the soul, and one of Plato's most elaborate myths, the Myth of Er, portraying the afterlife of the soul.

**GREK 721a<sup>U</sup>, Aeschylus, *Prometheus Bound*, and Sophocles, *Philoctetes*. Victor Bers.**

TTH 1–2.15

The *Prometheus Bound* attributed to Aeschylus and Sophocles's *Philoctetes*. The course examines two “eccentric” tragedies enacted in notionally desolate settings, linked in plot by Heracles's intervention, with protagonists in extreme physical pain who affront authority and challenge what is evidently a fixed destiny; theatrical treatment of the intersection of the human and the divine; the disputed authenticity of the *Prometheus* and the “unsophoclean” aspects of the *Philoctetes*.

**GREK 743b<sup>U</sup>, Homer's *Iliad*. Michael J. Anderson.**

MW 9–10.15

Reading of selected books of the *Iliad*, with attention to Homeric language and style, the Homeric view of heroes and gods, and the reception of Homer in antiquity.

**GREK 790a<sup>U</sup>, Greek Syntax and Style. Victor Bers.**

TTH 9–10.15

A review of accidence and syntax, stylistic analysis of Greek prose of the fifth and fourth centuries B.C., including a comparison of “prosaic” and “poetic” syntax, and prose composition in various styles.

**GREK 798a<sup>U</sup> and 799b<sup>U</sup>, Survey of Greek Literature. Michael Anderson [F], Victor Bers [Sp].**

TTH 11.30–12.45, 1 HTBA [F]

TTH 9–10.15, 1 HTBA [Sp]

A comprehensive treatment of Greek literature from Homer to the Imperial period. The student is expected to read extensively in the original language, working toward familiarity with the range and variety of the literature.

**LATN 710a<sup>U</sup>, Livy's First *Pentad*. Celia Schultz.**

MW 2.30–3.45

A course intended for students with an advanced reading knowledge of Latin. We read Books I and V of Livy's *Ab Urbe Condita* in Latin and the intervening books in English. Classroom discussion focuses on close reading of passages selected from a larger weekly assignment and on discussion of interpretive and historiographic issues. Throughout the term, students are assigned selected items from relevant secondary literature.

**LATN 719b<sup>U</sup>, *Georgics*. Kirk Freudenburg.**

TTH 11.30–12.45

The primary project of the course is to read the whole of Virgil's *Georgics*, attending to the basic demands of close reading as well as to larger matters of genre, style, and cultural context. The principal contexts to be explored are the political and social milieu of late triumviral (soon to become Augustan) Rome. The course includes sample readings from related works of Latin poetry and prose, as well as from works of modern scholarship.

**LATN 737b<sup>u</sup>, Roman Comedy. Jay Fisher.**

MW 2.30–3.45

A close reading of the *Aulularia* of Plautus and the *Adelphoe* of Terence, with attention to the literary, social, and historical contexts of both plays.

**LATN 747b<sup>u</sup>, Roman Social History in Latin Texts. John Matthews.**

TTH 2.30–3.45

The course, which is intended for graduate students and senior undergraduates, studies issues in the social and economic life of the Roman Empire of the first to fifth century through readings in the legal, documentary, and epigraphic as well as in the literary sources of the period. A strong knowledge of Latin is required, and emphasis is given to the variety of literary and nonliterary styles of the documents.

**LATN 761b<sup>u</sup>, Latin Popular Literature. Serena Connolly.**

MW 9–10.15

Close reading of Latin literature containing (or purporting to contain) popular diction. Focus on Plautus's *Menaechmi* and Petronius's *Cena Trimalchionis*, in particular style, genre, characterization, and audience. Additional selections from fables, personal correspondence, and graffiti.

**LATN 780a<sup>u</sup>, Lucretius. Celia Schultz.**

MW 1–2.15

Close reading of selected books of Lucretius's *De Rerum Natura* from both a poetic and a philosophical perspective.

**LATN 790b<sup>u</sup>, Latin Syntax and Style. Joseph Solodow.**

TTH 11.30–12.45

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.

**LATN 798a<sup>u</sup> and 799b<sup>u</sup>, Survey of Latin Literature. Kirk Freudenburg [F], Christina Kraus [Sp].**

MW 11.30–12.45, I HTBA [F]

MW 11.30–12.45, I HTBA [Sp]

A wide-ranging, yearlong treatment of Latin literature from its beginnings through the late Imperial period. Students are expected to read extensively in the original language in order to gain familiarity with literature of various genres from different periods.

**CLSS 601a, Latin Paleography. James John.**

TTH 4–5.15

A descriptive survey of scripts from Roman to Renaissance times, with practice in reading, localizing, and dating them. Also MDVL 52a.

**CLSS 621a, Seminar on Beinecke Library Ms. 439, the Scribal Pattern Book of Gregorius Bock. James John.**

W 1.30–3.20

A comprehensive study of the manuscript's origin, its scribe, its numerous text and initial alphabets, and its accompanying illustrative texts.

**CLSS 645b, Numismatics. William Metcalf.**

T 2.30–4.20

An introduction to the history of ancient coinage and the modern methodology of numismatic study. Brief consideration of the Greek background is followed by detailed treatment of the Roman Republic and Empire, with particular attention to the Roman provinces.

**CLSS 695b, Greek Paleography. Youval Rotman.**

Th 1–2.50

This seminar follows the development of Greek writing and the Greek book from Late Antiquity to the Early Modern period, while examining different types of scripts. The main goal of this seminar is to provide graduate students with the ability to approach and read Greek manuscripts. *Also HIST 526b, MDVL 554b.*

**CLSS 803au, New Approaches to Josephus. Tessa Rajak.**

W 1.30–3.20

Close readings and discussion of central issues and key passages in the writings of Flavius Josephus, with consideration of recent debates on the historian in relation to his environment. Knowledge of Greek not required, but opportunities are offered to consider issues of expression and style in the original. *Also HIST 505a<sup>u</sup>, JDST 731a<sup>u</sup>.*

**CLSS 806b<sup>u</sup>, Diaspora Interaction among Jews, Greeks, and Romans. Tessa Rajak.**

Th 11.30–12.45

An in-depth study of the primary evidence and of the leading modern interpretations of the Mediterranean Jewish diaspora, from the Hellenistic Age to late antiquity. The emphasis is on understanding the relationships between Jews and “pagans” in a world of ethnic diversity and on exploring the connections among politics, society, culture, and religion. Knowledge of the original languages not required. *Also HIST 506b<sup>u</sup>, JDST 732b<sup>u</sup>.*

**CLSS 809a, Issues in Roman History. John Matthews, William Metcalf, Veronika Grimm, Celia Schultz.**

W 2.30–4.20

A wide-ranging seminar offered once each academic year that allows students to explore a select number of issues pertaining to a given temporal period or theme in Roman history. The theme for fall 2006 is Transformations in the Roman World from Severus to Constantine, to be led by John Matthews. In addition to traditional political and military history, matters of social, religious, intellectual, and literary history are addressed. Class discussions draw on extensive reading in Latin and Greek sources in addition to secondary scholarship. *Also HIST 524a.*

**CLSS 817b, Plato's Philosophical Psychology. Verity Harte.**

M 3.30–5.20

The seminar explores the rich vein of thought on philosophical psychology running through several major Platonic works. Topics to be discussed include the nature of *psyche*, soul or mind, and its relation to body; the nature of psychological faculties such as perception, reason, and desire; the unity of consciousness; psychological conflict; and Plato's various models of the mind. Works to be discussed, in translation, include *Phaedo*, *Republic*, *Theaetetus*, and *Philebus*.

**CLSS 826b, Art and Text in Ancient Greece. Milette Gaifman.**

W 2.30–4.20

Since the rise of the Greek polis, Greek visual culture explored the relationship between art and text: in images of mythological scenes, in written descriptions of works of art, and in combining inscribed texts with pictorial representations. The course examines the relationship between word and image and between the visual and the literary in the Archaic and Classical periods. Taking Lessing's *Laokoon* of 1776 as a point of departure, the seminar considers the themes of pictorial narratives, the literary genre of *ekphrasis*, as well as the role and significance of inscriptions in Greek artistic representations. *Also ARCG 735b, HSAR 562b.*



**CLSS 835b, Early Roman Religion. Celia Schultz.**

M 2.30–4.20

A detailed examination of major issues and problems in the study of Roman religion in the Archaic period through the early and middle Republic. What is the nature of our sources? How do we reconcile conflicting sources (e.g., literary texts and archaeological material)? What is really Roman, versus what is Greek, Italic, or Etruscan? What are the major trends in the history of the field? It is expected that students have strong command of both Latin and ancient Greek. Course readings of ancient materials include epigraphic texts as well as extensive selections from the first decade of Livy's *AUC*, relevant works of Cicero, Festus, Plutarch, and others. Students must also possess reading knowledge of at least one modern language sufficient to handle select items of recent scholarship.

**CLSS 839a, The Historical and Comparative Grammar of Latin. Jay Fisher.**

Th 2.30–4.20

An introduction to the historical and comparative study of the Latin language with an emphasis on the earliest records of archaic Latin, the development of Latin grammar and vocabulary from Proto-Indo-European, and a comparison of this development with the grammar and vocabulary of Greek, English, and other Italic languages, including South Picene, Oscan, and Umbrian.

**CLSS 846a, Becoming Hadrian: Autobiography and Art in the Second Century A.D.**

Diana Kleiner.

T 1.30–3.20

Marguerite Yourcenar's famed fictional *Memoirs of Hadrian* serves as the starting point for an exploration of Hadrian and the art he commissioned in Rome and abroad. Hadrian's passion for life, quest after peace, romantic wanderlust, veneration of Greek culture, and craving for love, along with his acceptance of death's inexorableness, led him to commission some of Rome's greatest monuments. The emperor's flair for leadership and talent as an amateur architect informs student projects on the sculpture, mosaics, and buildings of the age, among them the portraiture of Hadrian's lover Antinous, the Pantheon, and Hadrian's Wall in Britain. Special attention is paid to Hadrian's Villa at Tivoli, an empire unto itself where Hadrian's autobiography was fully realized. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. *Also ARCG 749a, HSAR 570a.*

**CLSS 860b, Horace's *Odes* and *Epodes*. Kirk Freudenburg.**

Th 2.30–4.20

The primary project of the seminar is to read Horace's *Epodes* and *Odes* in their entirety, attending to the generic, stylistic, metrical, and textual challenges presented by these variously styled "songs." Close readings open up into broader considerations of how the poems "played" in the various cultural milieus (literary, political, material) of their day. Readings from secondary literature focus on the poet's performance as *vates*, and to the ways in which Horace shifts his singing voice between personal and political registers, carefully adjusting the private/public balance from one poem, or book, to the next.

**CLSS 863a, Tacitus's *Agricola* and the Ancient "Monograph" Tradition.**

Christina Kraus.

M 2.30–4.20

This seminar centers on a close reading of Tacitus's biography of his father-in-law, the *Agricola*. We also read earlier works in the tradition, including Isocrates's *Evagoras*, Xenophon's *Agésilaios*, and Sallust's *Bellum Catilinae* and *Bellum Iugurthinum*, together with ancient literary discussions of how to write such histories (e.g., Cic. *ad Fam.* 5.12). Participants are encouraged to read as much as possible of these in the original languages, but the main focus is the Tacitean work, its structure, themes, genre, and language.

**CLSS 879a, Aristotle's *Categories*. Verity Harte.**

w 4–5.50

The seminar reads and discusses the Greek text of Aristotle's *Categories*. The *Categories* is a foundational work in Aristotle's metaphysics, historically viewed as the best introduction to Aristotle's philosophical work and to philosophy in general. Professor Suzanne Bobzien participates in the seminar. *Also PHIL 707a.*

**CLSS 881a, Proseminar Classical Studies. William Metcalf.**

tth 2.30–3.45

An introduction to the bibliography and disciplines of classical scholarship. Faculty address larger questions of method and theory, as well as specialized subdisciplines such as linguistics, papyrology, epigraphy, palaeography, and numismatics. This course is required of all entering graduate students.

**CLSS 884b, The Thirty Tyrants. Donald Kagan.**

th 1.30–3.20

A study of the rule of the Thirty at Athens after the Athenian defeat in the Peloponnesian War. The ancient sources, chiefly the relevant passages in Xenophon's *Hellenica*, Diodorus Siculus, and Plutarch's *Lives*, are read in the original. Reading knowledge of French, German, or Italian desirable. *Also HIST 517b.*

**CLSS 893b, Origins and Interpretation of Attic Tragedy. Victor Bers.**

t 1.30–3.20

An examination of competing theories of the origin of the genre and interpretive approaches to its texts in the fifth century B.C. and later: approaches emphasizing "pure" literary descent, religious thought and ritual, political discourse, and psychoanalysis. Focus on particular plays and critical strategies according to the preference of the seminar participants.

**CLSS 900a or b, Directed Reading.**

By arrangement with faculty.

**CLSS 910a or b, Directed Research.**

By arrangement with faculty.

## COMPARATIVE LITERATURE

451 College, Rm 202, 432.2760  
M.A., M.Phil., Ph.D.

### *Chair*

David Quint

### *Director of Graduate Studies*

Pericles Lewis

### *Professors*

Dudley Andrew, Peter Brooks, Katerina Clark, Roberto González Echevarría, Benjamin Harshav, Carol Jacobs, Rainer Nägele, David Quint, Haun Saussy, Katie Trumpener

### *Associate Professors*

Catherine Labio, Pericles Lewis

### *Assistant Professors*

Ala Alryyes, Alexander Beecroft, Moira Fradinger, Barry McCrea

### *Visiting Professor*

Galin Tihanov

### *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<sup>u</sup>, Introduction to Theory of Literature. Paul Fry.**

TRH 11.30–12.20

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.

**CPLT 514a, Foundations of Modern Literary Theory. Benjamin Harshav.**

M 1.30–3.20

The course provides a survey and close readings of the foundations of modern theory of literature from Croce to Deconstruction and theory of fictional worlds. Foregrounded are the Russian Formalists, New Criticism, and Narratology. We discuss only theories of literature, rather than theories of other disciplines or philosophy applied to literature. Critical readings of the classics in a historical perspective are combined with questions about the validity of earlier ideas today.

**CPLT 515a, Proseminar in Comparative Literature. Haun Saussy.**

TRH 12.30–2.20

Introductory proseminar for all first-year graduate students in Comparative Literature (and other interested persons). Critical readings of formative texts in the theory and practice of the discipline, from the late eighteenth century to the present. Topics to be covered include the nature of literature; translation; national identities and identities beyond the nation; interpretation and evaluation; the humanities and the human; media. The course is taken for a grade of Satisfactory/Unsatisfactory.

**CPLT 517b, Interpretation and Authority. Carol Jacobs.**

T 1.30–3.20

The seminar explores the writings of four theorists of the twentieth century who meditate the concepts authority and interpretation. Our method is close readings of these works in which

much of what goes on is not only in the ostensible contents of the works but also in the performance of the writing. One is confronted in each case with writers who question the relationship between text and simplistic notions of truth. The obvious problem we encounter, then, is how, in turn, to read texts that claim to unsettle that relationship. The issues raised are those among interpretation and authority, both textual and political. Works by Sigmund Freud, Roland Barthes, Paul de Man, and Walter Benjamin. *Also GMAN 605b.*

**CPLT 537a, The Modernist Epic. Barry McCrea.**

T 7–9

One of the most striking techniques of the modernist novel is its extended analysis of very brief periods of time, a day or even a second. At the same time, modernist writers are far more anxious than their immediate predecessors to engage and connect with vast cycles of history. The course looks at the ways in which major twentieth-century writers use avant-garde literary techniques of microcosmic analysis to paint an “epic” canvas. Much of the term is concerned with the close reading of Joyce’s *Ulysses* and Proust’s *In Search of Lost Time*. Other works may include Woolf’s *Between the Acts*, Lorca’s *Romancero gitano*, or Heaney’s “bog-man” poems.

**CPLT 541b, Poetics I: Theory of the Work of Literature. Benjamin Harshav.**

M 1.30–3.20

The course presents a comprehensive theory of works of literature as the highest sign-complexes in human culture. From rhythm and sound patterns through metaphor and fictional world to genre and representation, a work of literature combines elements of structure with a network of necessary and possible or contradictory constructs. The seminar develops a conceptual network for the descriptive analysis of individual works of poetry and fiction. The theory focuses on questions of fictionality and art in language, yet goes beyond linguistics and philosophy of language, on the one hand, and narratology, on the other. It is grounded in close readings of poems and narrative texts by Kafka, Joyce, Eliot, Dostoevsky, and others. *Also PHIL 709b.*

**CPLT 583a<sup>U</sup>, Plato’s Legacy. Carol Jacobs.**

Th 1.30–3.20

Readings of Plato as well as readings of philosophic texts directly about Plato and literary texts that follow in this tradition and problematize similar issues. A meditation on the relationship between language and truth as well as broader questions of epistemology, ethics, and the political. Readings: *Republic* and *Phaedrus* as well as Heidegger and Derrida on Plato, and literary works that take up their themes. *Also GMAN 517a<sup>U</sup>.*

**CPLT 585a, Introduction to Middle High German Literature. William Whobrey.**

TTh 11.30–12.45

A survey of the major works of German vernacular literature from 1150 to 1250, including selections from courtly love poetry, heroic epic, Arthurian romance, crusader songs, and religious narratives. Works are read in the original Middle High German, and aspects of reading and translation are closely linked to an examination of the development of the German language. Special attention is given to the development of vernacular literature, the broader context of Latin culture, and the problems of manuscript transmission. Works to be read in whole or part include the *Nibelungenlied*, *Parzival*, *Tristan*, *Minnesang*, *Gregorius*, *Der arme Heinrich*. *Also GMAN 585a<sup>U</sup>.*

**CPLT 627a<sup>U</sup>, Sovereignty: Power and Representation. Kirk Wetters.**

M 3.30–5.20

This course examines the ongoing importance of the concept of sovereignty (which in democracies masquerades as “executive authority”) as representational structure, starting with its classic modern formulations (Machiavelli, Hobbes, Bodin) and ending with the most current

theoretical reflections (Agamben, Badiou). However, the work of Carl Schmitt and his contemporaries (Benjamin, Ball), particularly their elaboration of the concept of “political theology,” constitutes the course’s central focus. Political theology is, however, additionally and unavoidably coordinated to the broader question of secularization: thus we also discuss Marx, Weber, Blumenberg, Derrida, Benjamin, Taubes, and Hamacher. On the literary side we discuss representations of the problem of sovereignty (sovereignty as a structure of representation) in Shakespeare (with Kantorowitz) and Kleist. *Also GMAN 627a<sup>U</sup>.*

**CPLT 631a, History of Children’s Literature: The Anglo-American Tradition in European Perspective. Katie Trumpener.**

M 10.30–12.20

History and historiography of children’s literature, emphasizing the nineteenth and early twentieth century and situating the Anglo-American tradition in European perspective. Special focus on fiction and picture books; didacticism and fantasy literature; intersections with modernism. *Also ENGL 933a.*

**CPLT 641a, Friendship in Literature and Philosophy. Elke Siegel.**

W 3.30–5.20

The topic of friendship has experienced a renaissance in recent years. Disciplines as different as anthropology, literary studies, philosophy, and sociology have developed a new and invigorated interest in the theory and practice of friendship as a utopia of the community of individuals differing radically from those communities based on love, family, or nation. This course traces the history of friendship from antiquity to the present. Authors include Plato, Aristotle, Cicero, Montaigne, Schiller, Nietzsche, Simmel, Schmitt, Kafka, and Bernhard. Reading and discussion in English. *Also GMAN 641a<sup>U</sup>.*

**CPLT 647b, Perspectives on the Panorama. Timothy Barringer, Richard Maxwell.**

T 1.30–3.20

This course explores the cultural, aesthetic, and historical significance of the panorama. The first panoramas were gigantic 360-degree paintings generating a sense of immersion in an event or environment. Later panoramas took many shapes, anticipating the formats of photography, film, and digital imagery. We treat the panorama as a utopian, imperial, and didactic medium, tracing its impact on the fine arts, literature, and popular culture. The course coincides with an international conference on the panorama sponsored by the Yale Center for British Art. *Also HSAR 647b.*

**CPLT 650a<sup>U</sup>, Ideology, Revolution, and Religion in German Thought. Henry Sussman.**

MW 1.30–2.20

This is a course that sets out to explore the cross-currents of conservatism and radicality in nineteenth- and early twentieth-century German literature and culture. All of its authors contribute innovatively and momentarily to the enterprise of systems theory and systems critique: Nietzsche’s critique in the *Genealogy of Morals* and the *Anti-Christ*; Marx from the writings of German idealism to *Das Kapital*; Freud in his vacillations between cultural criticism and the medical authority he sought for psychoanalysis; Brecht in recalibrating Western dramaturgy toward alienation, gesture, and shock. The course encompasses a wide array of options for questioning and undermining the systematic aspirations of the Western tradition. *Also GMAN 643a<sup>U</sup>.*

**CPLT 651a<sup>U</sup>, Systems and Their Theory. Henry Sussman.**

T 1.30–3.20

This is a course examining the nature and impact of the conceptual systems that have, since the outset of modernity, furnished a format and platform for rigorous thinking at the same time that they have imposed self-reflexivity, consistency, repetition, purity, and dependability

on language. Readings by Kant, Hegel, Freud, Norbert Wiener, Bateson, Wilden, Luhmann, Kafka, Borges, Calvino, and Pynchon, among others. *Also GMAN 645a<sup>u</sup>, PHIL 608a.*

**CPLT 652b<sup>u</sup>, Dialectic of Enlightenment: Kant/Sade. Rainer Nägele.**

Th 3.30–5.20

In 1944, Adorno and Horkheimer, under the experience of the historical catastrophe, undertook a fundamental rethinking of the concept of Enlightenment, undercutting the all too simplistic opposition of rationality and irrationality through a complex analysis of the interweaving of the rational and irrational. One of the essays of their book brings together the odd couple of Kant and Sade, reading Sade as a Kantian rationalist and systematizer. Less than two decades later, Lacan, without apparent knowledge of this essay, reads Kant with Sade in his seminar on the ethics of psychoanalysis, later condensed in one of the essays of the *Écrits*. This course pursues this curious constellation through a close reading of Kant's *Critique of Practical Reason*, Sade's *Philosophy in the Boudoir*, and the two essays by Adorno and Lacan. *Also GMAN 664b<sup>u</sup>, PHIL 609b.*

**CPLT 672b, Milton. David Quint.**

M 10.30–12.20

A study of Milton and some of his controversial prose. We investigate the relation of the poetry to his historical contexts, focusing on the literary, religious, social, and political forces that shaped Milton's verse. *Also ENGL 672b.*

**CPLT 677b, The Performing Arts in Twentieth-Century Russia. Katerina Clark.**

W 1.30–3.20

Covers most of the performing arts: ballet, opera, theater, mass spectacle, and film. Theory of the performing arts, including selections from the writings of some of the most famous Russian directors such as Stanislavsky, Meierhold, Eisenstein, and Balanchine. Their major productions and some of the major Russian plays of the twentieth century (e.g., by Chekhov, Mayakovsky, Bulgakov, and contemporary dramatists). No knowledge of Russian is required. Students taking the course for credit in Comparative Literature can write their papers on texts in other languages. *Also RUSS 699b.*

**CPLT 717b, European Romanticism and Its Afterlives. Galin Tihanov.**

T 9.30–11.20

Building on students' familiarity with British and Continental Romanticism, this course is designed to expand knowledge of the most significant ideas and modes of thought in European Romanticism, always with reference to their significance for later developments and continuities in European intellectual life and literature. In examining the culture of European Romanticism and its afterlife in a multitude of nationally distinct historical environments, the course focuses mainly on the German, and to some extent also on the British, French, and Russian traditions. Good reading knowledge of German required. On some occasions texts are read in French and Russian; a detailed summary of the latter is provided in English.

**CPLT 723a, The French Atlantic Triangle: Literature and Culture of the Slave Trade.**

Christopher L. Miller.

Th 10.30–12.20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Jean-Jacques Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene. Taught in French. *Also AFAM 854a, AFST 739a, FREN 939a.*



**CPLT 727a, Postcolonialism and Its Discontents. Sara Suleri Goodyear.**

T 1.30–3.20

A reading of theoretical and fictional texts from the Indian subcontinent, Afghanistan, and the Middle East to raise questions of cultural, religious, and racial identities. *Also ENGL 935a, WGSS 714a.*

**CPLT 758b, Literature and the Arts: Critical Perspectives. Catherine Labio.**

W 1.30–3.20

An examination of philosophical and theoretical inquiries into the relationship between verbal and visual forms of representation, from Diderot's art criticism to the narratology and visual poetics of structuralist and poststructuralist thinkers. Works to be discussed include texts by Lessing, Kant, Gautier, Baudelaire, Magritte, Heidegger, Derrida, Foucault, Marin, Nancy, and Lyotard, as well as a wide range of images, from medieval narrative art to twentieth-century Franco-Belgian comics. *Also FREN 793b.*

**CPLT 759a, Fiction and Industry in the Nineteenth Century. Catherine Labio.**

T 1.30–3.20

An examination of the relationship between economics and verbal and visual arts in nineteenth-century Europe. Key topics include romanticism and the "spirit of commerce"; political economy as a subject of literature; and aestheticism, realism, and the visual and verbal representability of labor and poverty in urban and rural settings. Includes works by Wordsworth, Martineau, Balzac, Disraeli, Marx, Dickens, Gaskell, Dostoevsky, Chernychevsky, Baudelaire, Daumier, Fildes, Doré, Zola, Van Gogh, and Thomas Mann. *Also FREN 706a.*

**CPLT 859a, Henry James and Gustave Flaubert: The Project of the Novel.****Peter Brooks.**

Th 1.30–3.20

The course starts from Henry James's complex and ambivalent attitudes toward Flaubert's novels — his baffled attempts to understand Flaubert's project — and moves on to consider principally how the two novelists developed radically incompatible theories of the uses of fiction in their late work. Some attention is paid to the relation of both writers to Balzac's example, and their differing interpretations of this precursor. Principal novels for study include Flaubert's *L'Education sentimentale*, *Un coeur simple*, and *Bouvard et Pécuchet*, and James's *The Tragic Muse*, *What Maisie Knew*, *The Beast in the Jungle*, and *The Golden Bowl*. *Also FREN 913a.*

**CPLT 864b, Questions of Identity. Peter Brooks.**

Th 1.30–3.20

It is generally held that the modern novel — eighteenth to twentieth century — is centrally concerned with character — though what is meant by "character" is not easily defined. Much formal analysis of the place of character in the novel seems inadequate. The seminar focuses on one specific way in which issues of character often are posed in the novel, thematically and formally: as a question of identity, personal, social, and psychological. The identity paradigm seems to emerge with particular force in this period, no doubt in response to vast social dislocations as well as an enhanced sense of the individual personality. The seminar focuses on a selection of novels, and also draws on materials from law, moral philosophy, and psychoanalysis. Readings include J.-J. Rousseau, *Confessions*, vol. 1 and *Rêveries d'un promeneur solitaire*; Nathalie Z. Davis, *The Return of Martin Guerre*; H. de Balzac, *Le Colonel Chabert*; Charles Dickens, *Great Expectations*; Wilkie Collins, *The Woman in White*; Henry James, *The Wings of the Dove*; Marguerite Duras, *Le ravissement de Lol V. Stein*; J. M. Coetzee, *Disgrace*. *Also FREN 895b.*

**CPLT 883b, Theoretical Approaches to Gender and Sexuality. David Agruss.**

W 1.30–3.20

This course examines a wide range of theoretical approaches to the study of gender and sexuality — historicism, psychoanalysis, deconstruction, ideology critique, and postcolonial theory — in order to understand their particular protocols, strengths, and weaknesses, but also in order to work toward imagining alternate approaches to thinking about gender and sexuality analytically. We pay particular attention to the research interests of members of the class in order to work collectively toward theoretical strategies applicable to our own work. We read works by George Chauncey, Michel Foucault, David M. Halperin, Joan W. Scott, Judith Butler, Sigmund Freud, Kaja Silverman, Christopher Lane, Diana Fuss, Eve Kosofsky Sedgwick, Lee Edelman, Lisa Duggan, Jacques Derrida, Louis Althusser, Rosemary Hennessy, Judith Halberstam, Ann Laura Stoler, Anne McClintock, Timothy Mitchell, David Eng, Amy Villarejo, and others. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also WGSS 702b.*

**CPLT 900a, Directed Reading. Faculty.****CPLT 900b, Directed Reading. Faculty.****CPLT 901a, Individual Research. Faculty.****CPLT 901b, Individual Research. Faculty.****CPLT 910a, Psychoanalysis and Literature. Pericles Lewis.**

Th 1.30–3.20

An inquiry into Freud's use of literature and literature's use of Freud. Readings of Freud's texts alternate with readings from Sophocles, Shakespeare, E. T. A. Hoffmann, Henry James, Kafka, and Woolf. Some discussion of Freudian criticism. *Also ENGL 987a.*

**CPLT 918a, Dostoevsky and the Theory of the Novel. Kate Holland.**

T 10.30–12.20

The course examines the place of Dostoevsky's novels in Russian and European theoretical debates about the nature of the novel as a genre. We explore ways in which Dostoevsky engages with Romantic and Realist theories of the novel, look at how he responds to some central problems of novelistic representation, and consider how and why Dostoevsky's novels have been so influential for the development of novel theory in the twentieth century. Readings include a selection of the novels; critical works by Dostoevsky scholars such as Solinin, Ivanov, and Komarovich; and the novel theory of Friedrich Schlegel, Bakhtin, Lukacs, Girard, Moretti, and others. *Also RUSS 644a.*

**CPLT 938a, The Image after Bergson. Dudley Andrew.**

T 11.30–1.20, screenings M 7

A study of primarily French conceptions of the "image" since Bergson's *Matière et Mémoire* (1896). The nature, status, and role of the image in philosophy, literature, and art as it may have been challenged by photography and cinema. Texts by Sartre, Malraux, Merleau-Ponty, Bazin, Barthes, Lyotard, and Deleuze build the French debate, but students are encouraged to range beyond France in their papers and reports. Films from the silent and early sound era will be screened as a weekly sidebar. *Also FILM 846a, FREN 796a.*

**CPLT 939b, Garcilaso and Poetry. Roberto González Echevarría.**

W 1.30–3.20

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. *Also SPAN 533b*.

**CPLT 941a, Fiestas cubanas. Roberto González Echevarría.**

w 1.30–3.20

A study of the fiestas marking the Cuban calendar from the nineteenth century to the present, how they respond to cultural and political transformations, and how they are inscribed in literature, particularly the narrative as well as film. The feast as the representation of time and social and political change. The feast and sports, particularly baseball. The work of anthropologists and theorists of literature such as Claude Lévi-Strauss, Marcel Mauss, Arnold van Gennep, and Mikhail Bakhtin, along with that of Latin American and Cuban anthropologists and writers such as Fernando Ortiz, Lidia Cabrera, José Arrom, Manuel Moreno Fraginals, Miguel Barnet, and Octavio Paz. Fiction by Cirilo Villaverde, Alejo Carpentier, José Lezama Lima, Severo Sarduy, Reinaldo Arenas, Daína Chaviano, and others. In Spanish. *Also SPAN 942a*.

**CPLT 943b, Cinema: Experience and Reflexivity. Francesco Casetti.**

w 3.30–5.20, screenings su 7

To attend a film was a new form of experience within the framework of twentieth-century modernity. This seminar explores the meanings, functions, and rituals of film reception, with a stress on “classical” forms (1920s and 1930s) and their transformations in modern and post-modern cinema. We analyze films that openly display on screen the act of vision (from Keaton’s *Sherlock Junior* to Visconti’s *Bellissima*), and we study critical texts that describe or problematize this reflexive practice (from Victor Freeburg to Jean Epstein to Filmology). *Also FILM 803b, ITAL 803b*.

**CPLT 945a, War and Literature in the Eighteenth Century: Sterne, Johnson, Voltaire. Ala Alryyes.**

w 1.30–3.20

This seminar examines both the explicit and subtle literary representations of war in a century in which war, in Europe and its colonies, was almost continuous. The main authors are Sterne, Johnson, and Voltaire, but we also read works by Defoe, Swift, Pope, Hobbes, Joshua Reynolds, Smollett, and Diderot. We also look at legal cases and literary reviews. *Also ENGL 740a*.

## COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

Bass 432A, 432.8189

M.S., Ph.D.

### *Directors of Graduate Studies*

Mark Gerstein (Bass 432A, 432.6105, mark.gerstein@yale.edu)

Perry Miller (300 George St., Suite 501, 737.2903, perry.miller@yale.edu)

### *Professors*

James Aspnes (*Computer Science*), Joseph Chang (*Statistics*), Ronald Coifman (*Mathematics*), Lynn Cooley (*Genetics; Cell Biology*), Donald Engelman (*Molecular Biophysics & Biochemistry*), William Jorgensen (*Chemistry*), Douglas Kankel (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics*), Paul Lizardi (*Pathology*), Perry Miller (*Anesthesiology; Molecular, Cellular & Developmental Biology*), Willard Miranker (*Computer Science*), Anna Pyle (*Molecular Biophysics & Biochemistry*), Martin Schultz (*Computer Science*), Gordon Shepherd (*Neurobiology*), Abraham Silberschatz (*Computer Science*), Michael Snyder (*Molecular, Cellular & Developmental Biology*), Dieter Söll (*Molecular Biophysics & Biochemistry; Chemistry*), Günter Wagner (*Ecology & Evolutionary Biology*), Sherman Weissman (*Genetics; Medicine*), Steven Zucker (*Computer Science; Biomedical Engineering*)

### *Associate Professors*

Mark Gerstein (*Molecular Biophysics & Biochemistry; Computer Science*), Elias Lolis (*Pharmacology*), Andrew Miranker (*Molecular Biophysics & Biochemistry*), Michael Stern (*Genetics*), Kevin White (*Genetics*), Heping Zhang (*Epidemiology & Public Health; Statistics*), Hongyu Zhao (*Epidemiology & Public Health; Genetics*)

### *Assistant Professors*

Kei-Hoi Cheung (*Anesthesiology; Genetics*), Michael Krauthammer (*Pathology*), Annette Molinaro (*Epidemiology & Public Health*), Valerie Reinke (*Genetics*), David Tuck (*Pathology*)

### *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. 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). The courses taken to satisfy the core areas of competency may vary considerably. 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.

### *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 (see page 464).

### *Courses*

**CB&B 645b, Statistical Methods in Genetics and Bioinformatics.** Hongyu Zhao.

TRH 10.30–11.45

Stochastic modeling and statistical methods applied to problems such as mapping quantitative trait loci, analyzing gene expression data, sequence alignment, and reconstructing evolutionary trees. Statistical methods include maximum likelihood, Bayesian inference, Monte Carlo Markov chains, and some methods of classification and clustering. Models introduced include

variance components, hidden Markov models, Bayesian networks, and coalescent. Recommended background: STAT 541a, STAT 542b. Prior knowledge of biology is not required. Times to be arranged at organizational meeting. *Also BIS 692b, STAT 645b.*

**CB&B 740a, Clinical and Translational Informatics. Richard Shiffman, Michael Krauthammer.**

HTBA

The course provides an introduction to clinical and translational informatics. Topics include (1) overview of biomedical informatics, (2) design, function, and evaluation of clinical information systems, (3) clinical decision making and practice guidelines, (4) clinical decision support systems, (5) informatics support of clinical research, (6) privacy and confidentiality of clinical data, (7) standards, (8) issues in defining the clinical phenotype, and (9) topics in translational bioinformatics. Permission of the instructor required.

**CB&B 750b, Core Topics in Biomedical Informatics. Perry Miller and faculty.**

HTBA

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, interoperability 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. Permission of the instructor required. *Also MCDB 750b.*

**CB&B 752a, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein, Michael Snyder.**

MW 1–2.15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, comparative genomics, geometric analysis of protein structure, and macromolecular simulation. Prerequisite: EEB 122 and MATH 115, or permission of the instructor. *Also CPSC 752a<sup>U</sup>, MB&B 752a<sup>U</sup>, MCDB 752a<sup>U</sup>.*

**[CHEM 526a<sup>U</sup>, 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, 432.1246  
M.S., M.Phil., Ph.D.

### *Chair*

Abraham Silberschatz

### *Director of Graduate Studies*

Drew McDermott (508 AKW, 432.1283, drew.mcdermott@yale.edu)

### *Professors*

Dana Angluin, (*on leave* [Sp]), James Aspnes (*on leave* [F]), Ronald Coifman (*Mathematics*), Julie Dorsey, Stanley Eisenstat, Joan Feigenbaum, Michael Fischer, David Gelernter, Paul Hudak, Ravindran Kannan (*on leave* [F]), Drew McDermott, A. Stephen Morse (*Electrical Engineering*), Vladimir Rokhlin, Holly Rushmeier (*on leave* [Sp]), Martin Schultz, Zhong Shao (*on leave* [Sp]), Abraham Silberschatz, Daniel Spielman, Steven Zucker

### *Associate Professor*

Mark Gerstein (*Molecular Biophysics & Biochemistry*), Yorgis Makris (*Electrical Engineering*), Yang Richard Yang (*on leave* [Sp]), Edmund Yeh (*Electrical Engineering*)

### *Assistant Professors*

Michael Mahoney (*Applied Mathematics*), Brian Scassellati

### *Adjunct Professors*

Gil Kalai, Willard Miranker

### *Senior Lecturer*

Robert Dunne

## *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 and nonlinear algebra, numerical solution of partial differential equations, mathematical software, parallel algorithms); theory of computation (algorithms and data structures, complexity, distributive 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 twelve 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 (clause 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.

### *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.

*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<sup>u</sup>, Compilers and Interpreters. Zhong Shao.**

MW 1–2.15

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. After CPSC 323a.

### **CPSC 522b<sup>u</sup>, Operating Systems. James Aspnes.**

MW 1–2.15

The design and implementation of operating systems. Topics include synchronization, deadlocks, process management, storage management, file systems, security, protection, and networking. After CPSC 323a.

### **CPSC 524b<sup>u</sup>, Parallel Programming Techniques. David Gelernter.**

TTh 1–2.15

Software structures, architectures, and algorithms for parallel and distributed applications, focusing on coordination frameworks for asynchronous concurrency (on the code, that is, that creates and manages multiple processes and performs the inter-processes communication necessary to create integrated ensembles). Coordination languages and program-development environments. The fast-changing WAN-software picture. Parallel and distributed programming exercises on LANs.

[CPSC 525a<sup>u</sup>, Theory of Distributed Systems.]

[CPSC 530a<sup>u</sup>, Formal Semantics.]

### **CPSC 531a, Fundamentals of Computer Music. Paul Hudak.**

TTh 1–2.15

Study of the theoretical and practical fundamentals of computer-generated music. Music and sound representations, acoustics and sound synthesis, scales and tuning systems, algorithmic and heuristic composition, and programming languages for computer music. Theoretical concepts are supplemented with pragmatic issues expressed in a high-level programming language. After CPSC 223b or with permission of instructor.

[CPSC 533b, Computer Networks.]

### **CPSC 534a<sup>u</sup>, Mobile Computing and Wireless Networking. Yang Richard Yang.**

MW 2.30–3.45

An introduction to the principles of mobile computing and its enabling technologies. Topics include principles of mobile computing wireless systems, information management, location-independent and -dependent computing models, disconnected or weakly connected operation models, human-computer interactions, mobile applications and services, security, power management, and sensor networks.

**CPSC 536a, Networked Embedded Systems and Sensor Networks.****Andreas Savvides.**

TTh 2.30–3.45

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. *Also ENAS 960a.*

**CPSC 537a<sup>U</sup>, Introduction to Databases. Abraham Silberschatz.**

TTh 2.30–3.45

An introduction to database systems. Data modeling. The relational model and the SQL query language. Relational database design, integrity constraints, functional dependencies, and natural forms. Object-oriented databases. Implementation of databases: file structures, indexing, query processing, transactions, concurrency control, recovery systems, and security.

**[CPSC 539b<sup>U</sup>, Computer Systems.]****CPSC 540b<sup>U</sup>, Numerical Computation I. Vladimir Rokhlin.**

MW 2.30–3.45

Algorithms for numerical problems in the physical, biological, and social sciences: solution of linear and nonlinear systems of equations, interpolation and approximation of functions, numerical differentiation and integration, optimization.

**CPSC 545b, Introduction to Data Mining. Martin Schultz.**

TTh 2.30–3.45

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.

**[CPSC 555b<sup>U</sup>, Economics and Computation.]****[CPSC 557a<sup>U</sup>, Sensitive Information in a Wired World.]****[CPSC 560b<sup>U</sup>, Theoretical Methods in Computer Science.]****CPSC 562a, Graphs and Networks. Daniel Spielman.**

TTh 2.30–3.45

A mathematical examination of graphs and their applications in the sciences. Study of families of graphs, including social networks, small-world graphs, Internet graphs, planar graphs, well-shaped meshes, power-law graphs, and classic random graphs. Exploration of phenomena such as connectivity, clustering, communication, ranking, and iterative processes.

**CPSC 567a<sup>U</sup>, Cryptography and Computer Security. Michael Fischer.**

TTh 1–2.15

A survey of such private and public key cryptographic techniques as DES, RSA, and zero-knowledge proofs, and their application to problems of maintaining privacy and security in computer networks. The main focus is on technology, but the course also considers such societal issues as balancing individual privacy concerns against the needs of law enforcement, vulnerability of societal institutions to electronic attack, export regulations and international competitiveness, and development of secure information systems.

**CPSC 568b<sup>u</sup>, Introduction to Computational Complexity. Joan Feigenbaum.**

TTh 1–2.15

Introduction to the theory of computational complexity. Basis 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.

**CPSC 569b<sup>u</sup>, Randomized Algorithms. Ravindran Kannan.**

TTh 2.30–3.45

A study of randomized algorithms from several areas: graph algorithms, algorithms in algebra, approximate counting, probabilistically checkable proofs, and matrix algorithms. Topics include an introduction to tools from probability theory, including some inequalities such as Chernoff bounds.

**CPSC 570a<sup>u</sup>, Artificial Intelligence. Drew McDermott.**

MWF 2.30–3.20

An introduction to artificial intelligence research, focusing on reasoning and perception. Topics include knowledge representation, predicate calculus, temporal reasoning, vision, robotics, planning, and learning.

**CPSC 573b, Intelligent Robotics. Brian Scassellati.**

MWF 10.30–11.20

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.

**CPSC 575b, Computational Vision and Biological Perception. Steven Zucker.**

MW 1–2.15

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. *Also ENAS 575b<sup>u</sup>.*

**CPSC 577a<sup>u</sup>, Neural Networks for Computing. Willard Miranker.**

TTh 11.30–12.45

Artificial neural networks as a computational paradigm studied with application to problems in associative memory, learning, pattern recognition, perception, robotics, and other areas. Models for the dynamics of neurons and methods such as learning for designing neural networks are developed. Concepts, designs, and methods compared and tested in software simulation. Brain and consciousness studies are optional topics.

**CPSC 578b<sup>u</sup>, Computer Graphics. Julie Dorsey.**

TTh 4–5.15

An introduction to the basic concepts of two- and three-dimensional computer graphics. Topics include affine and projective transformations, clipping and windowing, visual perception, scene modeling and animation, algorithms for visible surface determination, reflection models, illumination algorithms, and color theory. Assumes solid C or C++ programming skills and a basic knowledge of calculus and linear algebra.

**[CPSC 579b<sup>u</sup>, Advanced Computer Graphics: Rendering Techniques.]****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 752a<sup>u</sup>, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein, Michael Snyder.**

MW 1–2.15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, geometric analysis of protein structure, and macromolecular simulation. *Also CB&B 752a, MB&B 752a<sup>u</sup>, MCDB 752a<sup>u</sup>.*

**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.

## EAST ASIAN LANGUAGES AND LITERATURES

308 Hall of Graduate Studies, 432.2860

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

### *Chair*

John Whittier Treat

### *Director of Graduate Studies*

Edward Kamens (310 HGS, 432.2862, edward.kamens@yale.edu)

### *Professors*

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

### *Assistant Professors*

Aaron Gerow, Christopher Hill, Paize Keulemans, Jing Tsu

### *Senior Lecturer*

Koichi Shinohara

### *Lecturers*

Chi-wah Chan, Charles Laughlin

### *Senior Lectors*

Seungja Choi, Koichi Hiroe, Zhengguo Kang, Yoshiko Maruyama, John Montanaro, 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, Ninghui Liang, Fan Liu, Jianhua Shen, Haiwen Wang, Jianxin Zhao

### *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 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 years 1 and 2, and then take two tutorials or two seminars in year 3. Students concentrating in Chinese or Japanese literature are encouraged to take at least one term course in Western literature or literary theory. All students must prove their proficiency in French, German, Russian, or another European language that the director of graduate studies deems appropriate, by the beginning of the second year. In some cases, with the approval of the director of graduate studies, students in Chinese literature may substitute modern Japanese and students in Japanese literature may substitute modern Chinese for a European language. 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 the end 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 Program in Film Studies, 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](http://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<sup>U</sup>, Man and Nature in Chinese Literature. Kang-i Sun Chang.

TRH 1–2.15

An exploration of concepts of man and nature in traditional Chinese literature and criticism, with special attention to aesthetic and cultural meanings. Topics include the centrality of Taoism and lyricism; Buddhism and poetry; 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; dream, nature, and passion. All readings in translation; no knowledge of Chinese required.

#### CHNS 560<sup>U</sup>, Introduction to Literary Chinese. Paize Keulemans.

MWF 10.30–11.20

Reading and interpretation of texts in various styles of literary Chinese (*wenyan*), with attention to basic problems of syntax and literary style. After CHNS 133 or 150 or equivalent.

#### CHNS 570a<sup>U</sup>, Advanced Readings in Modern Chinese Literature. Jing Tsu.

MW 11.30–12.45

Close textural analysis of modern Chinese literature in the original language. Concentration on criticism, comprehension, and translations of selected texts from the 1960s to the present. Issues of narrative techniques, approaches toward reading, and the vicissitudes of Chinese literature in the contemporary period.

#### CHNS 572b<sup>U</sup>, Chinese Visions of Violence in *The Outlaws of the Marsh*.

Paize Keulemans.

MW 2.30–3.45

A study of *The Outlaws of the Marsh*, one of the most important Chinese pre-modern vernacular novels. Focus on the moral, political, and literary questions surrounding violence, one of the central themes of the work. No knowledge of Chinese required.

#### CHNS 574a<sup>U</sup>, Modern Chinese Literature: Persons, Places, and Things. Jing Tsu.

TRH 1.30–12.45

An introduction to modern Chinese literature from the late nineteenth century through the twentieth. Questions of humanism, race, nationalism, travel, literary modernity, and cosmopolitanism. Works by Liu E, We Jianren, Li Boyuan, Lu Xun, Ba Jin, Ding Ling, Yu Dafu, Guo Moruo, Mao Dun, Xiao Hong, Zhang Ailing, Zhu Tianwen, Xi Xi, and Yu Hua. No knowledge of Chinese required.

#### CHNS 575b<sup>U</sup>, Literary Diaspora and the Idea of China. Jing Tsu.

MW 11.30–12.45

A study of the Chinese literary diaspora and sinophone literature, with a focus on the contemporary period. Works from mainland China, Hong Kong, Malaysia, Taiwan, France, England, and the United States through the lenses of cultural exile, sojourn, immigration, transnationalism, and nativism. No knowledge of Chinese required.

**CHNS 590b<sup>U</sup>, Materials and Methods for Research in Chinese Studies.****Chi-wah Chan**

W 3.30–5.20

Lectures, discussion, and written exercises designed to develop skills in using traditional Chinese research materials. Prerequisite: CHNS 150 or equivalent.

**CHNS 601a, Chinese Literary Criticism from the Second to the Sixth Century.****Kang-i Sun Chang.**

T 2.30–4.30

A study of texts in literary criticism from the Han to the Northern and Southern Dynasties. Particular attention to the relationship between the critical and poetic traditions; the interactions of gender and cultural values; and emerging concept of literary immortality. Texts include the *Wenxin Dialong*, *Shipin*, *Renwu zhi*, and *Lienu zhuan*.

**CHNS 686b, Literature, Popular Culture, and History in China, Nineteenth and Twentieth Centuries. Jing Tsu.**

T 1.30–3.20

This seminar examines the emergence of modern China in the world through questions of westernization, literature, conceptions of novelty and sensationalism, universalism, utopia, race, sexuality, pseudoscience, revolution, globalization, and popular culture since the Opium War. We examine a variety of materials from political tracts to fiction, journals to handbooks. Some of our guiding questions include: How did nineteenth-century cultural sensibilities undergo a drastic change with the formation of new fields of knowledge such as the physical sciences and technology? In what ways did this influence the articulation of nationalism and Chinese cultural identity in the twentieth century? What can we make of literature in light of history, and history in light of fiction?

**CHNS 825a, Literature and Print Culture in Late Imperial China. Paize Keulemans.**

W 2.30–4.20

How does knowledge of printing and reading practices, fonts and illustrations change our understanding of late imperial literature? We answer this question by looking at some of the major works from the late imperial opera and vernacular fiction tradition, including *The Dream of the Western Chamber*, *The Peony Pavilion*, *The Peach Blossom Fan*, Feng Menglong's vernacular short stories, *The Jin Ping Mei*, and *The Dream of the Red Chamber*. Readings are in English and Chinese. Knowledge of Chinese (classical and modern) required.

**CHNS 837b, Histories and Fiction in Early China. Annping Chin.**

Th 3.30–5.20

The course explores writings from early China where the line between facts and fiction is often blurred. Readings in Chinese include selections from the *Hanfeizi*, Sima Qian's *Shiji*, and Liu Xiang's *Lienu zhuan* and *Shuoyuan*. Also HIST 856b.

**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 560a<sup>U</sup>, Introduction to Literary Japanese. Edward Kamens.**

MW 2.30–3.45

Introduction to the grammar and style of the premodern literary language (*bungotai*) through a variety of texts. Prerequisite: JAPN 150 or equivalent.



**JAPN 561b<sup>U</sup>, Readings in Literary Japanese. Edward Kamens.**

M 1.30–3.20

Close analytical reading of a selection of texts from the Nara through Tokugawa period: prose, poetry, and various genres. After JAPN 560a or equivalent.

**JAPN 578a<sup>U</sup>, Modern Japanese Fiction. Christopher Hill.**

TTh 1–2.15

An introduction to Japanese fiction from the 1890s to the 1980s. Novels and stories by such writers as Natsume Soseki, Tanizaki Jun'ichiro, and Oe Kenzaburo; discussion of major trends such as modernism and writing by women. No knowledge of Japanese required.

**JAPN 581b<sup>U</sup>, Japanese Literature after 1970. John Treat.**

TTh 11.30–12.45

A continuation of JAPN 578a. 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.

**JAPN 582b<sup>U</sup>, Imagining Space in Japanese Fiction and Film. Christopher Hill.**

TTh 1–2.15

Representations of space in modern fiction and selected films. Aesthetic forms as they establish social and psychological space, urbanization, wartime destruction, and rural transformations as they affect the representation of space. Writers and directors include Kawabata, Enchi, Ôe, Murakami, Miyazaki. No knowledge of Japanese required.

**JAPN 702b, Readings in Heian Period Prose and Poetry. Edward Kamens.**

W 9–11

Close reading of works in various genres and styles from the eighth through twelfth century; research in traditional commentaries and contemporary criticism. In spring 2007 the seminar focuses on readings in *monogatari* and *waka*.

**JAPN 835b, Modernity and Culture in Imperial Japan. Christopher Hill.**

Th 3–5

Formations of modernity in Japan from the late Meiji to the early Shōwa period and their political and economic contexts. Materials include literature, essays, philosophy, and other sources such as visual texts according to student interest.

**JAPN 885a, Modern Japanese Novel. John Treat.**

W 10–12

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.

**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

320 Luce Hall, 34 Hillhouse, 432.3426  
M.A.

### *Chair*

Mimi Hall Yiengpruksawan (*History of Art*) (206 OAG, 56 High, 432.2682,  
mimi.yiengpruksawan@yale.edu)

### *Director of Graduate Studies*

Edward Kamens (310 HGS, 432.2862, edward.kamens@yale.edu)

### *Professors*

Kang-i Sun Chang (*East Asian Languages & Literatures*), Deborah Davis (*Sociology*), Koichi Hamada (*Economics*), Valerie Hansen (*History*), Edward Kamens (*East Asian Languages & Literatures*), William Kelly (*Anthropology*), Youngsook Pak (*East Asian Studies; History of Art [Visiting]*), Frances Rosenbluth (*Political Science*), Haun Saussy (*Comparative Literature; East Asian Languages & Literatures*), Helen Siu (*Anthropology*), Jonathan Spence (*History*), John Whittier Treat (*East Asian Languages & Literatures*), Mimi Hall Yiengpruksawan (*History of Art*)

### *Associate Professor*

Michael Auslin (*History*)

### *Assistant Professors*

Jinhee Choi (*East Asian Studies; Film Studies*), Aaron Gerow (*East Asian Languages & Literatures; Film Studies*), Christopher Hill (*East Asian Languages & Literatures*), Paize Keulemans (*East Asian Languages & Literatures*), Pierre Landry (*Political Science*), Karen Nakamura (*Anthropology*), Lan-ying Tseng (*History of Art*), Jing Tsu (*East Asian Languages & Literatures*)

### *Senior Lecturers*

Annping Chin (*History*), Marcus Noland (*East Asian Studies; Economics [Visiting]*), Koichi Shinohara (*Religious Studies; East Asian Languages & Literatures*)

### *Lecturers*

Chi-Wah Chan, Nicole Cohen, Gareth Fisher, Hoi-eun Kim, Charles Laughlin

### *Senior Lectors*

Seungja Choi, Koichi Hiroe, Zhengguo Kang, Yoshiko Maruyama, John Montanaro, 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, Ninghui Liang, Fan Liu, Jianhua Shen, Haiwen Wang, Jianxin Zhao

### *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 wishing to go on to the doctorate in one of the disciplines listed above, 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 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 director of graduate studies.

### *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 director of graduate studies.

### *Joint-Degree Programs*

Through agreements the MacMillan Center for International and Area Studies at Yale has negotiated with the Yale professional schools, the Council on East Asian Studies at Yale University now offers joint master's degrees with the Law School, the School of Management, the School of Forestry & Environmental Studies, and Epidemiology and Public Health. Students are required to complete applications from both the Yale Graduate School of Arts and Sciences and the appropriate professional school at Yale, with notation made on each application that it is to be considered for the joint-degree program. Please contact the director of graduate studies in East Asian Studies for up-to-date information regarding joint degrees.

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](mailto:eastasian.studies@yale.edu); Web site, <http://research.yale.edu/eastasianstudies>. Applications are available from the Admissions Office, Graduate School, Yale University, PO Box 208236, New Haven CT 06520-8236; e-mail, [graduate.admissions@yale.edu](mailto:graduate.admissions@yale.edu).

*Courses***EAST 501, Social Science Workshop on Contemporary China. Deborah Davis.**

M 12–I

This workshop examines contemporary Chinese development from a variety of 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. This format is designed to educate participants about particular topics, provide constructive feedback on developing works of scholarship, and generally foster interdisciplinary dialogue and perspectives among the broad community of social scientists focusing on China at Yale. One unit of course credit is available to students who attend the colloquium in both the fall and spring terms and submit a thirty-page paper. Permission of instructors required. *Also SOCY 507a/b.*

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

## ECOLOGY AND EVOLUTIONARY BIOLOGY

Osborn Memorial Laboratories, Rm 101, 165 Prospect Street, 432.3837

[www.eeb.yale.edu](http://www.eeb.yale.edu)

M.S. (en route to the Ph.D.), Ph.D.

### *Chair*

Günter Wagner

### *Director of Graduate Studies*

Richard Prum

### *Professors*

Leo Buss, Michael Donoghue, Jacques Gauthier (*Geology & Geophysics*), Willard Hartman (*Emeritus*), Vivian Irish (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics; Psychiatry*), Gene Likens (*Cary Arboretum*), Jeffrey Powell (*on leave* [Sp]), Richard Prum, Charles Remington (*Emeritus*), Oswald Schmitz (*Forestry & Environmental Studies*), David Skelly (*Forestry & Environmental Studies*), Stephen Stearns, J. Rimas Vaisnys (*Electrical Engineering*), Günter Wagner

### *Assistant Professors*

Suzanne Alonzo, Antonia Monteiro, Thomas Near, David Post, Melinda Smith, Jeffrey Townsend, Paul Turner

### *Lecturers*

Adalgisa Caccone, Kealoha Freidenburg, Dianella Howarth, Nancy Rosenbaum, Marta Martinez 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, 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) a program of ethics of research and authorship; (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 two courses, normally at the TF 3 level, during their first two years of study.

In the third term of study each student takes qualifying examinations in ecology and evolutionary biology. By the end of the third term, each student organizes a formal pre-prospectus consultative meeting with his/her advisory committee to discuss the planned dissertation research. By the end of the fourth term, students present and defend their planned dissertation research at a prospectus meeting, where 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 Maureen Cunningham, 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, [maureen.cunningham@yale.edu](mailto:maureen.cunningham@yale.edu); phone, 203.432.3837; fax: 203.432.2374; Web site: [www.eeb.yale.edu](http://www.eeb.yale.edu).

## Courses

### **E&EB 500a/b, Advanced Topics in Ecology and Evolutionary Biology.**

**Richard Prum.**

2 HTBA

Topics to be announced.

### **[E&EB 503a, Advanced Research Topics in Ecology and Evolutionary Biology: Module One: Topic to be announced.]**

### **[E&EB 504a, Advanced Research Topics in Ecology and Evolutionary Biology: Module Two: Experimental Evolution.]**

### **E&EB 510a<sup>U</sup>, Introduction to Statistics: Life Sciences. Günter Wagner.**

TTh 1–2.15

Statistical and probabilistic analysis of biological problems is presented with a unified foundation in basic statistical theory. A general lecture covering statistical theory and a discipline-based lecture covering statistical modeling of biological problems drawn from genetics, ecology, epidemiology, and bioinformatics. Graduate students are expected to finish a course project in addition to regular homework and exams. *Also STAT 501a<sup>U</sup>.*

### **E&EB 520a<sup>U</sup>, General Ecology. David Post.**

MWF 10.30–11.20

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.

### **E&EB 525b<sup>U</sup>, Evolutionary Biology. Jeffrey Powell, Richard Prum.**

TTh 11.30–12.45

An introduction to the study of evolution from both a macro- and microevolutionary perspective. Principles of population genetics, systematics, paleontology, and molecular evolution are addressed as well as application of evolutionary thinking to issues in animal behavior, ecology, and molecular biology.

### **E&EB 526Lb<sup>U</sup>, Laboratory for Evolutionary Biology. Marta Martinez Wells.**

W 1.30

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.

### **E&EB 530a<sup>U</sup>, Field Ecology. Melinda Smith.**

Th 1–5

A field-based introduction to ecological research. Experimental and descriptive approaches, comparative analysis, and modeling are explored using field and small-group projects relevant to major topics in ecology. Concurrently with or after E&EB 520a or by permission of the instructor. Limited enrollment.

### **E&EB 541a<sup>U</sup>, Animal Behavior. Suzanne Alonzo.**

MW 11.30–12.45, 1 HTBA

An introduction to the study of animal behavior from an evolutionary and ecological perspective. This course covers the history and methods used to study animal behavior as well as discussion of many of the important topics in animal behavior such as foraging, predation, communication, reproduction, cooperation, and the role of behavior in conservation.

**E&EB 550a<sup>u</sup>, Biology of Terrestrial Arthropods. Marta Martinez Wells.**

TTh 11.30–12.45

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).

**E&EB 551La<sup>u</sup>, Laboratory for Biology of Terrestrial Arthropods.**

Marta Martinez Wells.

W 1.30

Comparative anatomy, dissections, identification, and classifications of terrestrial arthropods; specimen collection; field trips.

**[E&EB 555b, Invertebrates I.]****[E&EB 556Lb, Laboratory for the Invertebrates I.]****E&EB 557b, Invertebrates II. Leo Buss.**

TTh 1–2.15

A comprehensive survey of the phyla comprising the Lophotrochozoa and the Ecdysozoa emphasizing anatomy, functional organization, systematics, and evolutionary history. May be taken before or after E&EB 555. Invertebrates II is designed to follow Invertebrates I, although students may take these courses in either order. Together, Invertebrates I and II provide a comprehensive introduction to all animal phyla excluding the terrestrial arthropods and chordates, which are traditionally taught separately. The course and its associated laboratory make extensive use of living specimens and the enormous riches of the Peabody Museum's Division of Invertebrate Zoology. Indeed, the availability of these collections permits the offering of a course with a depth that can be mimicked at few, if any, competing institutions. The course is organized by a phylum-by-phylum introduction to peculiarities of each of the major groups of phyla, in most cases to ordinal levels.

**E&EB 558Lb, Laboratory for Invertebrates II. Leo Buss.**

M 2–5

Study of the anatomy of representative living invertebrates comprising the Lophotrochozoa and the Ecdysozoa, accompanied by examination of museum specimens of both extant and fossil invertebrates. This course is the laboratory accompanying the Invertebrates II lecture course (E&EB 557). The course makes extensive use of living specimens, preserved microscopic sectioned material, and wet and dry museum specimens, including fossil material. Each lab is devoted to one major phylum and the students are exposed to the unique anatomical and histological elaborations of that body plan. Concurrently with E&EB 557b.

**E&EB 560a, Seminar in Invertebrate Zoology I. Leo Buss.**

HTBA

Seminar devoted to reading and discussion on the topic of metazoan colony organization. Topics include colony morphology, ontogeny, integration, and zooid polymorphism.

**E&EB 564a<sup>u</sup>, Ichthyology. Thomas Near.**

MWF 8.30–9.20

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.



**E&EB 565a<sup>u</sup>, Laboratory for Ichthyology. Thomas Near.**

W 1–4

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 564.

**E&EB 616La<sup>u</sup>, Laboratory in Molecular Systematics. Adalgisa Caccone.**

M 1.30–5.30

A practical introduction to molecular techniques used in systematics (DNA extraction, PCR, sequencing) and their application to field studies in natural history, population genetics, mating systems, paternity, and the historical analysis of lineages. Research projects apply the methodologies.

**E&EB 620b<sup>u</sup>, Conservation Genetics. Adalgisa Caccone.**

TTh 2.30–3.45

This course is designed to understand the importance of genetic diversity and to provide a review of the means for preserving it. Although conservation genetics is a quantitative field, the seminar is designed to make it accessible to as wide an audience as possible. Knowledge of basic molecular biology techniques and Mendelian genetics is assumed, as is the understanding of elementary statistical methodologies.

**[E&EB 626b<sup>u</sup>, Molecular Ecology.]****E&EB 646b<sup>u</sup>, Plant Diversity and Evolution. Dianella Howarth.**

MW 1–2.15

In recent years great progress has been made toward understanding the evolutionary relationships of plant lineages. This course explores the relationships and characteristics of the major plant groups including the green algae, mosses, ferns, conifers, and flowering plants within a phylogenetic context. The course addresses the depths of our understanding of ecology and development in the formation of the complexity and diversity among these plant groups. Students should have a general understanding of introductory biology and evolution.

**E&EB 647Lb<sup>u</sup>, Laboratory for Plant Diversity and Evolution. Dianella Howarth.**

T 1

Laboratory sessions include local flora field research. Labs include hands-on experience in the plant groups examined in the course. Students should have a general understanding of introductory biology and evolution.

**E&EB 660b<sup>u</sup>, Wildlife Conservation Ecology. Oswald Schmitz.**

3 HTBA; discussion 2 HTBA

An exploration of the evolutionary ecological basis for animal behavior and life history. Topics include how behavior evolves and what factors ultimately shape animal decision making and life histories; the link between animal behavior and population dynamics (demographic models that translate behavior into life-history strategies are used); and how environmental perturbations influence animal life histories to alter population structure and dynamics.

**E&EB 665a<sup>u</sup>, Landscape Ecology. David Skelly.**

An introduction to the study of large-scale ecological patterns and processes. Through lectures and the completion of a project, students learn how to integrate a spatial perspective into consideration of major ecological questions. *Also F&ES 32019a<sup>u</sup>.*

**E&EB 670a<sup>u</sup>, Aquatic Ecology. David Skelly.**

T 1–2.15, lab Th 1–5

An intensive introduction to the ecology of populations and communities in freshwater systems. Concepts, patterns, and organisms important in lakes and streams; techniques of information collection and analysis. Weekly field trips to gather data.

[E&EB 672b<sup>U</sup>, Ornithology.]

[E&EB 673Lb<sup>U</sup>, Laboratory for Ornithology.]

[E&EB 675b<sup>U</sup>, Molecular Approaches to Systematics, Conservation Genetics, and Behavioral Ecology.]

**E&EB 678b, Mathematical Models and Quantitative Methods in Evolution and Ecology.** Suzanne Alonzo, David Post.

2 HTBA

This course examines a variety of approaches used to model population-level processes in evolution and ecology, including population genetics, optimality models, game theory, and population dynamic equations. We also discuss experimental design, statistical analyses, and other quantitative methods.

**E&EB 691b, Developmental Evolution of Body Plans, Homology, and Evolutionary Innovations.** Günter Wagner.

M 2.30–4.30

This course analyzes the contributions of developmental genetics, while trying to resolve some of the oldest questions in evolutionary biology: What is the nature of body plans? How did they originate? What is the nature of homology? How do new characters evolve? Students are expected to present a paper on one subject and actively participate in the discussions.

**E&EB 728b<sup>U</sup>, Ecology and Evolution of Infectious Diseases.** Paul Turner.

TTh 11.30–12.45

Overview of the ecology and evolution of pathogens (bacteria, viruses, protozoa) and their impact on host populations, one of the greatest challenges facing humankind today. Scope is comprehensive, including theoretical concepts, ecological and evolutionary dynamics, molecular biology, and epidemiology of ancient and emerging diseases. Relevant for pre-med and medical students, as well as students in E&EB, F&ES, and EPH. *Also EMD 728b.*

**E&EB 810a, Dynamics of Evolving Systems.** J. Rimas Vaisnys.

TTh 11.30–12.45

An introduction to the ways in which the structure and behavior of evolving biological systems can be described, modeled, and analyzed. Examination of model systems as well as modeling of laboratory and field phenomena.

**E&EB 900a–b, First-Year Introduction to Research and Rotations.** Richard Prum.

**E&EB 930a, Seminar in Systematics.** Staff.

**E&EB 935a, Tutorial in Evolution.** Günter Wagner.

2 HTBA

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

By arrangement with faculty.

## ECONOMICS

28 Hillhouse, 432.3575

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

### *Chair*

Christopher Udry (28 Hillhouse, 432.3571)

### *Director of Graduate Studies*

Truman Bewley (30 Hillhouse, Rm 30, 432.3719, truman.bewley@yale.edu)

### *Professors*

Joseph Altonji, Donald Andrews, Dirk Bergemann, Steven Berry, Truman Bewley, William Brainard (*Emeritus*), Henry Broude (*Emeritus*), Donald Brown, Judith Chevalier (*SOM*), Eduardo Engel, Robert Evenson, Ray Fair, John Geanakoplos, William Goetzmann (*SOM*), Pinelopi Goldberg, Timothy Guinnane, Philip Haile, Koichi Hamada, Gerald Jaynes, Yuichi Kitamura, Alvin Klevorick, Richard Levin, George Mailath, Robert Mendelsohn (*Forestry & Environmental Studies*), Giuseppe Moscarini, Barry Nalebuff (*SOM*), William Nordhaus, Guy Orcutt (*Emeritus*), Joseph Peck (*Emeritus*), Peter Phillips, Benjamin Polak, Gustav Ranis (*Emeritus*), John Roemer (*Political Science*), Herbert Scarf, T. Paul Schultz, Robert Shiller, Martin Shubik, Anthony Smith, T. N. Srinivasan, Christopher Udry

### *Associate Professors*

Hanming Fang, Donato Gerardi, Carolyn Moehling, Rohini Pande

### *Assistant Professors*

Irene Brambilla, Björn Bruegemann, Eduardo Faingold, Justine Hastings, Dean Karlan, Fabian Lange, Taisuki Otsu, Melissa Tartari, Ebonya Washington

### *Fields of Study*

Fields include economic theory, including microeconomics, macroeconomics, mathematical economics; econometrics; economic history; labor economics; market organization; money and banking; financial economics; economics of the public sector; international trade and finance; economic development; demography; history of economic thought; comparative economic systems; political economy.

### *Special Admissions Requirements*

The GRE General Test is required of all applicants to the program. Students whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

### *Special Requirements for the Ph.D. Degree*

The following requirements must be satisfied in addition to those prescribed by the Graduate School.

1. *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 two times.

2. *Prior to Registration for the Third Year.* (a) Students must have met the two-Honors requirement specified by the Graduate School. (b) 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. (c) 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.

3. *Admission to Candidacy.* The Graduate School requires that students 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 director of graduate studies after having completed department requirements (1) and (2) above, the Graduate School's prospectus requirement, and the following additional requirements: (a) Students must have completed two one-term prospectus workshops. Prospectus workshops have the word "prospectus" in their title. (There are other workshops.) If students can find no workshop corresponding to their interests, they may substitute other workshops for this requirement. 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. In the paper, the student should (i) specify an economic model useful for the investigation of an interesting economic problem, (ii) select data and econometric methods appropriate to the question, (iii) conduct proper statistical analysis, and (iv) interpret the results in an intelligent way. (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.

4. *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, on request of the committee chair, 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 on pages 470–71 of this publication.

## *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 on page 252 of this publication.

Program materials are available on our Web site: [www.econ.yale.edu](http://www.econ.yale.edu).

## *Courses*

**ECON 500a, General Economic Theory: Microeconomics.** Truman Bewley,  
John Geanakoplos.

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.** Dirk Bergemann,  
George Mailath.

General equilibrium and welfare economics. Allocation involving time. Public sector economics. Uncertainty and the economics of information. Introduction to social choice.

**ECON 510a, General Economic Theory: Macroeconomics.** Eduardo Engel,  
Anthony Smith.

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.** Björn Bruegemann,  
Giuseppe Moscarini.

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

**ECON 520a, Advanced Microeconomic Theory I.** Eduardo Faingold, Itzhak Gilboa.

A formal introduction to game theory and information economics. Alternative noncooperative solution concepts are studied and applied to problems in oligopoly, bargaining, auctions, strategic social choice, and repeated games.

**ECON 521b, Advanced Microeconomic Theory II.** George Mailath,  
Wojciech Olszewski.

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, Topics in Game Theory. Staff.**

A forum for advanced students to examine critically recent papers in the literature and present their own work.

**[ECON 524a, Behavioral Applied Theory.]****ECON 525a, Advanced Macroeconomics I. Anthony Smith.**

Aggregation, inventory models, externalities, spillovers, information, and adjustment. Time series models, expectations, models of financial markets, risk management, monetary policy, term structure of interest rates.

**ECON 526b, Advanced Macroeconomics II. Giuseppe Moscarini.**

Selected empirical topics.

**ECON 527a, 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. *Also LAW 20083.*

**ECON 530a, Mathematical Economics I. Itzhak Gilboa, Herbert Scarf.**

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 531a/b, Mathematical Economics II. Pradeep Dubey, John Geanakoplos.**

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 capital asset pricing model, the "Hahn paradox" on the value of fiat 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 532a<sup>U</sup>, General Equilibrium under Uncertainty.]****[ECON 533a and b, Workshop on Discrete Mathematics and Applications.]****ECON 535a and b, Prospectus Workshop in Mathematical Economics.**

**Truman Bewley, John Geanakoplos, Donato Gerardi.**

Workshop for students researching in mathematical economics to present and discuss work.

**ECON 537a and 538b, Microeconomic Theory Workshop. Staff.**

Presentations by research scholars and participating students.

**ECON 540a and 541b, Student Workshop in Macroeconomics. Björn Bruegemann, Giuseppe Moscarini.**

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. Eduardo Engel, Anthony Smith.**

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, Economic Analysis. Cheryl Doss.**

MW 9–10.15

An introduction for International Relations students to more advanced concepts of micro- and macroeconomic analysis in an applied context. Different economies in different stages of development are used as illustrations of these concepts. Areas covered include employment, income, and interest rate determination as well as theories of consumption, investment, pricing, money, and production. *Also INRL 560a.*

**ECON 545a, Microeconomics. Michael Booser.**

A survey of the main features of current economic analysis and of the application of the theory to a number of important economic questions, covering microeconomics and demand theory, the theory of the firm, and market structures. For IDE Students.

**ECON 546b, Macroeconomics. Staff.**

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. Taisuki Otsu.**

Provides a basic knowledge of econometric theory, and an ability to carry out empirical work in economics. Topics include linear regression and extensions, including regression diagnostics, generalized least squares, statistical inference, dynamic models, instrumental variables and maximum likelihood procedures, simultaneous equations, nonlinear and qualitative-choice models. Examples from cross-section, time series, and panel data applications.

**ECON 552b, Econometrics III. Donald Andrews, Azeem Shaikh.**

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. Donald Andrews, Eric Gautier.**

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 555b, Applied Econometrics II: Microeconometrics. Michael Boozer.**

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 557b, Time Series Econometrics II: Unit Roots and Co-Integration.]****ECON 558a, Econometrics. Michael Boozer.**

Application of statistical analysis to economic data. Basic probability theory, linear regression, specification and estimation of economic models, time series analysis, and forecasting. The computer is used. For IDE students.

**[ECON 561a, Computational Method for Economic Dynamics.]****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; or permission of the instructor.

**ECON 581b, American Economic History. Howard Bodenhorn.**

This course studies the process of economic growth as it has occurred in the American economy.

**[ECON 582b, General Economic History: Latin America.]****[ECON 583a, Topics 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. Steven Berry, Justine Hastings.**

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 neo-classical theories. Then turns to a 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 Microeconomics. Steven Berry, Philip Haile.**

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, Workshop in Applied Microeconomics. 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, Fabian Lange.**

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. 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 exposit their research plans and findings. Discussions encompass empirical microeconomic research relating to both high- and low-income countries.

**ECON 670a, Financial Economics I. Zhiwu Chen.**

T 2.30–5.30

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. *Also MGMT 740a.*

**ECON 671b, 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. *Also MGMT 741b.*

**ECON 672a, Behavioral Finance. Nicholas Barbaris.**

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.]****ECON 681b, Public Finance II. Ebonya Washington.**

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 702b, International Economics. Koichi Hamada.**

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, International Economic Analysis. Cheryl Doss.**

MW 9–10.15

A continuation of ECON 544a/INRL 560a. It extends the use of economic analysis to international trade and monetary policy including exchange rates and balance of payments with an emphasis on their relation to international trade, cross-border capital flows, and national economic policies. Introduction to quantitative tools and analysis as a way to determine the effects of various policies, building on concepts introduced in ECON 544a and the first part of this course. *Also INRL 561b.*

**[ECON 709a, International Economics and Open Economy Macroeconomics.]****[ECON 720a, International Trade I.]****[ECON 721b, International Trade II.]****[ECON 724b, International Finance.]****ECON 730a, Economic Development I. Christopher Udry, Mark Rosenzweig.**

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. Mark Rosenzweig, T. N. Srinivasan.**

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. Robert Evenson.**

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<sup>U</sup>, Economics of Agriculture. Robert Evenson.**

[ECON 736a<sup>U</sup>, Economics of Technology.]

**ECON 737b<sup>U</sup>, Economics of Natural Resources. Robert Mendelsohn.**

Linking of abstract economic concepts to concrete policy and management decisions. Application of theoretical tools of economics to global warming, pollution control, fisheries, forestry, recreation, and mining.

**ECON 738a or b, Workshop on Environmental and Natural Resources.**

**William Nordhaus, Robert Mendelsohn.**

**ECON 749a and 750b, Trade and Development Workshop. Mark Rosenzweig, Christopher Udry.**

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. Dean Karlan, T. Paul Schultz.**

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

[ECON 776b<sup>U</sup>, Economics of Population.]

**ECON 788a, Political Competition. John Roemer.**

W 10.30 – 12.20

Political competition in democracies is party competition. We develop, from the formal viewpoint, theories of party competition in democracies. The familiar “median voter theorem” of A. Downs is the simplest example of such a theory, but it is inadequate in several ways. We develop a theory in which parties (1) compete over several issues, not just one issue, as in Downs; (2) are uncertain about how citizens will respond to platforms; and (3) represent interest groups in the population. Applications, particularly to the theory of income distribution and taxation, are studied. *Also PLSC 575a.*

[ECON 790b, Political Economy.]

[ECON 791a, Theories of Distributive Justice.]

**ECON 802a<sup>U</sup>, Economic Development of Japan. Koichi Hamada.**

Economic performance of Japan: historical development since Meiji Restoration, postwar reconstruction and rapid growth including the industrial policy, government policy, the political economy of U.S./Japan economic relations.

**ECON 899a or b, Individual Reading and Research.**

By arrangement with faculty.

## ELECTRICAL ENGINEERING

Dunham Laboratory, 432.4250

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

*Chair*

Tso-Ping Ma

*Professors*

Richard Barker (*Emeritus*), Andrew Barron, Richard Chang, 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, Jerry Woodall (*Adjunct*), Steven Zucker

*Associate Professors*

Yiorgos Makris, Janet Pan, Lawrence Staib, Hemant Tagare, Edmund Yeh

*Assistant Professors*

Eugenio Culurciello, Hür Köser, Richard Lethin (*Adjunct*), Andreas Savvides, Sekhar Tatikonda

### *Fields of Study*

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

## ENGINEERING AND APPLIED SCIENCE

Dunham Laboratory, 432.4250

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

*Dean*

Paul Fleury

*Director of Graduate Studies*

Eric Altman

Programs of study are offered in the areas of applied mechanics and mechanical engineering, applied physics, chemical engineering, electrical engineering, biomedical engineering, and environmental engineering. All programs are under the Faculty of Engineering.

### *Applied Physics*

*Chair*

Daniel Prober

*Professors*

Sean Barrett, William Bennett, Jr. (*Emeritus*), Richard Chang, Michel Devoret, Joseph Dillon, Jr. (*Adjunct*), Paul Fleury, Steven Girvin, Robert Grober, Victor Henrich, Arvid Herzenberg (*Emeritus*), Marshall Long, Tso-Ping Ma, Daniel Prober, Nicholas Read, Mark Reed, Robert Schoelkopf, Ramamurty Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*)

*Associate Professors*

Charles Ahn, Janet Pan

*Assistant Professor*

Sohrab Ismail-Beig

## FIELDS OF STUDY

Fields include areas of theoretical and experimental condensed-matter physics, optical and laser physics, and material physics. Specific programs include surface science, microlithography and quantum transport, optical properties of micro-cavities, spectroscopy at the nanoscale, near-field microscopy, atomic force microscopy and ferro-electronic materials, molecular beam epitaxy, mesoscopic physics, first principles electronic structure methods, and medical instrumentation.

## *Biomedical Engineering*

### *Chair*

Mark Saltzman

### *Professors*

Richard Carson, James Duncan, Douglas Rothman, Mark Saltzman, Steven Segal, Fred Sigworth, Steven Zucker (*Computer Science*)

### *Associate Professors*

Jacek Cholewicki, Todd Constable, Fahmeed Hyder, Lawrence Staib, Hemant Tagare

### *Assistant Professors*

Francesco d'Errico, Robin de Graaf, Tarek Fahmy, Themis Kyriakides, Mark Laubach, Erin Lavik, Michael Levene, Xenios Papademetris

### FIELDS OF STUDY

Fields include the physics of image formation (MRI, ultrasound, nuclear medicine, and X-ray), NMR spectroscopy, PET and modeling, digital image analysis and processing, computer vision, biological signals and sensors, biomechanics, physiology and human factors engineering, drug delivery, biotechnology, biomechanics of the spine, and tissue engineering.

## *Chemical Engineering*

### *Chair*

Menachem Elimelech

### *Professors*

Eric Altman, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Michael Loewenberg, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, L. Lee Wikstrom (*Adjunct*), Kurt Zilm

### *Associate Professor*

Paul Van Tassel

### *Assistant Professors*

Eric Dufresne, William Mitch, Jordan Peccia

### 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*

Tso-Ping Ma

### *Professors*

Richard Barker (*Emeritus*), Andrew Barron, Richard Chang, 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, Jerry Woodall (*Adjunct*), Steven Zucker

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### *Assistant Professors*

Eugenio Culurciello, Hür Köser, Richard Lethin (*Adjunct*), Andreas Savvides, Sekhar Tatikonda

## **FIELDS OF STUDY**

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

## *Environmental Engineering*

### *Professors*

Gaboury Benoit, Menachem Elimelech, Thomas Graedel, Edward Kaplan, Yehia Khalil (*Adjunct*), Joseph Pignatello (*Adjunct*), James Saiers

### *Assistant Professors*

Michelle Bell, Ruth Blake, William Mitch, Jordan Peccia

### *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, transport of microbes in aquatic environments, colloidal and interfacial phenomena in aquatic systems, environmental engineering microbiology, environmental molecular biology, 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

### *Professors*

David Bercovici, Ira Bernstein (*Emeritus*), Boa-Teh Chu (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Robert Gordon, Shun-Ichiro Karato, Amable Liñan-Martinez (*Adjunct*), Marshall Long, Manohar Panjabi, Daniel Rosner, Ronald Smith, Mitchell Smooke, George Veronis, Peter Wegener (*Emeritus*), Forman Williams (*Adjunct*)

### *Associate Professors*

Jacek Cholewicki, Corey O'Hern, Udo Schwarz, David Wu

### *Assistant Professors*

Jerzy Blawdziewicz, Eric Dufresne, David LaVan, John Morrell, Ainissa Ramirez

### *Lecturers*

Beth Anne Bennett, Kailasnath Purushothaman

## **FIELDS OF STUDY**

*Mechanics of Fluids:* 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; combustion and flames; computational methods for fluid dynamics and reacting flows; laser diagnostics of reacting and nonreacting flows.

*Mechanics of Solids/Material Science:* Mechanisms of deformation, mass transport, and nucleation within material systems through experimental, analytic, and computational studies; mechanical testing of small-scale structures; characterization of microscale inhomogeneities in plastic flow; impact loading of materials; diffusion of dopants within semiconductor films; evolution of surface roughness during plastic deformation; ion implantation-induced disorder in crystalline films; incorporation of microstructural information into constitutive laws; electromigration in metallic interconnects; transient nucleation in multicomponent systems; jamming in particulate systems such as glasses, colloids, granular materials; materials science of thin films; phase transformations; MEMS materials; atomic-scale investigations of surfaces, surface interactions, and surface properties (nanomechanics); nanotribology (atomic mechanisms of friction); and nanoelasticity.

## *Special Requirements for the Ph.D. Degree*

A pamphlet titled *Qualification Procedures for a Ph.D. Degree in Engineering and 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. (Students registered in Applied Physics must take a minimum of twelve term courses.) Mastery of advanced math, for example, ENAS 500a, is expected. Students may take an examination to place out of ENAS 500a. Placing out of the course will meet the mathematical topics requirement but will not reduce the total number of required courses. In addition, core courses, as identified by each department/program, should be taken in the first year. No more than two courses can be Special Investigations, and at least two must be outside the area of the dissertation. Periodically, the faculty reviews the overall performance of the student to determine whether he/she may continue for the Ph.D. degree. At the end of the first year, a faculty member typically agrees to accept the student as a research assistant. By October 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.

### *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. 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.

*Master of Engineering.* This degree is designed to be taken in conjunction with Yale undergraduate B.S. degrees in Engineering. For details please see the Engineering entry in the *Yale College Programs of Study*, and [www.eng.yale.edu/Select](http://www.eng.yale.edu/Select).

Program materials are available upon request to the Director of Graduate Studies, Engineering and Applied Science, Yale University, PO Box 208267, New Haven CT 06520-8267; e-mail, [engineering@yale.edu](mailto:engineering@yale.edu); Web site, [www.eng.yale.edu](http://www.eng.yale.edu).

## Courses

*The list of courses may be slightly modified by the time term begins. Please check the Web site [www.eng.yale.edu/graduate/course\\_descr.html](http://www.eng.yale.edu/graduate/course_descr.html) for the most updated course listing.*

### **ENAS 500a, Mathematical Methods I. Corey O'Hern.**

TTh 10.30–12

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 transforms, Fourier integrals in one and more dimensions, optimization, elements of ODE).

### **ENAS 501b, Mathematical Methods II. Jerzy Blawdziewicz.**

TTh 1–2.20

Special functions, the Laplace transformations, Fourier series, Fourier integrals, and partial differential equations including separation of variables, methods of characteristics, variational techniques, and the brief discussion of numerical methods.

### **ENAS 502b<sup>U</sup>, Stochastic Processes. Edmund Yeh.**

MW 9–10.15

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.

### **ENAS 503a, Probabilistic Networks, Algorithms, and Applications.**

**Sekhar Tatikonda.**

TTh 1–2.15

This course examines probabilistic and computational methods for the statistical modeling of complex data. The emphasis is on the unifying framework provided by graphical models, a formalism that merges aspects of graph theory and probability theory. Graphical models: Markov random fields, Bayesian networks, and factor graphs. Algorithms: filtering, smoothing, belief-propagation, sum-product, and junction tree. Variational techniques: mean-field and convex relaxations. Markov processes on graphs: MCMC, factored HMMs, and Glauber dynamics. Some statistical physics techniques: cavity and replica methods. Applications to error-correcting codes, computer vision, bio-informatics, and combinatorial optimization. *Also STAT 667a.*

### **ENAS 505a, Advanced Engineering Mathematics. Michael Loewenberg.**

TTh 10.30–12

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.

### **ENAS 506a<sup>U</sup>, Basic Quantum Mechanics. Robert Grober.**

TTh 1–2.15

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.

**ENAS 507b<sup>U</sup>, Digital Systems Testing and Design for Testability. Yiorgos Makris.**

TTH 11.30–12.45

Introduction to the fundamental concepts, algorithms, and design techniques for testing digital systems. Covered topics include test issues and economics, fault modeling, logic and fault simulation, test generation algorithms for combinational and sequential circuits, testability analysis, design for testability, built-in self-test, delay fault test, functional test, case studies (memory test, FPGA test, system-on-chip test, etc.). Lab work consists of projects employing logic and fault simulation, automatic test pattern generation, and design for testability software tools.

**[ENAS 509a<sup>U</sup>, Electronic Materials: Fundamentals and Applications.]****ENAS 510a<sup>U</sup>, Physical and Chemical Basis Biosensing. Douglas Rothman.**

TTH 1–2.15

Basic principles and technologies for sensing the chemical, electrical, and structural properties of living tissues and biological macromolecules. Topics include magnetic resonance spectroscopy, microelectrodes, fluorescent probes, chip-based biosensors, X-ray and electron tomograph, and MRI.

**ENAS 511b<sup>U</sup>, Physics and Devices of Optical Communication. Jung Han.**

MW 11.30–12.45

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 instructor required.

**ENAS 513a<sup>U</sup>, Introduction to Analysis. Peter Jones.**

TTH 1–2.15

Foundations of real analysis, including metric spaces and point set topology, infinite series, and function spaces.

**ENAS 514b<sup>U</sup>, Real Analysis. Philip Gressman.**

TTH 1–2.15

The Lebesgue integral, Fourier series, applications to differential equations.

**ENAS 521a, Classical and Statistical Thermodynamics. Abbas Firoozabadi.**

MW 9–10.15

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.

**ENAS 525a, Optimization I. Eric Denardo.**

TTH 1–2.20

Focus on linear programming, a resource-allocation method widely used by engineers, managers, economists, and social scientists. The theory of linear programming (the simplex method, sensitivity analysis, prices, duality, and geometry) is coupled with a survey of its principal uses.

**[ENAS 530a, Nonlinear and Convex Optimization.]****ENAS 534a, Biomaterials. Camille Solbrig.**

MWF 10.30–11.20

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.

**ENAS 535b, Tissue/Biomaterial Interactions. Themis Kyriakides.**

HTBA

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.

**ENAS 550a<sup>U</sup>, Physiological Systems. Mark Saltzman and staff.**

MWF 9.30–10.20

Regulation and control in biological systems, emphasizing human physiology and principles of feedback. The physiology of membranes and membrane transport systems is discussed. The cellular and molecular principles of organ and tissue physiology are explained by coverage of major human physiological systems including renal, cardiovascular, respiratory, endocrine, digestive, and nervous systems. *Also C&MP 550a, MCDB 550a<sup>U</sup>.*

**ENAS 551a<sup>U</sup>, Biomedical Engineering I: Quantitative Physiology. Tarek Fahmy.**

TTh 11.30–12.45

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.

**ENAS 553b, Immuno-Engineering. Tarek Fahmy.**

HTBA

This course focuses on the applications of engineering techniques and methods to the study of immunology and immunological problems. The course introduces the fundamentals of immunity, followed by examples of how quantitative analysis and biomaterial intervention have helped us shape our understanding of how the immune system works and how to repair its defects. The course is a mixture of lectures and weekly readings.

**[ENAS 554b<sup>U</sup>, Biochemical Engineering: Biotechnology.]****ENAS 557b<sup>U</sup>, Biomechanics. Jacek Cholewicki.**

TTh 2.30–3.45

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.

**[ENAS 560a, Measurement and Noise.]**

**ENAS 564a<sup>u</sup>, Tissue Engineering. Erin Lavik.**

HTBA

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.

**ENAS 570b<sup>u</sup>, Cellular and Molecular Physiology: Molecular Machines in Human Disease. Michael Caplan, Emile Boulpaep, Mark Mooseker, Fred Sigworth.**

MWF 9:30–10:20

This course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiologic levels. Students learn about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed upon the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiologic 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. *Also C&MP 560b, MCDB 560b<sup>u</sup>.*

**ENAS 575b<sup>u</sup>, Computational Vision and Biological Perception. Steven Zucker.**

MW 1–2:15

An overview of computational vision with a biological emphasis suitable as a introduction to biological perception for computer science and engineering students, as well as an introduction to computational vision for mathematics, psychology, and physiology students. After MATH 120a or b and CPSC 112a or b, or with permission of instructor. *Also CPSC 575b.*

**ENAS 580a<sup>u</sup>, Seminars in Biomedical Engineering. Staff.**

Tutorial seminars illustrating applications of physics and engineering to biomedical problems. Students are required to attend the seminars, to do the readings assigned after each seminar, to ask questions, and to participate in the discussions. Four to five short papers are required on issues arising from selected topics. The final papers may be presented to the rest of the class.

**[ENAS 589a, Introduction to Information Technology for Management.]****ENAS 600a<sup>u</sup>, Computer-Aided Engineering. Marshall Long.**

TTh 9–10:15

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.

**ENAS 602b, Chemical Reaction Engineering. Charles McEnally.**

MW 4–6:30

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.

**ENAS 603b, Energy Mass and Momentum Processes. Daniel Rosner.**

MW 9–10:15

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

**[ENAS 604b, Bioseparations: Science and Engineering.]**

**ENAS 605b, Colloidal Chemical Engineering. Paul Van Tassel.**

TTh 1–2.15

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.

[ENAS 607b<sup>U</sup>, Microhydrodynamics.]**ENAS 608b, Surface and Surface Processes. Eric Altman.**

HTBA

The chemistry and physics of solid surfaces. Emphasis on fundamental aspects of the following areas of surface science: surface crystallography and reconstruction; kinetics of gas-solid interactions; adsorption; heterogeneous catalysis by transition metal surfaces; oxidation and corrosion; and nucleation and growth of thin films by physical and chemical vapor deposition.

[ENAS 610a, Advanced Topics in Bioseparations.]

**ENAS 611a<sup>U</sup>, Separation Processes. Yehia Khalil.**

MW 2.30–3.45

Theory and design of separation processes for multicomponent and/or multiphase mixtures via equilibrium and rate phenomena. Included are single-stage and cascaded absorption, adsorption, extraction, distillation, filtration, and crystallization processes.

[ENAS 612a, Colloidal Separations.]

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

[ENAS 618a, Principles and Practice of Heterogeneous Catalysis.]

[ENAS 619b, Advanced Transport: Topics in Multiphase Chemical Reaction Engineering.]

[ENAS 622b, Topics in Multiphase Chemical Reaction Engineering.]

**ENAS 626a<sup>U</sup>, Chemical Engineering Process Control. Eric Altman.**

TTh 9–10.15

Modeling of steady- and unsteady-state behavior of chemical processes; optimal control strategies for processes of particular interest to chemical engineers; discussion of both classical and modern control theory, with applications.

**ENAS 627b<sup>U</sup>, Advanced Integrated Circuits. Eugenio Culurciello.**

TTh 10.30–11.20

Neuromorphic analog integrated circuit design, fabrication processes, fundamentals of devices, circuits, and basic topologies. Analog and mixed-signal VLSI and SOC for biomedical instrumentation and bio-inspired circuits. System-level design, simulation, layout and tapeout. Examples of VLSI systems for biomedical applications: models of biological systems and circuit implementation. Biomedical sensors, SNR, and electronic circuit noise. Sensor arrays, communication, and analog-digital circuit interaction and co-design. Signal conversion, conditioning, compression, and reconstruction.

[ENAS 628b<sup>U</sup>, Sensors and Biosensors.]**ENAS 639a, Management of Water Resources and Environmental Systems. Gideon Oron.**

MW 1–2.15

The purpose of the course is to characterize, define, and solve water resources and environmental engineering problems implementing operation research (OR) methods. Topics

include introduction to OR and its role in water resources and environmental systems, economic criteria in water and environmental systems, optimization criteria and optimality conditions, application of linear programming (river contamination), integer programming (solid waste disposal), fixed charge problems (reservoir operation), nonlinear programming (optimal water blending), and analytic hierarchy processes (selection of optimal waste treatment and reclamation).

**ENAS 640b, Aquatic Chemistry. Gaboury Benoit.**

TTH 11.30–12.45

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. *Also F&ES 6000gb.*

**ENAS 641b, Biological Processes in Environmental Engineering. Jordon Peccia.**

MW 2.30–3.45

Fundamental aspects of microbiology and biochemistry, including stoichiometry, kinetics, and energetics of biochemical reactions, microbial growth, and microbial ecology, as they pertain to biological processes for the transformation of environmental contaminants; principles for analysis and design of aerobic and anaerobic processes including suspended- and attached-growth systems, for treatment of conventional and hazardous pollutants in municipal and industrial wastewaters and in groundwater.

**ENAS 642b, Environmental Physicochemical Processes. Menachem Elimelech.**

TTH 2.30–3.45

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.

**ENAS 643a, Transport and Fate of Organic Chemicals in the Environment.**

**Joseph Pignatello.**

TTH 4–5.15

Fundamental chemical and physical processes controlling the distribution, transport, and transformation of anthropogenic organic chemicals in aqueous environments including soils, sediments, and groundwater. It provides basic knowledge about the following: (a) the use of chemical and physical principles to quantify the thermodynamics and kinetics of individual processes, (b) the use of chemical structure to understand these processes at the molecular level, and (c) a framework for evaluating the relative importance of these processes so that the fate of a particular chemical in a particular environment may be predicted.

**[ENAS 644b, Environmental Chemical Kinetics.]**

**ENAS 645b, Industrial Ecology. Thomas Graedel.**

MW 1–2.20

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. *Also F&ES 96007b.*

**ENAS 646b, Hydrology and Water Resources. James Saiers.**

MW 11.30–12.50

An introduction to the essential elements of hydrogeologic processes. Course topics include groundwater flow, occurrence and movement of water in the vadose zone, streamflow generation, groundwater contamination, and transport of chemicals in groundwater. Computer software packages are used to reinforce concepts presented in class. A modest background in general physics and calculus is required. *Also F&ES 61021b.*

[ENAS 647b, Hydrologic Modeling.]

[ENAS 648a, Environmental Aspects of Emerging Technology.]

**ENAS 649a, Policy Modeling. Edward Kaplan.**

HTBA

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. *Also MGT 611a.*

[ENAS 650a<sup>U</sup>, Instrumentation and Product Design.]

[ENAS 658a, MEMS Design.]

[ENAS 704a<sup>U</sup>, Theoretical Fluid Dynamics.]

[ENAS 705a, Numerical Simulations of Liquids.]

[ENAS 708b, Fundamentals of Combustion.]

[ENAS 709a, Special Topics in Combustion.]

[ENAS 713a<sup>U</sup>, Acoustics.]

**ENAS 718a<sup>U</sup>, Heterojunction Devices. Mark Reed.**

TTh 9–10.15

Survey of the physics, technology, and fabrication of semiconductor heterojunction materials and devices. Topics include contemporary compound semiconductor material properties and epitaxial growth techniques; high-speed analog and digital devices; microwave and millimeter wave devices for radar and wireless communications; the physics and device properties of quantum wells and superlattices; HEMTs and modulation-doped structures; resonant tunneling physics and devices; and device modeling using computer simulation tools. Lab includes fabrication of GAAs, FETs, and HBTs; fabrication and measurement of quantum Hall effect standards; LEDs; and resonant tunneling devices.

[ENAS 745a, Optical Diagnostics for Reacting and Nonreacting Flows.]



**ENAS 747a<sup>U</sup>, Applied Numerical Methods I. Beth Anne Bennett.**

TTH 2.30–3.45

A variety of numerical methods applied to problems in engineering and applied science. Topics include solutions of linear and nonlinear equations, interpolation and approximation, eigenvalue determination, and numerical integration.

**ENAS 748b<sup>U</sup>, Applied Numerical Methods II. Beth Anne Bennett.**

TTH 11.30–12.45

An introduction to numerical methods for solution of ordinary and partial differential equations. One-step, multistep, and Runge-Kutta methods for initial value problems, finite difference methods in the solution of elliptic parabolic and hyperbolic partial differential equations.

[ENAS 750b<sup>U</sup>, Mechanics of Deformable Solids.]

[ENAS 751a, Vibration Problems in Engineering.]

**ENAS 761a, Introduction to Continuum Mechanics. David Bercovici.**

TTH 9–10.15

Introduction to the physics of continuous media, with applications to physical, natural, and biological sciences and engineering. Topics include tensor analysis; analysis of stress, motion, and strain; conservation of mass, momentum, and energy; rheology; examples in fluid dynamics, elasticity theory, and other topics at the discretion of instructor. *Also G&G 525a.*

[ENAS 763a, Introduction to Polymer Science and Engineering.]

[ENAS 785a<sup>U</sup>, Microstructural Development of Materials.]

[ENAS 786b, Mechanical Behavior of Materials.]

[ENAS 789a, Turbulence and Related Problems.]

[ENAS 810a, Nonlinear Optics.]

[ENAS 811a, Stem Cells and Approaches to Repair in the Nervous System.]

**ENAS 812b, Molecular Transport and Intervention in the Brain. Mark Saltzman, Richard Carson.**

HTBA

This course is 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. *Also NSCI 612b.*

[ENAS 815b, Detection of Radiation.]

[ENAS 816b, Techniques of Microwave Measurements and RF Design.]

**ENAS 817a, Noise, Dissipation, Amplification, and Information. Michel Devoret.**

TTH 10.30–12

Graduate-level equilibrium and non-equilibrium statistical physics applied to quantum electronics/optics phenomena. The aim is to explain the fundamental link between the random fluctuations of a physical system in equilibrium 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 in particular the ultimate limits of amplifier sensitivity and speed in physics measurements. *Also PHYS 677a.*

**[ENAS 818a, Mesoscopic Physics.]**

**ENAS 821b<sup>u</sup>, Physics of Medical Imaging. Todd Constable.**

MW 11.30–12.45

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.

**ENAS 825a, Physics of Magnetic Resonance Spectroscopy in Vivo. Graeme Mason.**

WF 12.30–2

The physics of chemical measurements performed with nuclear magnetic resonance spectroscopy, with special emphasis on applications to measurements 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.

**ENAS 836b<sup>u</sup>, Biophotonics and Optical Microscopy. Michael Levene.**

MW 4–5.15

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.

**ENAS 849b, Statistical Physics II. Corey O'Hern.**

TTh 2.45–4

An advanced course in statistical mechanics. Topics to be covered include a statistical formulation of thermodynamics, review of the canonical and grand canonical ensembles, theories for simple gases, treatment of interacting systems using cluster expansions, review of phase transitions and critical phenomena, introduction to the renormalization group, and discussion of the approach to equilibrium and the fluctuation-dissipation theorem. *Also PHYS 628b.*

**ENAS 850a<sup>u</sup> and 851b<sup>u</sup>, Solid State Physics I and II. Victor Henrich [F],**

**Charles Ahn [Sp].**

TTh 1–2.15 [F], TTh 9–10.15 [Sp]

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. *Also PHYS 548a<sup>u</sup> and 549b<sup>u</sup>.*

**ENAS 852b, Quantum Many-Body Theory. Yoram Alhassid.**

TTh 10.45–12

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. *Also PHYS 610b.*

[ENAS 856a, Theory of Solids I.]

[ENAS 857b, Theory of Solids II.]

[ENAS 858a, Asymptotic Methods.]

[ENAS 859b, Special Topics in Optics.]

[ENAS 860a, Special Topics in Condensed Matter Physics: Quantum Hall Effect and Conformal Field Theory.]

**ENAS 863b, Introduction to Superconductivity. Daniel Prober.**

MW 10.30-12

The fundamentals of superconductivity, including both theoretical understandings of basic mechanism and description of major applications. Topics include historical overview, Ginzburg-Landau (mean field) theory, critical currents and fields of type II superconductors, BCS theory, Josephson junctions and microelectronic and quantum-bit devices, and high  $T_c$  oxide superconductors. *Also PHYS 633b.*

[ENAS 866a, MOS Device Physics and Technology.]

**ENAS 875a<sup>U</sup>, Introduction to VLSI System Design. Richard Lethin.**

Th 1.30-3.20

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 student. Prerequisite: circuits at the level of introductory physics and computer programming.

[ENAS 887b<sup>U</sup>, Dynamic Programming and Reinforcement Learning.]

**ENAS 902a, Linear Systems. A. Stephen Morse.**

MW 1-2.15

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.

[ENAS 907b<sup>U</sup>, Computer Systems.]

[ENAS 908a, Advanced Topics in Computer Architecture.]

[ENAS 910a, Adaptive Control and Neural Networks.]

**ENAS 912a<sup>U</sup>, Biomedical Image Processing and Analysis. James Duncan, Lawrence Staib.**

Th 9-10.15

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.

[ENAS 913a, Advanced Topics in Medical Imaging and Computer Vision.]

**ENAS 917a<sup>u</sup>, Optical Properties of Semiconductors. Richard Chang.**

TTTh 2.30–3.45

Comprehensive treatment of the optical and electronic properties of semiconductor alloys and quantum structures. Physical models of blackbody radiation, spontaneous emission, stimulated emission, absorption, and polarization. Quantitative analysis of the effects of temperature, pressure, stress fields, and electric and magnetic fields. *Also PHYS 676a.*

[ENAS 918b, Data/Telecommunication Technology.]

[ENAS 919b, Advanced Heterojunction Devices.]

[ENAS 928b, Compound Semiconductor Materials Science, Processing, Devices, and Characterization.]

[ENAS 929b, Advanced Semiconductors and Related Devices.]

**ENAS 936b<sup>u</sup>, Systems and Control. Kumpati Narendra.**

TTTh 2.30–3.45

State-variable representation of linear time-invariant dynamical systems in both continuous and discrete time. Topics include model building, stability, controllability, observability, observers, optimal control, and an introduction to adaptive control. Students also work on individual projects throughout the term.

**ENAS 944a<sup>u</sup>, Digital Communications Systems. Edmund Yeh.**

MW 10.30–11.45

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.

**ENAS 954b<sup>u</sup>, Information Theory. Sekhar Tatikonda.**

TTTh 9–10.15

Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithmic complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, mutual information, channel capacity. Basic theorems of data compression and coding for noisy channels. Applications in statistics, communication networks, and finance. *Also STAT 664b<sup>u</sup>.*

**ENAS 960a, Networked Embedded Systems and Sensor Networks.**

**Andreas Savvides.**

TTTh 2.30–3.45

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. *Also CPSC 536a.*

[ENAS 964b<sup>u</sup>, Communication Networks.]

[ENAS 974a, Math Tools/Biomed Signal Process.]

**ENAS 986b<sup>u</sup>, Semiconductor Silicon Devices and Technology. Tso-Ping Ma.**

MW 9–10.15

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.

**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 995b, Technology Management Seminar Series.]

[ENAS 996a, SynThesis: Product Design for Entrepreneurial Teams.]

[ENAS 996b, SynThesis: Product Design for Entrepreneurial Teams.]

## ENGLISH LANGUAGE AND LITERATURE

Linsly-Chittenden Hall, 432.2233

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

### *Chair*

Langdon Hammer

### *Director of Graduate Studies*

Linda Peterson (106a LC, 432.2226, linda.peterson@yale.edu)

### *Professors*

Harold Bloom, Leslie Brisman, David Bromwich, Jill Campbell, Janice Carlisle, Michael Denning, Wai Chee Dimock, Lukas Erne (*Visiting*), Roberta Frank, Paul Fry, Sara Suleri Goodyear, Langdon Hammer, Margaret Homans, Lawrence Manley, Alastair Minnis, Lee Patterson, Linda Peterson, Caryl Phillips, David Quint, Claude Rawson, Joseph Roach, Marc Robinson, John Rogers, Robert Stepto, Katie Trumpener, Ruth Bernard Yeazell

### *Associate Professors*

Murray Biggs (*Adjunct*), Jessica Brantley, William Deresiewicz, Elizabeth Dillon, Laura Frost, Matthew Giancarlo, Amy Hungerford, David Krasner, Pericles Lewis, Christopher R. Miller

### *Assistant Professors*

Tanya Agathocleous, Ala Alryyes, Shameem Black, Wes Davis, El Mokhtar Ghambou, Hsuan Hsu, Sanda Lwin, Stefanie Markovits, Diana Paulin, Nicole Rice, Caleb Smith, Elliott Visconsi, Brian Walsh

### *Fields of Study*

Fields include English from Old English to the present and American literature and language.

### *Special Requirements for the Ph.D. Degree*

In order to fulfill the basic requirements for the program, a student must:

1. Complete thirteen 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 thirteen courses must be The Teaching of English, ENGL 990.
2. Satisfy the language requirement. The requirement can be satisfied in two ways and is to be completed by the end of the second year.

*The two-language option:* two languages, one to be completed by passing two advanced literature courses (graduate or undergraduate courses 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. One of these two to be Latin or Greek. Students specializing in periods after 1750 may, with the permission of the director of graduate studies, substitute a second modern language.

*The three-language option:* three languages, all to be passed by departmental exam (in the case of the ancient language, by exam or by a year of successful Yale course work), selected from among 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. Students specializing in periods after 1750 may, with the permission of the director of graduate studies, 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 English Language) may be substituted for selection (c). The three-language requirement is to be completed by passing two exams by the end of the first year and the third by the end of the second year.

3. Pass the oral examination (before or as early as possible in the fifth term of residence).

4. Teach a minimum of two terms.

5. Submit a dissertation prospectus from three to six months after passing orals (depending on when these were taken).

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

A combined Ph.D. degree is available with African American Studies. Consult departments for details.

#### 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, ancient or modern, by departmental examinations.

### *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 director of graduate studies). 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.

Program materials are available upon request to the Graduate Registrar, English Department, Yale University, PO Box 208302, New Haven CT 06520-8302.

### *Courses*

**ENGL 500a, Old English. Roberta Frank.**

MW 9–10.15

Introduction to Old English language and style as well as reading and critical analysis of representative Old English poems (heroic narratives, elegies, religious meditations) and a few prose selections.

**ENGL 500b, *Beowulf*. Roberta Frank.**

MW 9–10.15

A close reading of the poem *Beowulf*, with some attention to shorter heroic poems.

**ENGL 517b, Medieval Romance and Chronicle. Matthew Giancarlo.**

W 10.30–12.20

A survey of middle English romances and chronicles from the thirteenth and fourteenth centuries, including works by Layamon, Mannyng, and Robert of Gloucester, as well as various metrical romances (Emaré, Havelok, King Horn, Orfeo, Octavian, and others).

**ENGL 546a, Chaucer. Alastair Minnis.**

W 1.30–3.20

A reading of the *Canterbury Tales* in the contexts of both medieval culture and modern critical and editorial practices.

**ENGL 550a<sup>U</sup>, Spenser. Leslie Brisman.**

MF 11.30–12.45

A reading of most of *The Faerie Queene*, together with some of the minor poetry and attention to Spenser's classical and Italian precursors. The class meets once a week together with the undergraduate seminar and once a week as a separate group.

**ENGL 617a, Textual Shakespeare. Lukas Erne.**

T 10.30–12.20

An examination of a selection of Shakespeare plays, tragedies, comedies, and histories, with an emphasis on their various textual incarnations. The play texts are studied alongside important recent critical and theoretical writings.

**ENGL 672b, Milton. David Quint.**

M 10.30–12.20

A study of Milton and some of his controversial prose. We investigate the relation of the poetry to his historical contexts, focusing on the literary, religious, social, and political forces that shaped Milton's verse. *Also CPLT 672b.*



**ENGL 682b, Satire (1660–1830): Milton to Byron. Claude Rawson.**

T 10.30–12.20

The major and some minor poets in a period when satire was a dominant form of poetic expression, followed by two Romantic poets who wrote important satires: Milton, Butler, Rochester, Boileau, Dryden, Garth, Pope, Swift, Gay, Fielding (*Jonathan Wild*), Johnson, Shelley, Byron.

**ENGL 740a, War and Literature in the Eighteenth Century: Sterne, Johnson, Voltaire. Ala Alryyes.**

W 1.30–3.20

An examination of both the explicit and subtle literary representations of war in a century in which war, in Europe and its colonies, was almost continuous. The main authors are Sterne, Johnson, and Voltaire, but we also read works by Defoe, Swift, Pope, Hobbes, Joshua Reynolds, Smollett, and Diderot. We also look at legal cases and literary reviews. *Also CPLT 945a.*

**ENGL 756a, Byron, Shelley, Keats. Paul Fry.**

W 10.30–12.20

The 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.

**ENGL 807a, Dickens and Eliot: Parallel Careers. Janice Carlisle.**

Th 10.30–12.20

A study of the comparable trajectories of the careers of two major Victorian novelists. Readings include initial exercises in short fiction (*Sketches by Boz*, *Scenes of Clerical Life*) and early novels (*Oliver Twist*, *Adam Bede*), followed by late-career masterpieces (*Great Expectations*, *Middlemarch*) and last novels depicting contemporary life (*Our Mutual Friend*, *Daniel Deronda*).

**ENGL 815b, Hardy and His Contemporaries. Ruth Bernard Yeazell.**

M 1.30–3.20

A study of the major Hardy novels in the context of some of his lesser-known experiments with fictional form (the sensation novel, comic pastoral, the artist tale) and of selected works by his contemporaries that bear significantly on those experiments. Readings include Wilkie Collins's *The Woman in White*, George Eliot's *Adam Bede*, selected tales by Henry James, and D.H. Lawrence's *The Rainbow*, as well as a substantial selection of Hardy's own novels.

**ENGL 828b, Nineteenth-Century Long Narrative Poetry. Stefanie Markovits.**

W 3.30–5.20

A consideration of the long narrative poem of the nineteenth century beginning with the *Prelude* and *Don Juan* before moving into Clough, Tennyson, Elizabeth Barrett Browning, and Robert Browning.

**ENGL 842b, The Transatlantic Novel in the Eighteenth and Nineteenth Centuries.**

Elizabeth Dillon.

T 1.30–3.20

A study of the novel in an Atlantic framework, including consideration of British and American novels from Defoe to Hawthorne together with discussion of the theory of the novel, colonialism, the print public sphere, diasporic culture, and transatlantic studies.

**ENGL 860a, Hawthorne to Mukherjee. Wai Chee Dimock.**

T 10.30–12.20

American literary history as instances of rewriting. *The Scarlet Letter* read against Updike's *S* and Bharati Mukherjee's *The Holder of the World*; Whitman's *Leaves of Grass* and *Specimen*

*Days* against Michael Cunningham's *Specimen Days*; *Uncle Tom's Cabin* and Poe's short stories against Ishmael Reed's *Flight to Canada*; Faulkner's *As I Lay Dying* against Suzan-Lori Parks's *Getting Mother's Body*. Also AMST 898a.

**ENGL 894a, Contemporary American Poetry. Langdon Hammer.**

M 1.30–3.20

Readings in contemporary American poetry alongside discussions of poetics, practical and theoretical, with the poets themselves. Poets include J.D. McClatchy, John Hollander, John Ashbery, Susan Howe, Louise Glück, Frank Bidart, and Rosanna Warren.

**ENGL 900a, Yeats and His Circle. Wes Davis.**

F 10.30–12.20

An examination of the poetry, prose, and plays of W.B. Yeats in a variety of contexts, including the Rhymers' Club, the Theosophical movement, and the Irish National Theatre. This approach to Yeats places his work alongside the writing of figures like Ernest Dowson, Arthur Symonds, Edward Martyn, Augusta Gregory, J.M. Synge, George Russell, Rabindranath Tagore, and Ezra Pound.

**ENGL 926b, Post-1945 Fiction. Amy Hungerford.**

W 1.30–3.20

This seminar examines what writers and critics have imagined to be the most pressing aesthetic and cultural concerns of the second half of the twentieth century as these pertain to fiction. Of particular interest to the seminar: novel and history, the writer's relation to her writing, modernism/postmodernism, literature and the market, technology and the novel, how to organize or periodize the second half of the twentieth century.

**ENGL 933a, History of Children's Literature: The Anglo-American Tradition in European Perspective. Katie Trumpener.**

M 10.30–12.20

History and historiography of children's literature, emphasizing the nineteenth and early twentieth centuries and situating the Anglo-American tradition in European perspective. Special focus on fiction and picture books; didacticism and fantasy literature; intersections with modernism. Also CPLT 631a.

**ENGL 935a, Postcolonialism and Its Discontents. Sara Suleri Goodyear.**

T 1.30–3.20

A reading of theoretical and fictional texts from the Indian subcontinent, Afghanistan, and the Middle East to raise questions of cultural, religious, and racial identities. Also CPLT 727a, WGSS 714a.

**ENGL 947a, African American Poets of the Modern Era. Robert Stepto.**

T 1.30–3.20

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic and blues poems. Poets studied include Paul Laurence Dunbar, Langston Hughes, Sterling Brown, Gwendolyn Brooks, Margaret Walker, and Robert Hayden. Also AFAM 596a, AMST 641a.

**ENGL 970a, British Fiction, 1890–1915. William Deresiewicz.**

W 3.30–5.20

Studies in the first generation of modern British fiction, with special emphasis on the works of Joseph Conrad. Issues of literary form, subjectivity, and the nature of the self; imperialism, Englishness, mass culture, and bureaucracy. Broader consideration of the natures of modernism and modernity as well as of interrelations of inspiration, collaboration, and rivalry among the writers in question. The syllabus includes Conrad's *Lord Jim*, *Nostramo*, *The Secret*

*Agent*, and *Under Western Eyes* as well as Hardy, *Jude the Obscure*; James, *The Turn of the Screw*; Wells, *Tono-Bungay*; Forster, *Howard's End*; Lawrence, *The Rainbow*; and Ford, *The Good Soldier*.

**ENGL 964b, Modern British Novel. Laura Frost**

Th 1.30–3.20

A study of the work and criticism of authors including Joyce, Lawrence, Woolf, Conrad, and Ford.

**ENGL 987a, Psychoanalysis and Literature. Pericles Lewis.**

Th 1.30–3.20

An inquiry into Freud's use of literature and literature's use of Freud. Readings of Freud's texts alternate with readings from Sophocles, Shakespeare, E.T.A. Hoffmann, Henry James, Kafka, and Woolf. Some discussion of Freudian criticism. *Also CPLT 910a.*

**ENGL 990a, The Teaching of English. Linda Peterson.**

M 3.30–5.20

An introduction to the teaching of literature and writing. 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.

**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 director of graduate studies.

## ENVIRONMENTAL ENGINEERING

Dunham Laboratory, 432.4250

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

### *Professors*

Gaboury Benoit, Menachem Elimelech, Thomas Graedel, Edward Kaplan, Yehia Khalil (*Adjunct*), Joseph Pignatello (*Adjunct*), James Saiers

### *Assistant Professors*

Michelle Bell, Ruth Blake, William Mitch, Jordan Peccia

### *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, transport of microbes in aquatic environments, colloidal and interfacial phenomena in aquatic systems, environmental engineering microbiology, environmental molecular biology, water reuse, disinfection by-product formation, emerging contaminants, membrane separations for water quality control, industrial ecology, and chemical reactions at the mineral-water interface.

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## EPIDEMIOLOGY AND PUBLIC HEALTH

60 College Street, 785.6383

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

### *Chair*

Paul Cleary

### *Director of Graduate Studies*

Nancy Ruddle (785.6383)

### *Director of Medical Studies*

Robert Dubrow

### *Director of Medical Research*

Elizabeth Claus

### *Professors*

Serap Askoy, Elizabeth Bradley, Michael Bracken, Kelly Brownell (*Psychology*), Richard Bucala (*Medicine*), Michael Cappello (*Pediatrics*), Mark Cullen (*Medicine*), Erol Fikrig (*Medicine*), Durland Fish, Robert Heimer, Theodore Holford, Edward Kaplan (*School of Management*), Stanislav Kasl, Harlan Krumholz (*Medicine*), Brian Leaderer, Robert Makuch, Lawrence Marks, Susan Mayne, Diane McMahon-Pratt, Michael Merson, I. George Miller (*Pediatrics*), Harvey Risch, Nancy Ruddle, Peter Salovey (*Psychology*), Mark Schlesinger, Jody Sindelar, Mary Tinetti (*Medicine*), Daniel Zelterman, Heping Zhang, Tongzhang Zheng

### *Associate Professors*

Susan Busch, Elizabeth Claus, Loretta DiPietro, Josephine Hoh, Jeannette Ickovics, Beth Jones, Amy Justice (*Medicine*), Becca Levy, Haiqun Lin, A. David Paltiel, Kathleen Sikkema, Nina Stachenfeld, Christian Tschudi, Herbert Yu, Hongyu Zhao, Liangbiao Zheng

### *Assistant Professors*

Colleen Barry, Michelle Bell (*Forestry & Environmental Studies*), Andrew Epstein, Jason Fletcher, Alison Galvani, Yongtao Guan, Melinda Irwin, Patricia Keenan, Trace Kershaw, Kaveh Khoshnood, Douglas Leslie, Tēne Lewis, Judith Lichtman, Shuangge Ma, Xiaomei Ma, Kathleen McCarty, Annette Molinaro, Linda Niccolai, Melinda Pettigrew, Jennifer Ruger, Hong Wang, Yawei Zhang, Yong Zhu

### *Fields of Study*

Programs of study are offered in the areas of biostatistics, chronic disease epidemiology, environmental health sciences, genetic epidemiology, health policy and administration, and epidemiology of microbial diseases (infectious disease epidemiology, vector-borne diseases, immunology, parasitology, and virology). 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, TSE, or IELTS examination.

### *Special Requirements for the Ph.D. Degree*

To be admitted to candidacy, students must: (1) satisfactorily complete the course requirements for their division as outlined in the most current *EPH Bulletin*, achieving grades of Honors in at least two; (2) obtain an average grade of High Pass on the qualifying examination; and (3) submit an approved 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 director of graduate studies (DGS) and the Departmental Doctoral Committee that the prospectus be approved. Each DAC is expected to meet at least once each year, and more frequently if necessary. Since Dissertation Progress Reports are due at the close of the spring term, it is advised that the annual meeting be scheduled during this term. The student schedules meetings of the DAC. The chairperson 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 chairperson.

After approval of the prospectus the DAC reviews the progress of the dissertation research and the dissertation and decides when it is ready to be submitted to the readers. At that time the chair of the DAC submits its recommendation to the DGS and the Departmental Doctoral Committee, together with the approved dissertation 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.

The normal requirement for the degree of Doctor of Philosophy is four full years of graduate study. Generally the first two years are devoted primarily to course work. 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, 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.

Students must achieve the grade of Honors in at least one full-year or two full-term graduate courses, taken after matriculation in the Graduate School and during the nine-month academic year. The Honors requirement must be met in courses other than those concerned exclusively with dissertation research and preparation. See page 464 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 and seminars developed with a faculty adviser;

Health Policy — an average of three to four courses per term plus seminars and colloquia.

Teaching experience is regarded as an integral part of the graduate training program. Doctoral students are required to satisfactorily complete four terms as Teaching Fellows (10 hours/week). During the second and third years of study, students serve as Teaching Fellows (10 hours/week) each term. 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 only available to students who have completed previous graduate study at Yale (e.g., the M.P.H. program); see page 463. 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 only be allowed to teach 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 DGS well before the start of the term in which they hope to participate in a course. In some instances, when a student has demonstrated excellent teaching abilities and with the approval of the DGS, graduate research assistantship opportunities may take the place of teaching in the third year of study. By year 4, all students are engaged in full-time research activities.

### *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 on the student's transcript must be balanced by one grade of Honors. For more details, please see pages 468–69.

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 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, TSE, or IELTS examination.

A minimum of twelve courses must be completed, and a grade of Honors achieved in at least two courses. 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 individuals who work in the pharmaceutical industry, other science Ph.D.s, or medical 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 will not be permitted.

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. In the Capstone experience the student is required to complete an NIH-type grant application that is deemed reasonably competitive by a faculty member. An optional Capstone experience is an individualized tutorial in which the student completes a manuscript that is suitable for submission for publication in a relevant journal. This manuscript may be derived from course work 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 director of graduate studies 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 director of graduate studies must approve any variations to these requirements.

*Teaching:* One term of teaching as a TA 2 (10 hours/week) will be required without pay. If students teach beyond this requirement, they can be compensated. If a student has served as a teaching assistant elsewhere on campus, this experience may be counted toward the requirement. Divisional 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 will take medical school courses in years 1 and 2, then EPH doctoral course work in years 3 and 4 (all or part of year 3). 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 from 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, eph.doctoral@yale.edu.

### *Courses for all Epidemiology and Public Health Graduate School Degrees*

#### **BIS 505a, Introduction to Statistical Thinking I. Elizabeth Claus.**

This course provides an introduction to the use of statistics in 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 Statistical Analysis Systems (SAS) software on the PC is introduced.

#### **BIS 505b, Introduction to Statistical Thinking II. Annette Molinaro.**

This continuation of BIS 505a covers multiple regression, analysis of variance, nonparametric tests, survival analysis, and logistic regression. The course concludes with a review of commonly used statistical methods. As in the first term, the Statistical Analysis Systems (SAS) software package is used for statistical analysis. Prerequisite: BIS 505a.

#### **BIS 511a, GIS Applications in Epidemiology and Public Health. Theodore Holford.**

This course provides an introduction to methods for studying the association between exposure risk and diseases that are spatially dependent. The use of geographic information systems (GIS) is introduced to capture, store, analyze, and display spatial information in epidemiology and public health. This class covers the basic concept used in storing geographic data, geocoding location, and performing spatial analyses using ArcGIS. These tools are then used to construct disease maps, analyze disease clusters, and smooth continuous variables. No prior GIS experience necessary.

#### **BIS 525a and b, Seminar in Biostatistics. Annette Molinaro, Shuangge Ma.**

Faculty and invited speakers present and discuss current research.

#### **BIS 538b, Survey Sampling: Methods and Management. Robert Makuch.**

This course reviews the major sampling plans: simple, stratified, systematic, and cluster random sampling. The uses of weighted data and ratio estimation are discussed. The course emphasizes application of methodology, including use of SUDAAN. Prerequisite: BIS 505b or equivalent.

#### **BIS 540a, Fundamentals of Clinical Trials. Robert Makuch.**

This 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. Enrollment limited to second-year students.

#### **[BIS 560b, Database Management in Medicine and Epidemiology.]**

#### **BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials.**

**Peter Peduzzi, Pamela Hartigan.**

This course addresses advanced issues related to the design, conduct, monitoring, and analysis of multicenter randomized clinical trials. Topics include organizational, regulatory, and human rights issues; an overview of design strategies; advanced topics in sample size estimation and monitoring; data management and quality assurance procedures; cost-effectiveness and quality of life; and case studies of vaccine trials, factorial trials, primary and secondary prevention trials, large simple trials, strategy trials, and cost-effectiveness. The case studies

include many of the classical and landmark clinical trials, such as the polio vaccine field trial, Physicians Health Study, and the trials of AZT for the treatment of AIDS. Prerequisites: BIS 505a and BIS 540b. Enrollment limited to second-year students.

**BIS 623a, Applied Regression Analysis. Yongtao Guan.**

This course covers linear regression, estimation and hypothesis in multivariate regression, regression diagnostics, analysis of variance, and adjusting for covariates. Emphasis is on the application of methods. SAS is used throughout the course. Prerequisite: BIS 505b or equivalent.

**BIS 625a, Categorical Data Analysis. Daniel Zelterman.**

This 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.**

This 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 are used throughout the course. Prerequisites: BIS 623a and BIS 625a.

**BIS 631a, Genetic Epidemiology. Hongyu Zhao, Elizabeth Claus, Kenneth Kidd.**

This course deals with the interface of genetics and epidemiology as they relate to problems of public health, covering both the epidemiology of Mendelian disorders and the genetic and environmental contributions to common, complex genetic traits. Topics include study designs for assessing the importance of genetic factors (family, twin, and adoption studies), population genetics, and mapping and identification of genetic variants responsible for diseases through linkage and association analyses. Applications to various disease areas (e.g., cancer, obesity, psychiatry, and cardiovascular disease) are discussed. *Also GENE 631a.*

**BIS 635b, Topics in Statistical Epidemiology. Theodore Holford.**

This course considers methods for analyzing the association of one or more factors with disease by applying generalized linear models. Topics include the analysis of cohort studies, case-control studies, survival analysis, and the analysis of vital rates. In addition, methods of allowing for study design in the analysis are discussed, including the use of conditional logistic regression for matched data. Aspects of planning epidemiological studies are also covered, including the calculation of power and sample size using alternative study designs. Emphasis is placed on the application and interpretation of the techniques. Prerequisites: BIS 505a and BIS 505b, BIS 623a or BIS 625a.

[BIS 637b, Stochastic Processes in Biology and Medicine.]

[BIS 640a, Quantitative and Computational Methods in Bioinformatics.]

**BIS 643b, Theory of Survival Analysis and Its Applications. Haiqun Lin.**

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 STAT 542b.

**[BIS 645a, Statistical Methods in Human Genetics.]****BIS 646a, Nonparametric Statistical Methods and Their Applications. Faculty.**

Nonparametric statistical procedures including recursive partitioning techniques, splines, bootstrap, and other sample reuse methods are introduced. Some of the supporting theory for these methods is proven rigorously, but some are described heuristically. Advantages and disadvantages of these methods are illustrated by medical and epidemiological studies. Students may be required to compare these methods with parametric methods when analyzing data sets. Familiarity with basic statistical theory and computer languages is assumed. Prerequisites: STAT 541a and STAT 542b.

**[BIS 691b, Theory of Generalized Linear Models.]****BIS 692b, Statistical Methods in Genetics and Bioinformatics. Hongyu Zhao.**

Stochastic modeling and statistical methods applied to problems such as mapping quantitative trait loci, analyzing gene expression data, sequence alignment, and reconstructing evolutionary trees. Statistical methods include maximum likelihood, Bayesian inference, Monte Carlo Markov chains, and some methods of classification and clustering. Models introduced include variance components, hidden Markov models, Bayesian networks, and coalescent. Recommended background: STAT 541a, STAT 542b. Prior knowledge of biology is not required. *Also CB&B 645b, STAT 645b.*

**CDE 505a, Social and Behavioral Influences on Health. Jeannette Ickovics.**

This 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. This course emphasizes the integration of research from the social and behavioral sciences with epidemiology and biomedical sciences. *Also PSYC 657a.*

**CDE 508a, Principles of Epidemiology I. Robert Dubrow.**

This 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. *Also EMD 508a.*

**CDE 516b, Principles of Epidemiology II. Xiaomei Ma.**

This is 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 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 and from 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 the assessment of quality of life and the role of pharmacoepidemiology in a managed care environment. Prerequisites: CDE/EMD 508a, BIS 505a, and BIS 505b.

**CDE 521b, The Epidemiology of Selected Chronic Diseases. Beth Jones.**

This survey course covers some of the major chronic diseases, including coronary artery disease, cancer, stroke, chronic obstructive pulmonary disease, diabetes, major depression, and Alzheimer's. Invited lecturers who are experts in the field cover the basic pathophysiology, etiology, epidemiology, risk factors, and public health importance of each. Approximately half of the scheduled classes are devoted to discussions of major research articles on these diseases. The course emphasizes developing a working knowledge of chronic diseases, the application of epidemiologic methods, and the capacity to read the literature critically. Prerequisites: CDE/EMD 508a, CDE 516b.

**CDE 523b, Measurement Issues in Chronic Disease Epidemiology. Susan Mayne.**

This 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 525a and b, Seminar in Chronic Disease Epidemiology.]

[CDE 531a, Health and Aging.]

**CDE 532b, Epidemiology of Cancer. Brenda Cartmel.**

This 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. Prerequisites: CDE/EMD 508a, or permission of the instructor.

**CDE 533b, 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.

This 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 instructors for non-CDE majors required); students must have taken or must be currently taking BIS 505b and CDE 516b.

**CDE 535b, Vascular Epidemiology. Judith Lichtman.**

Vascular disease is the leading cause of death and disability among industrialized nations. This 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 vascular disease 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 analysis of actual 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. Jeannette Ickovics.**

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. This 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. This 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.]**

**CDE 570a, Epidemiology of Psychiatric Disorders. Selby Jacobs.**

This course reviews the application of traditional epidemiologic methods to the study of psychiatric disorders. Emphasis is on study design and assessments. New technologies for case identification are discussed. Application of these methods to studies of the epidemiology and genetics of the major psychiatric disorders (e.g., depression, schizophrenia, anxiety disorders) is reviewed. Prerequisite: CDE/EMD 508a.

**CDE 571b, Psychosocial and Behavioral Epidemiology. Stanislav Kasl.**

This 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.**

This 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. This 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.**

This course is intended to be a practical "how to" application of concepts and methods learned in CDE 572a. The primary objective of this 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.]****CDE 578b, Applied Research Methods for the Social and Behavioral Sciences.****Faculty.**

This course equips students with hands-on experience with qualitative and quantitative research methods that are integral to the social and behavioral sciences. Key concepts include (1) study design and threats to validity as related to program evaluation, (2) measurement issues within the context of the development, conduct, and analysis of health-related surveys, (3) qualitative research, (4) application of statistical concepts relative to the social and behavioral sciences, and (5) research with human subjects.

**CDE 617b, Developing a Research Protocol. Melinda Irwin.**

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), doctoral student status, or permission of 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, Ph.D. 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, cell and molecular biology are helpful, but not required).

**[CDE 638a, HIV/AIDS Prevention Research Seminar.]**

**CDE 650a, Introduction to Evidence-Based Health Care. Michael Bracken.**

Evidence-based health care uses best current evidence in addressing clinical or public health questions. This course introduces principles of evidence-based health care in formulating clinical or public health questions, systematically searching for evidence, and applying it to the question. Types of questions considered include treatment/prevention of disease, 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. Prerequisites: Students must have passed or be concurrently taking CDE 516b, or obtain permission of instructor.

**CDE 660 a and b, 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 which 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. Prerequisites: doctoral student status or permission of faculty.

**[CDE 669a, Research Seminar in Psychosocial Epidemiology.]**

**CDE 670a and b, Advanced Field Methods in Chronic Disease Epidemiology.**

**Faculty.**

This 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. John Stitt.**

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 503b, Introduction to Toxicology. Jonathan Borak, Cheryl Fields.**

This 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 508a, Assessing Exposures to Environmental Stressors. Brian Leaderer.**

This 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 510b, Fundamentals of Environmental Health and Risk Assessment.**

**Loretta DiPietro, Youcheng Liu.**

This course is an overview of environmental health. Students are introduced to the fundamentals of environmental health from the perspective of using risk analysis to reduce environmentally induced disease. The principles used to apply toxicologic, statistical, and pharmacokinetics factors in the assessment of health risk from chemicals are emphasized. Quantitative risk assessment, exposure assessment, and risk characterization are emphasized.

**EHS 511a, Applied Risk Assessment I. Jonathan Borak.**

This 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 514a, Environmental Chemistry. Meredith Stowe.**

The basic chemical principles underlying environmental pollutants in water, soil, air, and specialized media are introduced. Various categories of federally regulated compounds and elements are examined with respect to group characteristics, analytical measurement techniques of choice, sampling methods, and data interpretation. Selected chemical agents are studied with regard to their fate (possible transformations/decomposition) in the environment. Students develop insight into some current problems faced in applying pollutant measurements to public health, e.g., analytical precision, uncertainty, detection limits, chemical speciation, and toxicological properties.

**EHS 525a and b, Seminar in Environmental Health. Nina Stachenfeld.**

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 535a, Disaster Preparedness. Linda Degutis.**

This course focuses on the practical application of theoretical concepts related to disaster preparedness through a series of lectures by experts. Students are expected to actively participate in the sessions.

**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. Linda Degutis.**

This course addresses the application of epidemiological methods to injury surveillance, etiology of injuries, and the evaluation of the effects of injury control programs. Major topics include methods of scoring injury severity; distribution of injury types and severity in segments of the U.S. population; exemplar epidemiological studies of etiology; strategies to reduce incidence and severity; evaluation of attempts to change environments and behavior by standards, laws, persuasion, and economic incentives; and the use of cost-effectiveness, cost-benefit, and cost-savings analysis. Prerequisite: permission of the instructor or completion of epidemiologic methods course work.

**EHS 570a, Public Health Management of Disasters. David Cone.**

This course addresses the role of public health in disaster preparedness and management. It includes discussion of concepts in basic science, human responses to injury and illness, public health systems, and policy. Major topics include types of disasters and their consequences; the role of public health systems in disasters; hazard assessment and community vulnerability management; and mental health and environmental health issues in disasters. Practical applications of the concepts developed are emphasized, as are both the similarities and differences between domestic and foreign disaster management. Prerequisite: CDE/EMD 508a.

**EHS 575a and b, Introduction to Occupational and Environmental Medicine.**

**Mark Cullen [F], Mark Russi [Sp].**

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.

**EMD 508a, Principles of Epidemiology I. Robert Dubrow.**

This 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. *Also CDE 508a.*

**EMD 512a, Immunology for Epidemiologists. Nancy Ruddle,  
Diane McMahon-Pratt.**

This 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 520a, HIV-1/AIDS: Biology and Intervention. Louis Alexander.**

This course is geared toward advanced M.P.H. as well as Ph.D. and medical students who seek to gain an understanding of the HIV-1 life cycle, the effect of co-infections, and interventions designed to inhibit the spread of AIDS. Experts in specific topics covered in the course provide in-depth insights consistent with the advanced nature of the course. Prerequisites: EMD 512a, EMD 542b.

**EMD 541b, Infectious Diseases: Epidemiology, Prevention, and Control.  
Kaveh Khoshnood.**

Students learn epidemiologic methods and concepts in infectious diseases, specific viral and bacterial infections, and problems illustrative of the methods and/or disease. Methods include surveillance, seroepidemiology, case/control and cohort studies, vaccine trials, epidemic investigation, principles of causation, immunization policies and their implementation, and evaluation in developed and developing countries. Specific viral and bacterial infections of the central nervous, respiratory, and intestinal tracts; the herpes viruses; slow and persistent viral infections; retroviruses, including AIDS; the exanthems; nosocomial infections; and the relation between viruses and cancer are discussed. The use of epidemiological concepts in the prevention of disease is emphasized. Prerequisite: microbiology.

**EMD 557a, Public Health Issues in HIV/AIDS. Kaveh Khoshnood.**

An introductory, broad-based survey 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. The course, designed to give students a general, comprehensive understanding of HIV/AIDS issues, is targeted to students beginning work in public health or HIV/AIDS, or for 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. *Also NURS 713a.*

**EMD 560b, Epidemiologic Methods in STD/HIV Research. Linda Niccolai.**

The purpose of this course is to explore epidemiologic concepts and methods in the design, implementation, and interpretation of studies focused on sexually transmitted infections including the human immunodeficiency virus. Students learn how to address analytical research challenges including, but not limited to, choice of study design; sample selection; data collection; minimizing bias and confounding; generalizability. This course utilizes a combination of lectures and case studies. Through this course, students learn to critically read the published literature as well as design a methodologically rigorous research study. Prerequisite: EMD 508a.

**EMD 630a, Modeling Infectious Diseases: Theory and Applications.  
Edward Kaplan.**

This course provides an introduction to the mathematical modeling methods that have developed over the years for the description and control of infectious diseases, and also considers applications of such models to standard problems in epidemiology and more broadly in contemporary public health. The course emphasizes the formulation of basic models, the insight that derives from the formal analysis of such models, and the translation of such insights into the world of real problems. Prerequisites: CDE/EMD 508a and permission of the instructor, or doctoral student status.

**EMD 642a, Roles of Microorganisms in the Living World. Diane McMahon-Pratt, L. Nicholas Ornston, Dieter Söll.**

This topical course explores the biology of microorganisms. Emphasis is placed on mechanisms underlying microbial adaptations and how they influence biological systems. Prerequisites: biology, chemistry, and biochemistry. Requirements: class participation and three exams. *Also GENE 642a, MBIO 642a, MCDB 642a.*

**EMD 650b, Biology of Disease Vectors. Liangbiao Zheng.**

This course aims at providing a basic foundation on the biology of disease vectors, specifically arthropods. The course is broken down into two halves, the first half on common issues relevant to all disease vectors and the second half on specific vectors and the pathogens they transmit.

**[EMD 664b, Biology of Parasitic Protozoa and Helminths.]****EMD 670a, 670b, 671a, Advanced Research Laboratories. Christian Tschudi.**

This 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 675a and b, Advanced Topics in Infectious Disease Epidemiology.****Durland Fish.**

Participating EMD faculty present real and theoretical situations relating to problems or situations in contemporary infectious disease epidemiology and provide specific questions or problems to be solved by the students. The students have two weeks to research the problem and prepare answers, which they then present and discuss during ninety-minute biweekly meetings with faculty. The goal is to provide doctoral students with an opportunity to apply the principles and practice of infectious disease epidemiology at an advanced level with close mentoring by faculty with diverse professional interests which will provide an overview of the discipline. Topics include biological and social aspects of infectious disease control and prevention, vaccine efficacy, molecular epidemiology, disease surveillance, and risk assessment. All EMD doctoral students must take this course for one term.

**[EMD 680a, Advanced Topics in Molecular Parasitology.]****EMD 682a and b, Advanced Topics in Vector Biology. Serap Aksoy, Liangbiao Zheng.**

This broadly based seminar is on current research topics in the biology of medically important vectors, vector-pathogen interactions, vector ecology, disease management, and vector control strategies. Topics are chosen from the current literature. Prerequisite: Ph.D. student status or permission of the instructor.

**EMD 684b, Molecular and Cellular Processes of Parasitic Eukaryotes.****Diane McMahon-Pratt, Christian Tschudi.**

An advanced graduate-level seminar course in modern parasitology. The class is focused on the reading and critical evaluation of papers from the current literature selected by the students in cellular and molecular mechanisms of parasitism. Prerequisites: EMD 690a is highly recommended; permission of instructor. *Also MBIO 684b.*

**EMD 694a, Tutorial in Population Genetics of Vectors. Leonard Munstermann.****EMD 695a, Readings in Vector Ecology. Durland Fish.****EMD 728b, Ecology and Evolution of Infectious Diseases. Paul Turner.**

Overview of the ecology and evolution of pathogens (bacteria, viruses, protozoa) and their impact on host populations, one of the greatest challenges facing humankind today. Scope is

comprehensive, including theoretical concepts, ecological and evolutionary dynamics, molecular biology, and epidemiology of ancient and emerging diseases. Relevant for pre-med and medical students, as well as students in E&EB, F&ES, and EPH. *Also E&EB 728b<sup>II</sup>.*

**HPA 510a, Health Policy and Health Systems. Mark Schlesinger.**

This 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, Government and Health Policy. Colleen Barry.**

This 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 516a, Clinical Concepts: Individuals, in Sickness and in Health. David Katz.**

This course is directed at students with no or little background in biomedical or clinical sciences. The normal anatomy and physiology of the major organ systems are described to serve as a basis for understanding disease processes of public health importance. The course is taught by a practicing clinician and draws liberally from actual patient care experiences, as well as from the current medical literature. The course assumes little prior knowledge, but does develop some fairly complex concepts necessary to understand the workings of the human body. There is substantial emphasis placed on the interdependence of clinical medicine and public health, and on medical humanism. (An appreciation for poetry is desirable, but not required.) Upon completing the course, students will have a working knowledge of the human body, its remarkable adaptations, and its myriad vulnerabilities; facility with medical terminology; an understanding of clinical decision making; and familiarity with medical technology.

**HPA 529a, Policy Analysis and Health Politics. Patricia Keenan.**

This 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.

**[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.**

This 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. Faculty.**

This 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, CDE 505a.

**[HPA 546b, Ethical Issues in Public Health.]**

**HPA 547b, Law and Ethics for Health Care Organizations. Theodore Ruger.**

This 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. Susan Busch.**

This course introduces students to the organization and operation of the American health care system. The course examines systems of health care delivery and finance and recent trends in their organization, including the growth of managed care. The course seeks to provide students with an understanding of the existing structure of the system and to provide them with conceptual frameworks.

**[HPA 564a, Integrated Clinical/Financial Information Management.]**

**HPA 570b, Cost-Effectiveness Analysis and Decision Making. A. David Paltiel.**

This 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 583b, Methods in Health Services Research. Andrew Epstein.**

This 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. Susan Busch.**

This 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. This course is designed for students with minimal previous exposure to economics.

**HPA 587a, Health Care Economics. Douglas Leslie.**

This 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 588b, Multivariate Statistical Methods: Causal Modeling and Measurement Theory.]****[HPA 590b, Economics of Drugs and Crime.]****HPA 592a, Concepts and Principles of Aging. Mary Bourbonniere.**

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. *Also NURS 723a.*

**[HPA 596b, Critical Policy Issues in the AIDS Pandemic.]****HPA 597b, Capstone Course in Health Policy. Colleen Barry, Mark Schlesinger.**

This seminar is designed as the capstone educational experience for students concentrating in health policy. It integrates previous course work in health policy and public health and facilitates students' transition from the academic setting into the world of professional policy analysis. Students explore different strategies for policy analysis and associated models of professionalism. They learn how to select the appropriate strategy and disciplinary perspective for addressing a social problem. Students also learn how to identify and frame health policy problems. They gain an understanding of how framing may be used to change the focus of policy debates. Finally, students learn to present ideas in the sort of crisp and concise fashion required of professional policy analysis. These issues are studied in a series of applied areas, including substance abuse and the community obligations of managed care plans. Prerequisite: HPA 510a or equivalent.

**HPA 600a and b, Readings in Health Services Research and Policy. Faculty.**

This 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: Ph.D. student status or permission of the instructor.

**[HPA 603b, The Ethical Conduct of Research.]**



**HPA 612a and b, Interface of Health Policy and Clinical Care. David Katz.**

This course explores health policy dilemmas that have an impact on both populations and individual patients. The emphasis is on balancing the demands of public and private health care delivery, and on critical decision making. Current topics are chosen each term. Examples include resource allocation in end-of-life care, breast cancer screening, medical malpractice and tort law, physician-assisted dying, and appropriateness of invasive hemodynamic monitoring. Students receive a packet of readings from the current literature each week. Classes consist of student presentations followed by discussion and debate. Discussions are moderated by an expert faculty member from EPH, the School of Medicine, or outside institutions as indicated. The course is open to M.D./M.P.H. students, physicians, and others by permission of the instructor.

**HPA 617a, Colloquium in Health Policy and Health Services Research I. Faculty.**

This seminar focuses on the analysis of current issues in health policy and on state-of-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: Ph.D. student status or permission of the instructor.

**HPA 617b, Colloquium in Health Policy and Health Services Research II. Faculty.**

This 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: Ph.D. student status or permission of instructor.

**HPA 650a, Colloquium on Mental Health Services Research I. Faculty.**

This seminar focuses on the state-of-the-art methods in the evaluation and the 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: Ph.D. student status or permission of the instructor.

**HPA 650b, Colloquium on Mental Health Services Research II. Faculty.**

This 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: Ph.D. student status or permission of the instructor.



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## EUROPEAN AND RUSSIAN STUDIES

The MacMillan Center for International and Area Studies  
242 Luce Hall, 34 Hillhouse, 432.3423  
[www.yale.edu/macmillan/europeanstudies](http://www.yale.edu/macmillan/europeanstudies)  
M.A.

### *Chair*

Laura Engelstein

### *Director of Graduate Studies*

Timothy Snyder (245 Luce Hall, 432.3423)

### *Professors*

Julia Adams (*Sociology*), Vladimir Alexandrov (*Slavic Languages & Literatures*), Ivo Banac (*History*), Dirk Bergemann (*Economics*), Paul Bushkovitch (*History*), David Cameron (*Political Science; on leave [S]*), Katerina Clark (*Slavic Languages & Literatures*), Mirjan Damaška (*Law*), Edwin Duval (*French; on leave*), Laura Engelstein (*History*), Robert Evenson (*Economics*), Paul Freedman (*History*), Ute Frevert (*History*), John Gaddis (*History*), Harvey Goldblatt (*Slavic Languages & Literatures*), Philip Gorski (*Sociology*), Robert Greenberg (*Adjunct, Slavic Languages & Literatures*), Cyrus Hamlin (*Germanic Languages & Literatures*), Benjamin Harshav (*Comparative Literature*), Stathis Kalyvas (*Political Science*), Paul Kennedy (*History*), John Merriman (*History*), Steven Pincus (*History*), Susan Rose-Ackerman (*Law*), Frank Snowden (*History*), Timothy Snyder (*History*), Ivan Szelenyi (*Sociology*), Katie Trumpener (*Comparative Literature*), Tomas Venclova (*Slavic Languages & Literatures*), Miroslav Volf (*Divinity*), Jay Winter (*History*)

### *Associate Professors*

Hilary Fink (*Slavic Languages & Literatures*), Lawrence King (*Sociology*), John MacKay (*Slavic Languages & Literatures; on leave*), Nicholas Sambanis (*Political Science*)

### *Assistant Professors*

Keith Darden (*Political Science*), Kate Holland (*Slavic Languages & Literatures*)

### *Senior Lectors*

Irina Dolgova (*Slavic Languages & Literatures*), Rita Lipson (*Slavic Languages & Literatures*), Constantine Muravnik (*Slavic Languages & Literatures*), Slobodan Prosperov Novak (*Slavic Languages & Literatures*), Julia Titus (*Slavic Languages & Literatures*), Karen von Kunes (*Slavic Languages & Literatures*)

The European Studies Council formulates and implements new curricular and research programs reflective of current developments in Europe. The geographical scope of the council's activities extends from Ireland to the lands of the former Soviet Union. Its definition represents a concept of Europe that embraces the conventional divisions into Western, Central, and Eastern Europe, and is understood to include the Balkans and Russia. In 2000 and 2003, the U.S. Department of Education 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 demanding 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*

Comparative literature; economics; history; political science; law; Slavic languages and literatures; 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. 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. All students must demonstrate proficiency in two European languages besides English. 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 courses in at least three of the major disciplines relevant to the program (history, literature, social sciences, and law). 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. For those focusing on Central and Western Europe, two courses must concern Russia and Eastern Europe. Students may substitute a yearlong course of language study for two terms of graduate course work. Under this option the language course may not be taken for audit. Students with previous language preparation may in certain cases receive credit for this work. In all cases, students are required to pass examinations in two European languages (one of which may be Russian) 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 examinations in French, German, Italian, Spanish, or other West European languages should register for a placement 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 following: the Law School, the School of Management, the School of Forestry & Environmental Studies, and Epidemiology and Public Health. Application for admission must be made to both 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 for up-to-date information.

### *The Master's Thesis*

The master's thesis is based on research in a topic approved by the director of graduate studies and advised by a faculty member with specialized competence in the chosen topic. The thesis is normally written in conjunction with E&RS 950. Students may register for an independent study to prepare topics and begin research. The master's thesis is due in two copies no later than April 10 of the student's second year.

Program materials are available upon request to the Council on European Studies, Yale University, PO Box 208206, New Haven, CT 06520-8206.

### *Courses*

#### **E&RS 652b, The European Union's Contemporary Challenges.**

**Francesco Tonon Meggiolaro.**

HTBA

Each year, this 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. *Also INRL 549b.*

#### **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

342 Brady Memorial Laboratory, 785.6721

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

### *Chair*

Jon Morrow (*Molecular, Cellular & Developmental Biology*)

### *Director of Graduate Studies*

David Stern (785.4832, df.stern@yale.edu)

### *Professors*

Philip Askenase (*Internal Medicine*), Richard Bucala (*Internal Medicine*), Young Choi, José Costa (*Internal Medicine-Oncology*), S. Evans Downing (*Emeritus*), Gary Friedlaender (*Orthopaedics*), Earl Glusac (*Dermatology*), Nikki Holbrook (*Internal Medicine*), Michael Kashgarian (*Molecular, Cellular & Developmental Biology*), Jung Kim, Paul Lizardi, Marc Lorber (*Surgery*), Joseph Madri, Nita Jane Maihle (*Obstetrics, Gynecology & Reproductive Sciences*), Vincent Marchesi (*Director, Boyer Center for Molecular Medicine; Cell Biology*), Mark Mooseker (*Molecular, Cellular & Developmental Biology*), Jon Morrow (*Molecular, Cellular & Developmental Biology*), Jordan Pober (*Immunobiology; Dermatology*), John Rose (*Cell Biology*), Jeffrey Sklar (*Laboratory Medicine*), David Stern, Fattaneh Tavassoli (*Obstetrics, Gynecology & Reproductive Sciences*), Raymond Yesner (*Emeritus*)

### *Associate Professors*

Janet Brandsma (*Comparative Medicine*), Shawn Cowper (*Dermatology*), Robert Homer, Dhanpat Jain, Diane Krause (*Laboratory Medicine*), Jennifer McNiff (*Dermatology*), Wang Min, Archibald Perkins (*Molecular, Cellular & Developmental Biology*), Miguel Reyes-Mugica (*Pediatrics*), David Rimm, Marie Robert (*Internal Medicine*), Gerald Shadel, John Sinard (*Ophthalmology*)

### *Assistant Professors*

Carlo Bifulco, Demetrios Braddock, Liming Hao, Pei Hui, Steven Kleinstein, Diane Kowalski (*Surgical Otolaryngology*), Michael Krauthammer, Themis Kyriakides, Rossitza Lazova (*Dermatology*), Maritza Martel, Robert Means, Thomas Mezzetti, Marguerite Pinto, Lihui Qin, Pars Ravichandran, Ali Riba, Antonio Subtil-Deoliveira, Jr. (*Dermatology*), Idris Tolgay Ocal, David Tuck, Zenta Walther, Carolla Zalles, Eduardo Zambrano

### *Instructor*

Anjana Vijayvargiya

### *Research Scientists*

Christine Howe, Deepthi Pradhan

### *Associate Research Scientists*

Robert Camp, Gouri Chatterjee, Carol Cianci, Jan Czycyk, Alessio D'Alessio, Peter Gershkovich, Maureen Gilmore-Hebert, Malini Harigopal, Amy Jackson-Fisher,

Nancy Kirkiles-Smith, Sabine Lang, Jie Hui Li, Meng Liu, Dianhong Luo, Thomas Manes, Mark Mattie, Nina Rose, Michael Stankewich, Alexi Stortchevoi, Bogdan Yatsula, Haifeng Zhang

### *Fields of Study*

Fields include molecular and cellular basis of cancer; biology, biochemistry, and pathology of the plasma membrane; cells, molecules, and response to stimuli of connective tissue; interaction of viruses with animal cells; pathology of organ systems; somatic cell genetics and birth defects; biology of endothelial cells; assembly of viruses.

### *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 Centers).

### *Special Requirements for the Ph.D. Degree*

There is no foreign language requirement. Three to four terms of course work including courses in biochemistry, genetics, immunology, cell biology, and pathology are selected according to the student's background and choice. The qualifying examination has both written and oral parts. After a reading period of six weeks the student will answer, in essay form, one of two questions in each of three subject areas, which include a brief research proposal. The oral examination will specifically address the chosen areas of interest in addition to general problems of pathology. 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. They must then submit a written thesis describing the research and present a thesis research seminar.

In accordance with the BBS program, Ph.D. students are expected to participate in two terms (or the equivalent) of teaching.

### *Master's Degrees*

*M.Phil.* See Graduate School requirements. Awarded only to students who are continuing for the Ph.D. Students are not admitted for this degree.

*M.S.* Awarded only to students who are not continuing for the Ph.D., but who have successfully completed one year of the doctoral program. 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/DEPT/edu/gradtraing.htm](http://www.yalepath.org/DEPT/edu/gradtraing.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 (Dr. Joseph Madri).

#### **PATH 600, Pathological Basis of Human Disease. Joseph Madri 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. José Costa 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. David Stern.**

Laboratory rotations for first-year graduate students.

#### **PATH 630b, Biomaterial-Tissue Interactions. Themis Kyriakides.**

HTBA

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.

**PATH 65ob, Cellular and Molecular Biology of Cancer. David Stern,  
Archibald Perkins.**

MWF

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.

**PATH 67ob, Biological Mechanisms of Reaction to Injury. Michael Kashgarian,  
Jon Morrow, José Costa.**

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 68oa, Seminar in Pharmacology and Molecular Medicine. Michael Robek,  
Robert Means.**

M 3–5 (or 5.30)

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.

**PATH 69oa, Molecular Mechanisms of Disease. Jeffrey Sklar.**

TTh 2–3

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

## FILM STUDIES

53 Wall, Rm 216, 436.4668

M.Phil., Ph.D.

### *Co-Chairs*

Dudley Andrew

Charles Musser

### *Director of Graduate Studies*

Dudley Andrew (Rm 219, 53 Wall, [dudley.andrew@yale.edu](mailto:dudley.andrew@yale.edu))

### *Professors*

Dudley Andrew,\* Ora Avni, David Bromwich, Hazel Carby, Katerina Clark,\* Michael Denning, John Mack Faragher, Benjamin Harshav, David Joselit, Thomas Kavanagh,\* Millicent Marcus,\* Christopher L. Miller, Charles Musser,\* Alexander Nemerov, Brigitte Peucker,\* Joseph Roach, Michael Roemer, John Szwed,\* Katie Trumpener,\* Laura Wexler

### *Associate Professors*

John MacKay,\* Noa Steimatsky\*

### *Assistant Professors*

Seth Fein, Moira Fradinger, Terri Francis,\* Aaron Gerow,\* Karen Nakamura

\* 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, sociology, and other areas. Film Studies offers a combined Ph.D. with a number of other departments and programs, currently including African American Studies, American Studies, Comparative Literature, East Asian Languages and Literatures, 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, early cinema.
2. Aesthetics: theories of the image, adaptation, film/philosophy, avant-garde film.
3. European film: British, 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.

\*Member of the Graduate Committee



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](http://www.yale.edu/graduateschool/admissions). In the "Programs of Study" section of the application, the applicant should do the following: Applicants should 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 presented to a faculty committee consisting of at least one member of the Film Studies Graduate Committee and one member of the participating department who is not also on the Film Studies Graduate Committee. Once the student and dissertation adviser deem the dissertation finished, a public defense of the completed work shall be held. At least one examiner of the dissertation must be a member of the Film Studies Graduate Committee and one a 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 required to serve as a teaching fellow in two 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, Historical Methods in Film Study. Charles Musser.

W 1.30–3.20, screenings T 7

A range of historiographic issues in film studies, including the roles of technology, exhibition, and spectatorship. Topics include intermediality and intertextuality. Consideration of a range of methodological approaches through a focus on international early cinema and American race cinema of the silent period. Particular attention to the interaction between scholars and archives. *Also AMST 814a.*

### FILM 717b<sup>U</sup>, Black Women's Film and Video. Terri Francis.

W 3.30–5.20, screenings M 9.30 P.M.

Study of films and videos made by women of African descent during the twentieth and twenty-first centuries. Focus on filmmaking as a critical practice and an art form, particularly the way it engages cinematic perceptions of black womanhood. Films placed in a matrix of African American film history, feminist film theory, and legacies of black feminist writing and image making. Topics include film language, authorship, performance, and the question of audience. *Also AFAM 731b<sup>U</sup>, WGSS 705b.*

### FILM 724a<sup>U</sup>, Contemporary Documentary Film and Video. Charles Musser.

M 7–10.30

Examination of documentary and related nonfiction forms in the last three decades. Issues include film truth, performance, ethics, race and gender, and the filmmaker as participant-observer. Filmmakers include Frederick Wiseman, William Greaves, Chris Choy, Errol Morris, Lourdes Portillo, Trin T. Minh-Ha, Sue Friedrich, and Marlon Riggs. *Also AMST 813a<sup>U</sup>.*

### FILM 726b<sup>U</sup>, Documentary and War. Charles Musser.

W 1.30–3.20

Examines the ways that armed conflict has been represented in nonfiction film from the Spanish-American War to the present. Emphasis is on the Vietnam War and the current war in Iraq. Films include *Let There Be Light*, *Why Vietnam?*, *Year of the Pig*, *Fog of War*, *Fahrenheit 9/11*, *Off to War*. *Also AMST 815b<sup>U</sup>.*

### FILM 732a<sup>U</sup>, Cinematic Neorealism. Millicent Marcus.

W 3.30–5.20, screenings M 7

The course considers the complex relationship between the theory and practice of Italian cinematic neorealism. We screen a film weekly and analyze it in the context of an evolving theoretical paradigm, beginning with Rossellini's *Open City* (1945) and *Paisà* (1946), and flashing back to the proto-neorealist *Ossessione* (Visconti, 1942). We devote a great deal of attention to De Sica's contributions to neorealism, including *Shoeshine* (1946), *Bicycle Thief* (1948), *Miracle in Milan* (1951), and *Umberto D* (1952), in addition to De Santis's *Bitter Rice* and Visconti's *La terra trema* (1948). The course also includes a study of the movement's afterlife in *Bellissima* (Visconti, 1951), and the recent revisitations of neorealism in *Ice Thief* (Nichetti, 1989) and *Celluloide* (Lizzani, 1996), before concluding with Gianni Amelio's *Stolen Children* (1992), which has been hailed as the harbinger of a realist revival in the 1990s. *Also ITAL 595a.*

### FILM 751a<sup>U</sup>, British Cinema. Katie Trumpener.

M 1.30–3.20, screening SU 7

This course surveys the British film tradition, emphasizing overlaps with literature, drama, and art; visual modernism; documentary's role in defining national identity; "heritage" filmmaking and alternative approaches to tradition; auteur and actors' cinema.

**FILM 763b<sup>U</sup>, The Films of Fassbinder, Herzog, and Wenders. Brigitte Peucker.**

T 3.30–5.20, screenings M 7

The three major directors of the New German Cinema. Topics include postmodernism; high and low culture; film's relation to the other arts; issues of gender, race, and national identity; the influence of Hollywood. *Also GMAN 720b<sup>U</sup>.*

**FILM 775b, Post-Stalin Literature and Film. Katerina Clark.**

Th 1.30–3.20, screenings W 7

The main developments in Russian and Soviet literature and film from Stalin's death in 1953 to the present. *Also RUSS 696b.*

**FILM 803b, Cinema: Experience and Reflexivity. Francesco Casetti.**

W 3.30–5.20, screenings SU 7

To attend a film was a new form of experience within the framework of twentieth-century modernity. This seminar explores the meanings, functions, and rituals of film reception, with a stress on "classical" forms (1920s and 1930s) and their transformations in modern and post-modern cinema. We analyze films that openly display on screen the act of vision (from Keaton's *Sherlock Junior* to Visconti's *Bellissima*), and we study critical texts that describe or problematize this reflexive practice (from Victor Freeburg to Jean Epstein to Filmology). *Also CPLT 943b, ITAL 803b.*

**FILM 827b, The Face on Film. Noa Steimatsky.**

Th 2–5.30, screenings W 9 P.M.

The human face is a paradigmatic arena in which the largest questions on referentiality, the inscription of identity and subjectivity, and the articulation of interiority in art intersect. This seminar explores cinema's intervention vis-à-vis portraiture's traditional concerns, the narrative, discursive, ideological uses of facial representation, and its modern transfigurations. In extending its photographic basis to consider the parameters of movement, the incorporation of speech, and the shifting trajectory of the look, our discussion juxtaposes narrative fiction film in relation to documentary and experimental "cinematic portraits." We explore the close-up, the regime of the shot-reaction short, the debates surrounding identification, expressivity, and notions of animism in cinema, in light of theoretical writings and of classical and experimental films by such makers as Epstein, Kuleshov, Dreyer, Bresson, Pasolini, Hitchcock, Warhol, Cronenberg. *Also HSAR 727b.*

**FILM 846a, The Image after Bergson. Dudley Andrew.**

T 11.30–1.20, screenings M 7

A study of primarily French conceptions of the image since Bergson's *Matière et Mémoire* (1896). The nature, status, and role of the image in philosophy, literature, and art as it may have been challenged by photography and cinema. Texts by Sartre, Malraux, Merleau-Ponty, Bazin, Barthes, Lyotard, and Deleuze build the French debate, but students are encouraged to range beyond France in their papers and reports. Films from the silent and early sound era are screened as a weekly sidebar. *Also CPLT 938a, FREN 796a.*

## FORESTRY & ENVIRONMENTAL STUDIES

205 Prospect, 432.5100  
M.S., M.Phil., Ph.D.

### *Dean*

James Gustave Speth

### *Director of Doctoral Studies*

Xuhui Lee (338 ESC, 432.6271, xuhui.lee@yale.edu)

### *Professors*

Mark Ashton, Gaboury Benoit, Graeme Berlyn, Garry Brewer, William Burch, Jr., Lisa Curran, Michael Dove, Daniel Esty, Thomas Graedel, Timothy Gregoire, Stephen Kellert, Xuhui Lee, Robert Mendelsohn, Chadwick Oliver, James Saiers, Oswald Schmitz, David Skelly, John Wargo

### *Associate Professor*

Benjamin Cashore

### *Assistant Professors*

Robert Bailis, Michele Bell, Marian Chertow, Erin Mansur, Sheila Olmstead, Peter Raymond

### *Non-Ladder Faculty*

Shimon Anisfeld, Ellen Brennan-Galvin, Richard Burroughs, Ann Camp, Carol Carpenter, Timothy Clark, Amity Doolittle, Paul Draghi, Gordon Geballe, Bradford Gentry, Arnulf Grubler, Lloyd Irland, Reid Lifset, Florencia Montagnini, Robert Repetto, Jonathan Reuning-Scherer, Thomas Siccama

### *Courtesy Joint Appointments*

James Axley, Ruth Blake, Adalgisa (Gisela) Caccone, David Cromwell, Michael Donoghue, Menachem Elimelech, Robert Evenson, Nathaniel Keohane, Brian Leaderer, William Mitch, William Nordhaus, Jeffrey Powell, Richard Prum, James Scott, Ronald Smith, Stephen Stearns, Karl Turekian, Ernesto Zedillo

### *Visiting Faculty, Fellows, Adjunct Faculty, and Faculty with Primary Appointments Elsewhere*

Diana Balmori, Hooper Brooks, Dale Bryk, Maureen Burke, Douglas Daly, Mary Beth Decker, Pablo Martinez de Anguita d'Huart, William Ellis, James Fickle, Ramachandra Guha, Andrew Henderson, Richard Jones, Roy Lee, Lye Lin Heng, Lawrence Kelly, James Lyons, James MacBroom, David Mattson, Fabian Michaelangeli, Arvid Nelson, John Nolon, Michael Northrop, Josef Pacyna, Christine Padoch, Charles Peters, Nicholas Robinson, Dennis Stevenson, Fred Strebeigh, Charles Dana Tomlin

### *Fields of Study*

Fields include agroforestry; biodiversity conservation; biostatistics and biometry; community ecology; ecosystems ecology; ecosystems management; 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.

### *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, 824a/b, 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 or third term. All students must complete the examination at the end of their fourth term of study. 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 graduate 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 two terms prior to the end of their fourth year of study. In addition, before the end of their fourth year of study, all doctoral students must complete a two-term research project/assistantship with their major adviser (10 hours per week). The nature of teaching assignments and research duties is determined in cooperation with the student's major adviser and the director of graduate studies.

### *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](http://www.yale.edu/environment), or contact Admissions Director, Yale School of Forestry & Environmental Studies, 205 Prospect Street, New Haven CT 06511.

For courses, see the *Bulletin of the School of Forestry & Environmental Studies*.

## FRENCH

82–90 Wall Street, 3d floor, 432.4900

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

### *Chair*

Thomas Kavanagh

### *Director of Graduate Studies*

Howard Bloch (82–90 Wall Street, Rm 325, 432.4902, howard.bloch@yale.edu)

### *Professors*

Ora Avni, Howard Bloch, Edwin Duval, Marie-Hélène Girard (*Visiting*), Thomas Kavanagh, Patrick Wald Lasowski (*Visiting* [F]), Christopher L. Miller

### *Associate Professors*

Catherine Labio, Farid Laroussi, Donia Mounsef, Jean-Jacques Poucel

### *Assistant Professor*

Julia Prest

### *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 pre-dissertation 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 program in African American Studies), and one in French and Film Studies (in conjunction with the program in Film Studies). 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, French Department, Yale University, PO Box 208251, New Haven CT 06520-8251.

## Courses

*All classes are taught in French unless otherwise noted.*

### **FREN 610a, Old French. Howard Bloch.**

W 3:30–5:20

An introduction to the historical grammar of Old French through reading, translation, and discussion of some of its major literary forms, including epic, romance, allegory, *fabliau*, and drama.

### **FREN 671a. The Guillotine and the Nineteenth-Century Novel.**

Patrick Wald Lasowski.

W 1:30–3:20

Bringing together Enlightenment, Revolution, Terror, and the new age of the machine, the guillotine marks the beginning of our modernity. Asking if there exists an “aesthetics of the cut,” this seminar adopts four different perspectives on how this terrifying apparatus inscribes itself within the nineteenth-century novel: (1) the guillotine and a new novelistic exposition of the face: how characters are “glorified” as their heads enter the lunette of the scaffold; (2) the guillotine and the renewal of representation in painting, prints, photography, cinema (but also, later, in comic strips and video clips); (3) the guillotine and desire through its new exchanges between eros and thanatos; and (4) the evolution in the representation of the guillotine from the Restoration to the end of the nineteenth century. Readings: Chateaubriand (*Mémoires d'outre-tombe*), Balzac (*Le Curé de village*), Nodier (*Souvenirs*), Dumas (*Joseph Balsamo*), *La Femme au collier de velours*), Stendhal (*Le Rouge et le Noir*), Borel (*Champavert, contes immoraux*), Hugo (*Quatrevingt-treize*), Schwob (*Coeur double*), Villiers de l'Isle Adam (*Chez les passants*, *Le Convive des dernières fêtes*), Lorrain (*Histoires de masques*), France (*Les Dieux ont soif*), *Le Rouge (Notre-Dame la Guillotine)*, Richépin (*Les Morts bizarres*).

### **FREN 706a, Fiction and Industry in the Nineteenth Century. Catherine Labio.**

T 1:30–3:20

An examination of the relationship between economics and verbal and visual arts in nineteenth-century Europe. Key topics include romanticism and the spirit of commerce; political economy as a subject of literature; and aestheticism, realism, and the visual and verbal representability of labor and poverty in urban and rural settings. Includes works by Wordsworth, Martineau, Balzac, Disraeli, Marx, Dickens, Gaskell, Dostoevsky, Chernychevsky, Baudelaire, Daumier, Fildes, Doré, Zola, Van Gogh, and Thomas Mann. *Also CPLT 759a.*

### **FREN 737b, Maghreb Distinctions. Farid Laroussi.**

T 9:30–11:20

A seminar on Maghreb literature, the course provides a venue to explore works of fiction by Maghreban writers. We engage in questions pertaining to Orientalism and the postcolonial condition, especially the constitutive feature of politics, religion, and sexuality within the domestic realities in the Maghreb's nations. Special focus on how such a fairly young literature can be marshaled to question systems (ethical, aesthetic, ideological) while producing its own radical alterity because of both the exilic conditions of the writers and the empiric referent that the homelands have become. Readings include Boudjedra, Chraïbi, Dib, Djébar, Khatibi, Mokeddem, and Tlili.

**FREN 751b, Rousseau. Thomas Kavanagh.**

M 10.30–12.20

This seminar examines the relation between Rousseau the writer and Rousseau the political philosopher – between such works as *La Nouvelle Héloïse*, *Les Confessions*, *Les Rêveries* on the one hand and the two *Discours*, *Emile*, *Du contrat social*, and the *Essai sur l'origine des langues* on the other. We look at various approaches (psychoanalytic, historical, semiological) to resolving this opposition while considering the major contemporary critical assessments of Rousseau (Starobinski, Derrida, de Man, and others).

**FREN 793b, Literature and the Arts: Critical Perspectives. Catherine Labio.**

W 1.30–3.20

An examination of philosophical and theoretical inquiries into the relationship between verbal and visual forms of representation, from Diderot's art criticism to the narratology and visual poetics of structuralist and poststructuralist thinkers. Works to be discussed include texts by Lessing, Kant, Gautier, Baudelaire, Magritte, Heidegger, Derrida, Foucault, Marin, Nancy, and Lyotard, as well as a wide range of images, from medieval narrative art to twentieth-century Franco-Belgian comics. *Also CPLT 758b.*

**FREN 796a, The Image after Bergson. Dudley Andrew.**

T 11.30–1.20, screenings M 7

A study of primarily French conceptions of the "image" since Bergson's *Matière et Mémoire* (1896). The nature, status, and role of the image in philosophy, literature, and art as it may have been challenged by photography and cinema. Texts by Sartre, Malraux, Merleau-Ponty, Bazin, Barthes, Lyotard, and Deleuze build the French debate, but students are encouraged to range beyond France in their papers and reports. Films from the silent and early sound era are screened as a weekly sidebar. *Also CPLT 938a, FILM 846a.*

**FREN 807b, The Arthurian Illustrated Manuscript: Yale 229. Howard Bloch.**

W 3.30–5.20

A seminar devoted to a spectacular illustrated manuscript (Beinecke 229) containing several complete works of the thirteenth-century Lancelot Prose Cycle. An online scanned version of the manuscript allows students to work on illustrations and marginalia on their home computers. In English. *Also HSAR 590b.*

**FREN 858a, Sex and Gender in Seventeenth-Century Theater. Julia Prest.**

T 10.30–12.20

A study of key themes and issues related to sex and gender through a series of plays and secondary literature. Topics include sexual identity, cross-dressing, cross-casting, marriage, female authorship, homoeroticism, and patriarchy. Plays by Benserade, Corneille, Molière, Racine, T. Corneille, DeVise, and Villedieu.

**FREN 895b, Questions of Identity. Peter Brooks.**

Th 1.30–3.20

It is generally held that the modern novel—eighteenth to twentieth century—is centrally concerned with character—though what is meant by "character" is not easily defined. Much formal analysis of the place of character in the novel seems inadequate. The seminar focuses on one specific way in which issues of character often are posed in the novel, thematically and formally: as a question of identity, personal, social, and psychological. The identity paradigm seems to emerge with particular force in this period, no doubt in response to vast social dislocations as well as an enhanced sense of the individual personality. The seminar focuses on a selection of novels, and also draws on materials from law, moral philosophy, and psychoanalysis. Readings include J.-J. Rousseau, *Confessions*, vol. 1 and *Rêveries d'un promeneur solitaire*; Nathalie Z. Davis, *The Return of Martin Guerre*; H. de Balzac, *Le Colonel Chabert*; Charles

Dickens, *Great Expectations*; Wilkie Collins, *The Woman in White*; Henry James, *The Wings of the Dove*; Marguerite Duras, *Le ravissement de Lol V. Stein*; J. M. Coetzee, *Disgrace*. Also CPLT 864b.

### **FREN 913a, Henry James and Gustave Flaubert: The Project of the Novel.**

**Peter Brooks.**

TH 1.30–3.20

The course starts from Henry James's complex and ambivalent attitudes toward Flaubert's novels — his baffled attempts to understand Flaubert's project — and moves on to consider principally how the two novelists developed radically incompatible theories of the uses of fiction in their late work. Some attention is paid to the relation of both writers to Balzac's example, and their differing interpretations of this precursor. Principal novels for study include Flaubert's *L'Education sentimentale*, *Un coeur simple*, and *Bouvard et Pécuchet* and James's *The Tragic Muse*, *What Maisie Knew*, *The Beast in the Jungle*, and *The Golden Bowl*. Also CPLT 859a.

### **FREN 939a, The French Atlantic Triangle: Literature and Culture of the Slave Trade.**

**Christopher L. Miller.**

TH 10.30–12.20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene. Also AFAM 854a, AFST 739a, CPLT 723a.

### **FREN 941b, The Modern Short Story. Ora Avni.**

T 1.30–3.20

An examination of the nineteenth- and twentieth-century French short story. Focus on narrative techniques. Authors may include Gautier, Balzac, Mérimée, Maupassant, Flaubert, Barbey d'Aurevilly, Hugo, Dumas, Nerval, Daudet, Gide, Allais, Sarraute, Queneau, Modiano. We also read some theoretical texts.

### **FREN 957a, Experiments in Twentieth-Century Fiction. Ora Avni.**

T 1.30–3.20

This 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 disillusion, 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 Forets, Modiano, Chamoiseau, Gary, Cohen, and Nothomb.

## GENETICS

I-313 Sterling Hall of Medicine, 785.5846

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

### *Chair*

Richard Lifton

### *Director of Graduate Studies*

Michael Stern (I-352 SHM, 737.2283, michael.stern@yale.edu)

### *Professors*

Edward Adelberg (*Emeritus*), Nancy Berliner (*Internal Medicine/Hematology*), Douglas Brash (*Therapeutic Radiology*), W. Roy Breg, Jr. (*Emeritus*), Lynn Cooley, Daniel DiMaio, Jerome Eisenstadt (*Emeritus*), Bernard Forget (*Internal Medicine/Hematology*), Peter Glazer (*Therapeutic Radiology*), Arthur Horwich, Paula Kavathas (*Laboratory Medicine*), Kenneth Kidd, Richard Lifton (*Internal Medicine/Nephrology; Molecular Biophysics & Biochemistry*), 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

### *Associate Professors*

Allen Bale, Susan Baserga (*Molecular Biophysics & Biochemistry*), Jeffrey Gruen (*Pediatrics*), Michael Stern, Hong Sun, Hui Zhang, Hongyu Zhao (*Epidemiology & Public Health; Biostatistics*)

### *Assistant Professors*

Kei-Hoi Cheung (*Medical Informatics*), Peining Li, Valerie Reinke, Matthew State (*Child Study Center*), Zhaoxia Sun

### *Fields of Study*

Molecular Genetics: chromosome structure and function, genetic recombination, viral genetics, DNA damage repair, ribosome biogenesis, protein folding, and the regulation of gene expression. Genomics: genome mapping, genome modification, high-throughput technology, evolutionary genetics and functional genomics. Cellular and Developmental Genetics: 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, 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 level. Students are not expected to teach during their first year.

### *Honors Requirement*

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see page 464).

### *Master's Degrees*

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

*M.S.* Students are not admitted for this degree but may be awarded this degree if they leave Yale without completing certain requirements for the Ph.D.

Prospective applicants are encouraged to visit the BBS web site ([info.med.yale.edu/bbs](http://info.med.yale.edu/bbs)), MCGD Track.

## Courses

### GENE 500b, Principles of Human Genetics. Allen Bale.

HTBA

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.

### GENE 603a and b, 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](http://www.seop.yale.edu). Contact Professor Kavathas. *Also IBIO 603.*

### GENE 625a, Basic Concepts of Genetic Analysis. Tian Xu, Michael Koelle, Richard Lifton, Shirleen Roeder, Michael Stern.

MW 11.30–12.45

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. *Also MB&B 625a<sup>II</sup>, MCDB 625a<sup>II</sup>.*

### GENE 631a, Genetic Epidemiology. Hongyu Zhao, Elizabeth Claus, Kenneth Kidd.

M 1–2.50

This course deals with the interface of genetics and epidemiology as they relate to problems of public health, covering both the epidemiology of Mendelian disorders and the genetic and environmental contributions to common, complex genetic traits. Topics include study designs for assessing the importance of genetic factors (family, twin, and adoption studies), population genetics, and mapping and identification of genetic variants responsible for diseases through linkage and association analyses. Applications to various disease areas, such as cancer, obesity, psychiatry, and cardiovascular disease, are discussed. *Also BIS 631a.*

### GENE 642a, Roles of Microorganisms in the Living World. L. Nicholas Ornston, Diane McMahon-Pratt, Dieter Söll.

TTh 11.30–12.45

A topical course exploring the biology of microorganisms. Emphasis on mechanisms underlying microbial adaptations and how they influence biological systems. *Also EMD 642a, MBIO 642a, MCDB 642a.*

### GENE 645a, Statistical Methods in Human Genetics. Hongyu Zhao, Elizabeth Claus, Kenneth Kidd.

Probability modeling and statistical methodology for the analysis arising from human genetics studies are presented. Topics include: population genetics, single locus and polygenic inheritance, linkage analysis using parametric models and allele-sharing methods, population-based and family-based disease-marker associations, genetic risk prediction models, sequence analysis, microarray data analysis. Prerequisites: introductory Genetics; BIS 505a and b, or equivalent; permission of instructor.

### GENE 675a and b, Graduate Student Seminar. Joann Sweasy and staff.

W 4–5

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.

**GENE 705a, Molecular Genetics of Prokaryotes. Nigel Grindley, Patrick Sung.**

MW 11.30–12.45

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Required: previous or concurrent introductory courses in genetics and biochemistry. *Also MB&B 705a<sup>U</sup>, MCDB 505a.*

**GENE 734a, Molecular Biology of Animal Viruses. Daniel DiMaio, George Miller, Peter Tattersall, Walther Mothes, Jack Rose, Robert Means, Michael Robek.**

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions. *Also MBIO 734a.*

**GENE 743b, Advanced Eukaryotic Molecular Biology. Anthony Koleske, Mark Hochstrasser, Patrick Sung.**

TTh 11.30–12.45

Selected topics in regulation of gene expression, genome structure and evolution, signal transduction, cellular physiology, development, and carcinogenesis. Prerequisite: biochemistry or permission of the instructor. *Also MB&B 743b<sup>U</sup>, MCDB 743b.*

**GENE 749a, Medical Impact of Basic Science. Joan Steitz, Enrique De La Cruz, Mark Hochstrasser, Andrew Miranker, Lynn Regan, Patrick Sung.**

TTh 1–2.15

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: MB&B 600a<sup>U</sup>/601b<sup>U</sup> or permission of the instructor. *Also MB&B 749a<sup>U</sup>.*

**GENE 777b, Mechanisms of Development. Lynn Cooley, Xing-Wang Deng, Valerie Reinke, Michael Stern, Zhaoxia Sun.**

M 9.45–11, F 2–3.15

This is 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. *Also MCDB 677b.*

**[GENE 810a, Human Molecular Genetics.]****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, First-Year Introduction to Research. Shirleen Roeder.**

Lab rotations, grant writing, and ethics for Molecular Cell Biology, Genetics, and Development track students. *Also CBIO 900a, MCDB 900a.*

**GENE 901b, First-Year Introduction to Research. Michael Stern, Carl Hashimoto.**

Lab rotations, topic-based seminars for Molecular Cell Biology, Genetics, and Development track students. *Also CBIO 901b, MCDB 901b.*

**GENE 921a and b, Reading Course in Genetics and Molecular Biology.****Michael Stern and staff.**

Directed reading with faculty. Term paper required. Permission of Genetics DGS is required.

## GEOLOGY AND GEOPHYSICS

Kline Geology Laboratory, 432.3124

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

### *Chair*

David Bercovici

### *Director of Graduate Studies*

John Wettlaufer

### *Professors*

Jay Ague, David Bercovici, Robert Berner, Mark Brandon, Derek Briggs, Leo Buss, Michael Donoghue, Jacques Gauthier, Robert Gordon, Thomas Graedel, Leo Hickey, Shun-ichiro Karato, Jeffrey Park, Danny Rye, Adolf Seilacher (*Adjunct*), Brian Skinner, Ronald Smith, Karl Turekian, George Veronis, Elisabeth Vrba, John Wettlaufer

### *Associate Professors*

Peter Reiners, Steven Sherwood

### *Assistant Professors*

Ruth Blake, David Evans, Alexey Federov, Jun Korenaga, Mark Pagani

### *Lecturer*

Catherine Skinner

### *Fields of Study*

Fields include geochemistry and petrology, geophysics, mineral physics, seismology and geodynamics, structural geology and tectonics, paleontology and paleoecology, and oceanography, meteorology, 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 stu-



dent'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.

### *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.

Program materials are available at [www.geology.yale.edu](http://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](mailto:dgs@geology.yale.edu).

### *Courses*

**G&G 500b<sup>u</sup>, Mineral Deposits. Brian Skinner.**

An introduction to the formation and distribution of mineral deposits.

[G&G 501b<sup>u</sup>, Radiative Transfer and Climate.]

**G&G 502a<sup>u</sup>, Introduction to Geochemistry. Peter Reiners, Mark Pagani.**

MW 11.30–12.45

Basic principles of geochemistry and their use in geological science. Thermodynamics of aqueous and igneous systems. Element fractionation and isotope geochemistry. Biogeochemical cycles, geochronology, cosmochemistry.

**G&G 504au, Minerals and Human Health. Catherine Skinner.**

TR 11.30–12.45

Study of the interrelations between earth materials and processes, and personal and public health. The transposition of the chemical elements essential for life from the environment.

[G&G 505a<sup>u</sup>, Geochemistry of Planetary Evolution.]

[G&G 506bu, Chemical Cycles, Pollution, and the Global Environment.]

[G&G 507a, Radiogenic Isotopes and Geochronology.]

**G&G 511a, Stratigraphic Principles and Applications. Leo Hickey.**

Principles of classification, age determination, and paleoenvironmental interpretation of stratified rocks with application to actual cases drawn from various geological disciplines.

[G&G 515b<sup>u</sup>, Paleobotany.]

[G&G 516a<sup>u</sup>, The Invertebrates.]

[G&G 517La<sup>u</sup>, Laboratory for the Invertebrates.]

[G&G 518a<sup>u</sup>, Trace Fossil Analysis.]

**G&G 519a<sup>u</sup>, Introduction to the Physics and Chemistry of Earth Materials. Shun-ichiro Karato.**

TTH 11.30–12.45

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.

**G&G 521b<sup>u</sup>, Geophysical Fluid Dynamics. George Veronis.**

TTH 1–2.15

Derivation of the equations of a geophysical fluid. Analysis of the most important dynamical phenomena common to all planetary atmospheres, oceans, and interiors, with emphasis on the roles of planetary rotation, gravitation, and thermal gradients.

**G&G 522a<sup>u</sup>, Physics of Weather and Climate. Steven Sherwood.**

TTH 9–10.15

The climatic system; survey of atmospheric behavior on timescales 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.

[G&G 523b<sup>u</sup>, Theory of Climate.]

**G&G 525a, Introduction to Continuum Mechanics. David Bercovici.**

TTH 9–10.15

Introduction to the physics of continuous media, with applications to physical, natural, and biological sciences and engineering. Topics include tensor analysis; analysis of stress, motion, and strain; conservation of mass, momentum, and energy; rheology; examples in fluid dynamics, elasticity theory, and other topics at the discretion of instructor. *Also ENAS 761a.*

**G&G 526b<sup>u</sup>, Introduction to Earth and Planetary Physics. Jun Korenaga.**

MWF 10.30–11.20

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 527b, Dynamics of Earth and Planets.]

[G&G 530a<sup>u</sup>, Large-Scale Atmospheric Motions I.]

[G&G 531b<sup>u</sup>, Large-Scale Atmospheric Motions II.]

**G&G 533a<sup>u</sup>, Paleogeography. David Evans.**

TTH 2.30–3.45, 1 HTBA

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.

**G&G 535a<sup>U</sup>, Physical Oceanography. Alexey Fedorov.**

TTh 11.30–12.45

An introduction to ocean dynamics. Exploration of the physical mechanisms underlying the large-scale ocean circulation, the Gulf Stream, wind-driven waves, tides, coastal upwelling, and phenomena attributable to the Earth's rotation.

**G&G 536b, Atmospheric Waves, Convection, and Vortices. Ronald Smith.**

This is an advanced course on atmospheric dynamics covering internal gravity waves, mountain waves and wind storms, the turbulent boundary layer, vortices (tornados, hurricanes, frontal cyclones, lee eddies, and rotors), K-H and vortex stability, and convection-mean flow interaction. Basic principles are emphasized.

**G&G 538a, Computational Methods in Astrophysics and Geophysics.****Gordon Drukier.**

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. *Also ASTR 520a.*

**G&G 540a<sup>U</sup>, Geomicrobiology: Microbial Processes in the Geologic Environment.****Ruth Blake.**

TTh 1–2.15

A laboratory-based course providing interdisciplinary practical training in geomicrobiological methods including microbial enrichment and cultivation techniques; light, epifluorescence, and electron microscopy; and molecular methods (DNA extraction, PCR, T-RFLP, FISH).

**G&G 550a<sup>U</sup>, Paleontology and Evolutionary Theory. Elisabeth Vrba.**

TTh 11.30–12.45

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.

**[G&G 556a<sup>U</sup>, Introduction to Seismology.]****G&G 557b, Advanced Seismology. Jeffrey Park.**

TTh 10.30–11.20, 1 HTBA

Computational approaches to seismic wave propagation in Earth's interior. Stress and strain, raytracing in 1-D and 3-D media, tomography, reflection and refraction, surface waves and free oscillations. Emphasis on computer exercises.

**[G&G 560a<sup>U</sup>, Theory of Viscous Flow.]****G&G 562b<sup>U</sup>, Remote Sensing: Observing the Earth from Space. Ronald Smith and staff.**

TTh 9–10.15

Topics include the spectrum of electromagnetic radiation; satellite-borne radiometers; data transmission and storage; computer image analysis; and GIS analysis of satellite imagery with applications to weather and climate, oceanography, surficial geology, snow and ice, forestry, agriculture, and watershed management. *Also ARCG 762b<sup>U</sup>, F&ES 77001b.*

**G&G 565a<sup>U</sup>, Archaeometallurgy. Robert Gordon.**

TTH 9–10.15

Technology in material culture explored through evidence of the winning and use of metals from earliest to modern times. Environmental consequences; resource depletion and sustainability. Principles of materials science applied to the interpretation of artifacts; use of primary documentary sources. *Also ARCG 765a<sup>U</sup>.*

**[G&G 567b<sup>U</sup>, Geochemical Approaches to Archaeology.]****G&G 602b<sup>U</sup>, Paleoclimates. Alexey Fedorov, Mark Pagani.**

TTH 11.30–12.45

A study of the dynamic evolution of the Earth's climate. Topics include warm (the Cretaceous, the Eocene, the PETM, the Pliocene) and cold (the “snowball Earth”) climates of the past, glacial cycles, abrupt climate changes, the climate of the past thousand years, and the climate of the twentieth century.

**G&G 610b, Advanced Topics in Macroevolution. Elisabeth Vrba.**

A seminar course for graduate students, and undergraduate juniors and seniors with a suitable prior background, in which we read and discuss Stephen Jay Gould's book *The Structure of Evolutionary Theory*. Each student is expected to write a term paper on a selected topic from the book. Meeting times and place are by arrangement. Permission of instructor is required.

**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 then conducted as a series of topical seminars chosen by the instructor and the participants.

**[G&G 615b, Fluid Flow and Chemical Reaction in Geologic Systems.]****G&G 617b, Leaf Architecture of the Flowering Plants. Leo Hickey.**

HTBA

An overview of the description and systematic distribution of the features of angiosperm leaves, with emphasis on their identification. Topics include the classification of leaf features, leaf ranking, and the use of leaf architecture in determining the identity and ecologic requirements of various angiosperm taxa with emphasis on the fossil record. Course is conducted as a series of lecture/laboratory sessions using cleared leaf material, herbarium specimens, and fossils. Readings to be assigned. Participants should have a working knowledge of plant taxonomy. Term paper representing independent research on some aspect of leaf architecture.

**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.**

HTBA

This seminar course 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.

**[G&G 650b<sup>U</sup>, Time-Dependent Deformation of Earth Materials.]**

**G&G 655a<sup>U</sup>, Extraordinary Glimpses of Past Life. Derek Briggs, Adolf Seilacher.**

MW 11.30–12.45

The fossil record is typically limited to the hard parts of organisms. In exceptional settings, called *lagerstaetten*, more complete and even nonmineralized animal skeletons are preserved. These peepholes into the history of life (e.g., the Burgess Shale, Solnhofen limestones) are examined to reveal ancient life styles, environments, and preservational processes.

**G&G 657a, Marine, Atmospheric, and Surficial Geochemistry. Karl Turekian.**

MWF 9.30–10.20

The processes at the Earth's surface including the atmosphere, oceans, ice caps, and the upper layers of crust are the subjects of the course with the insights gained from radioactive, radiogenic, and light stable isotopes.

**G&G 660a, Diagenesis, Weathering, and Geochemical Cycles. Robert Berner.**

TTh 10.30–11.20

A theoretical approach to Earth surface chemical processes; modeling of geochemical cycles.

**G&G 666b, Statistical Thermodynamics for Astrophysics and Geophysics.**

John Wettlaufer.

TTh 2.30–3.45

Classical thermodynamics is derived from statistical thermodynamics. We then develop kinetics, transport theory, and reciprocity from the linear thermodynamics of irreversible processes. Emphasis is placed on phase transitions, including novel states of matter, nucleation theory, and the thermodynamics of atmospheres. We explore phenomena that are of direct relevance to problems in astrophysical settings, atmospheres, oceans, and the Earth's interior. No quantum mechanics is necessary as a prerequisite. *Also ASTR 666b.*

**[G&G 675a, Advanced Structural Geology.]****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. Approval of director of graduate studies and adviser required.

**G&G 703a, Seminar in Systematics. Jacques Gauthier.**

3 HTBA

**[G&G 705b, Advanced Seminar in Evolutionary Paleontology.]****[G&G 707a, Advanced Topics in Macroecology and Macroevolution.]****G&G 735a, Introduction to Organic Geochemistry. Mark Pagani.**

This 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 cover compound-specific carbon and hydrogen isotope analysis, temperature and CO<sub>2</sub> reconstruction, and other topics. The class meets twice a week.

**G&G 740a, Sediment Seminar. Robert Berner.**

F 1.30–3.20

**G&G 742a or b, Seminar in Geophysical Fluid Dynamics. Ronald Smith.**

**G&G 744a or b, Seminar in Mantle and Core Processes. David Bercovici and Shun-ichiro Karato[F], Jun Korenaga [Sp].**

The seminar covers advanced topics concerning physical and chemical processes in the mantle and core of the Earth and planets. Specific topic and hour are arranged in consultation with enrolled graduate students.

**G&G 746a or b, Seminar in Global Change. Karl Turekian.**

**[G&G 753a, Seminar in Petrology.]**

**G&G 757b, Studies in Global Geoscience. David Evans.**

2 HTBA

Reading seminar devoted to a specific geographic region of the Earth, selected as the destination of the departmental field trip for the current year. Topics of discussion include a broad range of geoscience disciplines, to be determined in part by the interests of participating students.

**[G&G 762a or b, Seminar in Applications of Satellite Remote Sensing.]**

**G&G 767b, Seminar in Ice Physics. John Wettlaufer.**

HTBA

We bring together the basic thermodynamics and statistical mechanics of crystal growth, surface phase transitions, metastability, and instability to explore the many faces of the surface of ice. These processes control the macroscopic growth shapes of ice crystals, underlie the enigma of the snowflake, and have implications in, inter alia, the atmosphere, the oceans, basic materials science, and astrophysics.

**[G&G 777a, Early Life.]**

**G&G 800a or b, Tutorial in Paleobiology.**

**G&G 805a or b, Fossil Floras. Leo Hickey.**

**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, 432.0788

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

### *Chair*

Carol Jacobs

### *Director of Graduate Studies*

Brigitte Peucker (308 WLH, [brigitte.peucker@yale.edu](mailto:brigitte.peucker@yale.edu))

### *Professors*

Carol Jacobs, Rainer Nägele, Brigitte Peucker, Henry Sussman (*Visiting* [F])

### *Assistant Professors*

Elke Siegel, Kirk Wetters

### *Lecturer*

William Whobrey

### *Affiliated Faculty*

Seyla Benhabib (*Political Science; Philosophy*), Ute Frevert (*History*), Karsten Harries (*Philosophy*), James Kreines (*Philosophy*), Christine Mehring (*History of Art*), Steven Smith (*Political Science*), Katie Trumpener (*Comparative Literature; English*), Jay Winter (*History*), Christopher Wood (*History of Art*)

### *Fields of Study*

Fields include medieval literature, German literature and culture from the Reformation to the twenty-first century in Germany, Austria, and Switzerland; literary and cultural theory; film.

### *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 at the end of the fourth term of study. French is recommended, although occasionally, on consultation with the 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. An oral examination must be passed not later than the end of the sixth term of study, and a dissertation prospectus should be submitted soon thereafter, but not later than the beginning of the seventh term of study. 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 September of the seventh term. Students

are admitted to candidacy for the Ph.D. upon completion of all pre-dissertation 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.

Two concentrations are available to students: Germanic Literature and German Studies.

### *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.

### *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. 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*

The Department of Germanic Languages and Literatures also offers, in conjunction with the Program in Film Studies, 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. Additionally, students in Germanic Languages and Literatures 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 eight graduate term courses and the demonstration of reading knowledge in either Latin or French.

*Master's Degree Program.* For the terminal master's degree students must pass eight term courses, six of which must be in the department, and demonstrate a reading knowledge of French. A comprehensive written examination will be given at the end of the second term. For the quality requirement for the M.A. degree, see pages 468–69.

Program materials are 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](mailto:german@yale.edu).



## Courses

### GMAN 517a<sup>U</sup>, Plato's Legacy. Carol Jacobs.

TH 1.30–3.20

Readings of Plato as well as readings of philosophic texts directly about Plato and literary texts that follow in this tradition and problematize similar issues. A meditation on the relationship between language and truth as well as broader questions of epistemology, ethics, and the political. Readings: *Republic* and *Phaedrus* as well as Heidegger and Derrida on Plato, and literary works that take up their themes. Also CPLT 583a<sup>U</sup>.

### GMAN 585a<sup>U</sup>, Introduction to Middle High German Literature. William Whobrey.

TTH 11.30–12.45

A survey of the major works of German vernacular literature from 1150 to 1250, including selections from courtly love poetry, heroic epic, Arthurian romance, crusader songs, and religious narratives. Works are read in the original Middle High German, and aspects of reading and translation are closely linked to an examination of the development of the German language. Special attention is given to the development of vernacular literature, the broader context of Latin culture, and the problems of manuscript transmission. Works to be read in whole or part include the *Nibelungenlied*, *Parzival*, *Tristan*, *Minnesang*, *Gregorius*, *Der arme Heinrich*. Also CPLT 585a.

### GMAN 597b<sup>U</sup>, Thomas Mann: *The Magic Mountain*. Rainer Nägele.

W 1.30–3.20

Thomas Mann's most famous novel, *Der Zauberberg/The Magic Mountain*, written and published shortly after the First World War, can be considered as a kind of narrative investigation into a period of European and German culture that came to an abrupt end with the war—which is also the end of the novel. A close reading of this novel thus offers the opportunity not only to do a close analysis of one of the most important German novels, but also to unfold a whole cultural and intellectual history from the Enlightenment to the early twentieth century. At the same time, one might say that this novel represents the tradition and the end of the so-called *Bildungsroman*.

### GMAN 605b<sup>U</sup>, Interpretation and Authority. Carol Jacobs.

T 1.30–3.20

The seminar explores the writings of four theorists of the twentieth century who meditate the concepts authority and interpretation. Our method is close readings of these works in which much of what goes on is not only in the ostensible contents of the works but also in the performance of the writing. One is confronted in each case with writers who question the relationship between text and simplistic notions of truth. The obvious problem we encounter, then, is how, in turn, to read texts that claim to unsettle that relationship. The issues raised are those among interpretation and authority, both textual and political. Works by Sigmund Freud, Roland Barthes, Paul de Man, and Walter Benjamin. Also CPLT 517b.

### GMAN 622a<sup>U</sup>, German Literature and Politics: 1960s to the Present. Elke Siegel.

T 3.30–5.20

This course offers an introduction to contemporary German literature from 1960 to the present by focusing on the relationship between politics and literature. Read against the background of the debates surrounding the Nazi past in West Germany, the topics covered in the course include literature and the Holocaust; literary revolts against institutions and norms; the politics of minority discourses; literature and literary figures becoming the center of debates; and literary articulations of the problematic question of German victimhood in WWII. The class focuses especially on literary engagements with the 1968 student movement and the Red Army Faction as well as the disillusionment with 1968 in the next generations. Authors include Kluge, Weiss, Enzensberger, Timm, Brinkmann, Fichte, Handke, Walser, Beyer, Dische, Röggl, Peltzer, Kracht, Goetz, and Zaimoglu.

**GMAN 627a<sup>U</sup>, Sovereignty: Power and Representation. Kirk Wetters.**

M 3.30–5.20

This course examines the ongoing importance of the concept of sovereignty (which in democracies masquerades as “executive authority”) as representational structure, starting with its classic modern formulations (Machiavelli, Hobbes, Bodin) and ending with the most current theoretical reflections (Agamben, Badiou). However, the work of Carl Schmitt and his contemporaries (Benjamin, Ball), particularly their elaboration of the concept of “political theology,” constitutes the course’s central focus. Political theology is, however, additionally and unavoidably coordinated to the broader question of secularization: thus we also discuss Marx, Weber, Blumenberg, Derrida, Benjamin, Taubes, and Hamacher. On the literary side we discuss representations of the problem of sovereignty (sovereignty as a structure of representation) in Shakespeare (with Kantorowitz) and Kleist. *Also CPLT 627a<sup>U</sup>.*

**GMAN 631b<sup>U</sup>, Goethe and the Demonic. Kirk Wetters.**

Th 1.30–3.20

This course is an advanced seminar on Goethe that presumes a degree of familiarity with his works. Texts are read and discussed in German (subject to the decision of the students enrolled). Secondly, this course investigates what Goethe calls “the demonic.” This unusual conception, which Goethe uses to characterize the relation of literature to life and individual to world, is developed particularly in Goethe’s later works and autobiography. Goethe’s notion of the demonic is also especially significant because of its reception by later authors such as Kierkegaard, Georg Lukács, Walter Benjamin. Primary works include *Egmont*, *Faust II*, *West-östlicher Divan*, *Elective Affinities*, *Wilhelm Meisters Wanderjahre*, *Dichtung und Wahrheit* (excerpts), *Italian Journey* (excerpts), *Urworte*, *Orphisch*.

**GMAN 641a<sup>U</sup>, Friendship in Literature and Philosophy. Elke Siegel.**

W 3.30–5.20

The topic of friendship has experienced a renaissance in recent years. Disciplines as different as anthropology, literary studies, philosophy, and sociology have developed a new and invigorated interest in the theory and practice of friendship as a utopia of the community of individuals differing radically from those communities based on love, family, or nation. This course traces the history of friendship from antiquity to the present. Authors include Plato, Aristotle, Cicero, Montaigne, Schiller, Nietzsche, Simmel, Schmitt, Kafka, and Bernhard. Reading and discussion in English. *Also CPLT 641a.*

**GMAN 643a<sup>U</sup>, Ideology, Revolution, and Religion in German Thought.**

Henry Sussman.

MW 1.30–2.20

This course sets out to explore the cross-currents of conservatism and radicality in nineteenth- and early twentieth-century German literature and culture. All of its authors contribute innovatively and momentously to the enterprise of self-aware speculation and systems critique: Nietzsche’s critique in the *Genealogy of Morals* and the *Anti-Christ*; Marx from the writings of German idealism to *Das Kapital*; Freud in his vacillations between cultural criticism and the medical authority he sought for psychoanalysis; Brecht in recalibrating Western dramaturgy toward alienation, gesture, and shock. The course encompasses a wide array of options for questioning and undermining the systematic aspirations of the Western tradition. *Also CPLT 650a<sup>U</sup>.*

**GMAN 645a<sup>U</sup>, Systems and Their Theory. Henry Sussman.**

T 1.30–3.20

This is a course examining the nature and impact of the conceptual systems that, since the outset of modernity, have furnished a format and platform for rigorous thinking at the same time that they have imposed self-reflexivity, consistency, repetition, purity, and dependability

on language. Readings of texts by Kant, Hegel, Freud, N. Wiener, Bateson, Wilden, Luhmann, Kafka, Borges, Calvino, and Pynchon, among others. *Also CPLT 651a<sup>u</sup>, PHIL 608a.*

**GMAN 664b<sup>u</sup>, Dialectic of Enlightenment: Kant/Sade. Rainer Nägele.**

<sup>T</sup>h 3.30–5.20

In 1944 Adorno and Horkheimer, under the experience of the historical catastrophe, undertook a fundamental rethinking of the concept of Enlightenment, undercutting the all too simplistic opposition of rationality and irrationality through a complex analysis of the interweaving of the rational and irrational. One of the essays of their book brings together the odd couple of Kant and Sade, reading Sade as a Kantian rationalist and systematizer. Less than two decades later, Lacan, without apparent knowledge of this essay, reads Kant with Sade in his seminar on the ethics of psychoanalysis, later condensed in one of the essays of the *Écrits*. This course pursues this curious constellation through a close reading of Kant's *Critique of Practical Reason*, Sade's *Philosophy in the Boudoir*, and the two essays by Adorno and Lacan. *Also CPLT 652b<sup>u</sup>, PHIL 609b.*

**GMAN 720b<sup>u</sup>, The Films of Fassbinder, Herzog, and Wenders. Brigitte Peucker.**

<sup>T</sup> 3.30–5.20

The three major directors of the New German Cinema. Topics include postmodernism; film's relation to the other arts, including painting and theater; issues of gender, race, and national identity; the influence of Hollywood. *Also FILM 763b<sup>u</sup>.*

**GMAN 900a,b, Directed Reading.**

By arrangement with the faculty.

## HISTORY

240 Hall of Graduate Studies, 432.1366

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

### *Chair*

Paul Freedman

### *Director of Graduate Studies*

Timothy Snyder (236 HGS, 432.1361)

### *Professors*

Jean-Christophe Agnew (*American Studies*), Abbas Amanat, Ivo Banac, David Blight, Paul Bushkovitch, Jon Butler, George Chauncey, John Demos, Carlos Eire, Laura Engelstein, John Mack Faragher, Paul Freedman, Joanne Freeman, Ute Frevert, John Gaddis, Glenda Gilmore, Robert Gordon (*Law*), Timothy Guinnane (*Economics*), Valerie Hansen, Robert Harms, Jonathan Holloway, Paula Hyman, Matthew Jacobson, Gilbert Joseph, Donald Kagan, Paul Kennedy, Daniel Kevles, Benedict Kiernan, Bentley Layton (*Religious Studies*), Ivan Marcus, John Matthews (*Classics*), John Merriman, Joanne Meyerowitz, Steven Pincus, Stephen Pitti, Cynthia Russett, Lamin Sanneh (*Divinity*), Stuart Schwartz, Frank Snowden, Timothy Snyder, Jonathan Spence, Harry Stout, Frank Turner, John Harley Warner (*History of Science & Medicine*), Anders Winroth, Jay Winter, Keith Wrightson

### *Associate Professors*

Michael Auslin, Susan Lederer (*History of Science & Medicine*), Mary Lui, Michael Mahoney, Naomi Rogers (*History of Science & Medicine*)

### *Assistant Professors*

Jennifer Baszile, Bruno Cabanes, Seth Fein, Beverly Gage, Michael Gasper, Andrew Gregory, Lillian Guerra, Jennifer Klein, Carolyn Moehling, Ole Molvig, Alyssa Mt. Pleasant, Carlos Noreña, Mridu Rai, Youval Rotman, Celia Schultz (*Classics*), Francesca Trivellato, Charles Walton, Kariann Yokota

### *Fields of Study*

Fields include ancient, medieval, early modern, and modern Europe (including Britain, Russia, and Eastern Europe), United States, Latin America, Asia, Middle East, Africa, Jewish history; and diplomatic, environmental, ethnic, intellectual, labor, military, political, religious, social, and women's history.

### *Special Admissions Requirements*

The department requires a short book review 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.

### *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 department.

*American:* Two languages relevant to the student's research interests, or a high level of proficiency in one language; competence in statistics may substitute for a natural language under appropriate circumstances.

*Ancient:* French, German, Greek, and Latin.

*Chinese:* Chinese and French; additional languages like Japanese, Russian, or German may be necessary for certain dissertation topics.

*East European:* The language 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 some fields of study.

*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 as appropriate.

*Russian:* Russian plus French or German with other languages as required.

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.

Three of the twelve courses must be research seminars in which the student produces an original research paper from primary sources. One of the second-year courses may be a tutorial resulting in a prospectus for the dissertation. In the third year, students are required to hold their prospectus colloquium with the proposed dissertation committee.

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 must be completed before the student takes his/her oral examination.

The oral examination will cover three chosen fields of concentration: a major field and two minor fields, one of which is comparative or theoretical, or on a continent different from the student's ordinary field of specialization. U.S. historians must offer a minor field that addresses historiography outside the United States. If these do not include one field dealing with premodern history, then a year's work in that earlier period must have been included among the twelve required courses. 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 dissertation 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.

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 in exceptional cases where unique personal circumstances or substantial difficulties in obtaining archival sources have prevented normal progress. 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. Half of the dissertation chapters should be complete and must be submitted with the petition.

### *Combined Ph.D. Programs*

#### HISTORY AND AFRICAN AMERICAN STUDIES

The Department of History also offers, in conjunction with 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.

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 505a<sup>u</sup>, New Approaches to Josephus. Tessa Rajak.**

w 1.30–3.20

Close reading and discussion of central issues and key passages in the writings of Flavius Josephus, with consideration of the recent debates on the historian in relation to his environment. Knowledge of Greek not required, but opportunities are offered to consider issues of expression and style in the original. *Also CLSS 803a<sup>u</sup>, JDST 731a<sup>u</sup>.*

**HIST 506b<sup>u</sup>, Diaspora Interaction among Jews, Greeks, and Romans. Tessa Rajak.**

tTh 11.30–12.45

An in-depth study of the primary evidence and of the leading modern interpretations of the Mediterranean Jewish diaspora from the Hellenistic age to late antiquity. The emphasis is on understanding the relationships between Jews and “pagans” in a world of ethnic diversity and on exploring the connections among politics, society, culture, and religion. Knowledge of the original languages not required. *Also CLSS 806b<sup>u</sup>, JDST 732b<sup>u</sup>.*

**HIST 514a<sup>u</sup>, The Athenian Imperial Democracy. Donald Kagan.**

T 2.30–4.20

A history of Greece in the years between the Persian invasion and the Peloponnesian War, with emphasis on Athens.

**HIST 516b<sup>u</sup>, Thucydides and the Peloponnesian War. Donald Kagan.**

T 1.30–3.20

A study of the great war between Athens and Sparta that transformed the world of the Greek city-states, and the brilliant historian and political thinker who described it.

**HIST 517b, The Thirty Tyrants. Donald Kagan.**

Th 1.30–3.20

Reading and discussion. A study of the regime of the thirty in Athens, 404–403 B.C. Ancient Greek and French, German, or Italian required. *Also CLSS 884b.*

**HIST 524a, Issues in Roman History. John Matthews, William Metcalf, Veronica Grimm, Celia Schultz.**

w 2.30–4.20

A wide-ranging seminar offered once each academic year that allows students to explore a select number of issues pertaining to a given temporal period or theme in Roman history. The theme for fall 2006 is Transformations in the Roman World from Severus to Constantine, to be led by John Matthews. In addition to traditional political and military history, matters of social, religious, intellectual, and literary history are addressed. Class discussions draw on extensive reading in Latin and Greek sources in addition to secondary sources. *Also CLSS 809a.*

**HIST 526b, Greek Paleography. Youval Rotman.**

Th 1–2.50

This seminar follows the development of Greek writing and the Greek book from Late Antiquity to the Early Modern period, while examining different types of scripts. The main goal of this seminar is to provide graduate students with the ability to approach and read Greek manuscripts. *Also CLSS 695b, MDVL 554b.*

**HIST 531a<sup>u</sup>, Seminar: The Making of Monasticism. Bentley Layton.**

T 1.30–3.20

The history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity, with special attention to the eastern Mediterranean world. *Also NELC 534a<sup>u</sup>, RLST 659a<sup>u</sup>.*



**HIST 535a<sup>U</sup>, History of Jewish Culture to the Reformation. Ivan Marcus.**

TRH 11.30–12.45

Undergraduate lecture course open to graduate students by permission of instructor. *Also JDST 761a<sup>U</sup>, RLST 773a<sup>U</sup>.*

**HIST 536a, Sanity–Insanity–Sanctity. Youval Rotman.**

M 4–6

This seminar analyzes the borderline between sanity and insanity in the Middle Ages and beyond. It examines the ways in which the definition of sanity-insanity has been conceptualized by modern scholars, and challenges this defined borderline by the use of a third parameter: sanctity. It thus examines the meeting point of the definitions of sanctity and insanity. Readings include modern works by historians, anthropologists, psychologists, and philosophers, together with primary sources from the Middle Ages.

**HIST 543a, Apocalyptic Imagination in Judaism, Christianity, and Islam.**

Abbas Amanat, John Collins.

Th 1.30–3.20

This course deals with the origins of apocalyptic beliefs in ancient Judaism and early Christianity, their continuing influence down to modern times, and the distinctive apocalyptic tradition in Islam. *Also RLST 806a.*

**HIST 549a, Trade, Cuisine, and Exotic Products in the Middle Ages.**

Paul Freedman.

T 1.30–3.20

Long-distance travel, especially exchanges between Europe and Asia, seen in terms of demand as well as supply. Attention is given to the appetite for imported luxuries, changes of taste and fashion in cuisine, as well as the real and imagined contacts with the East.

**HIST 551b, Readings in Medieval European History: Church History.**

Anders Winroth.

M 1.30–3.20

Discussion of topics in medieval church history, focusing on the period of reform.

**HIST 565a, Early Modern Spain. Carlos Eire.**

W 3.30–5.20

Readings and discussion in sixteenth- and seventeenth-century Spanish texts (all available in English translation) and also in recent scholarship on early modern Spain. *Also RLST 522a.*

**HIST 580a, Encounters: Ourselves and Others in the Early Modern World.**

Stuart Schwartz.

W 3.30–5.20

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 alterity and cultural perceptions are discussed.

**HIST 583a<sup>U</sup>, Jewish Intellectual and Cultural Life in Early Modern Italy.**

Daniel Stein Kokin.

TRH 2.30–3.45

This course explores the intellectual and cultural life of Jews in Italy from the fifteenth through early seventeenth century. Christian attitudes toward, and interest in, Judaism and Jewish sources are of special interest, including Jewish philosophy in the Humanist movement; Christian Hebraism; the rise of printing; the Ghetto; censorship and anti-Semitism; and Jewish confraternities and preaching. *Also JDST 765a<sup>U</sup>.*

**HIST 584b<sup>U</sup>, Jewish Messianisms in Historical Context and Theory.****Daniel Stein Kokin.**

Th 1.30–3.20

An exploration of the development and place of messianism in Jewish history and theology. The course focuses on major messianic figures (e.g., Bar Kokhba, Shlomo Molkho, Shabbetai Tzvi) and influential theorists of messianism (e.g., Maimonides, Abraham Abulafia, Avraham Yitzhak Kook). Classic scholarly approaches to messianism are also studied and evaluated. *Also JDST 766b<sup>U</sup>.*

**HIST 602a, Microhistories. Keith Wrightson.**

W 10.30–12.20

Research seminar. The first weeks are devoted to microhistorical studies of individuals, families, communities, incidents, and processes principally (though not exclusively) drawn from the literature on early modern England. 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.

**HIST 610b, Early Modern Empires: Theory and History. Steven Pincus,****Julia Adams.**

Th 1.30–3.20

This co-taught graduate seminar explores the dynamics of early modern empires, as well as the relevant theoretical literature that addresses problems of colonialism and empire more generally. Why and where were the successive early modern empires built; how and why did they cohere and come apart? What differentiates them from contemporary or ancient colonialism and empire? Our readings range over varied intersecting historical colonial contexts, including the first wave of overseas empire of the western European states; the Ottoman Empire; and imperial orders in Asia and the Americas. Students write a primary-source-based research paper at the close of the course. *Also SOCY 590b.*

**HIST 625a, The Old Regime and the French Revolution. Charles Walton.**

W 10.30–12.20

This course introduces students to the principal themes and debates in the study of the Old Regime and French Revolution. Topics include the relationship between the impact of the Enlightenment on the Old Regime, the causes of the French Revolution, political radicalization after 1789, the instability of the politics of Thermidor and the Directory, and the legacy of the Revolution for women, colonial societies, and nineteenth- and twentieth-century historiography.

**HIST 637a, Research Seminar in Modern France. John Merriman.**

T 10.30–12.20

Participants select a topic and then research and write an essay. Knowledge of French required.

**HIST 642b, Paris and London: Metropolitan Trajectories, 1815–1945.****John Merriman, Jay Winter.**

T 9.30–11.20

Reading and discussion seminar. Topics include the impact of large-scale economic transformation; popular protest; migration and mobility; social geography; city and country; the world of work and leisure; the experience of war; images and representation of the city; and the successes and failures of urban planning.

**HIST 646b, European Socialism. Frank Snowden.**

M 3.30–5.20

An examination of the socialist tradition in Europe from 1799. Attention is given to various schools of socialist thought, including utopian socialism, anarchism, anarcho-syndicalism, marxism, revisionism, leninism, and Eurocommunism. Political ideas are studied in their historical context, so that students should expect to become familiar with such events as the French Revolution, the revolutions of 1848, the Paris Commune, the rise of Social Democracy in Germany, and the revolutions of 1905 and 1917. Theorists to be read include Fourier, Louis Blanc, Proudhon, Marx, Engels, Bakunin, Bernstein, Kropotkin, Lenin, and Gramsci. With the approval of the instructor, the course may be taken as a research seminar.

**HIST 648b, How (Not) to Write European History. Ute Frevert.**

M 1.30–3.20

We go through a number of recent monographs that have been written on modern European history, and analyze the underlying ideas, assumptions, and major arguments. We also read programmatic and conceptual articles on transnational and comparative history and confront them with empirical work.

**HIST 655a, Relations of the Great Powers since 1890. Paul Kennedy.**

HTBA

Reading and discussion. Among the topics covered are the “New Imperialism,” the military and naval arms race prior to 1914, the relationship between domestic politics and foreign affairs, the First World War and the alteration of the Great Power order, the “new diplomacy,” appeasement, and the rise of the dictator state. The course involves a heavy emphasis on historiography, and an encouragement to relate economic and strategic trends to diplomatic.

**HIST 660a, Hitler's Germany and Stalin's Russia. Laura Engelstein, Ute Frevert.**

M 1.30–3.20

The seminar compares two societies and political systems, both involving strong authoritarian leaders, militant revolutionary ideologies, mass mobilization, and a repressive state apparatus. Format as reading seminar, but students may also choose research papers.

**HIST 666b, Russia to 1725. Paul Bushkovitch.**

T 10.30–12.20

The major phases of Russian history from the tenth century, covering the major historiographical controversies and sources. Russian or German helpful but not required.

**HIST 685b, Yugoslavia 1918–1991. Ivo Banac.**

T 1.30–3.20

Reading and discussion. Main topics in the history of two Yugoslav states. Conflicts, ideologies, dissolution. Oral reports and one essay. No language requirement.

**HIST 687a<sup>u</sup>, Jews and Modernity in Eastern Europe and Russia. Marci Shore.**

TTh 10.30–11.20, 1 HTBA

This course explores the variety of ways in which Jews and Jewish communities in Eastern Europe responded to a radically changed world in the nineteenth and twentieth centuries. How did Jews engage with new ideas about time and history, and about nation and class, that wrought havoc with traditional societies — both Jewish and non-Jewish — in this part of the world? *Also JDST 782a<sup>u</sup>.*

**HIST 688b<sup>U</sup>, Jews and Cosmopolitanism in Modern European Intellectual History. Marci Shore.**

TTh 11.30–12.45

This seminar, inspired by Isaac Deutscher's essay "The Non-Jewish Jew," examines Jewish contributions to "cosmopolitan" ideas in modern European intellectual history. Topics include Marxism, psychoanalysis, and deconstruction. *Also JDST 783b<sup>U</sup>.*

**HIST 692a, Communism in Eastern Europe. Ivo Banac.**

T 1.30–3.20

Research seminar on the political, social, and cultural effect of the Communist movement in the countries of Eastern Europe, where the Communist parties established the monopoly of power in the 1944–1948 period.

**HIST 700a, Introduction to the Historiography of the United States. Stephen Pitti.**

TTh 10.30–12.20

Readings and discussion of scholarly works on U.S. history from the settlement era to the present. Members of the department faculty visit the class on a rotating basis. *Also AMST 700a.*

**HIST 703b, Readings in Early National American History. Joanne Freeman.**

T 1.30–3.20

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 a national culture, and the evolution of political cultures. *Also AMST 802b.*

**HIST 716a, Research in the Nineteenth-Century U.S.: Politics and Reform.****Robert Forbes**

W 3.30–5.20

This seminar, emphasizing primary sources, concentrates on the contested nature of the American republic and efforts by a variety of groups to reshape it to their ideal. Religion, temperance, abolition, feminism, and other movements are considered. Emphasis is placed on the interaction of different groups within U.S. society.

**HIST 720b, Readings in Religion and American History, 1600–1990. Jon Butler.**

M 9–11

This introductory graduate readings course assesses interrelationships between religion and American society from 1600 to 1990. Concentrates on religion's successes and failures in shaping American society from the Puritans to modern neo-conservative fundamentalism. Readings in primary and secondary sources; development of bibliographical skills. *Also AMST 705b, RLST 705b.*

**HIST 726a, The Culture of the Gilded Age. Cynthia Russett.**

Th 1.30–3.20

Although the politics of the Gilded Age may seem somewhat jejune (who today has lively memories of Chester A. Arthur or James Garfield?) its society and culture were undergoing dramatic and challenging developments. Industrialization and urbanization brought new immigrants to our shores; labor unions grew and flexed their muscle in a series of major strikes. In the world of thought the impact of Darwinism was still being absorbed, especially in the new academic disciplines of the social sciences: sociology, economics, and psychology. Some important names from the period: William James, Charlotte Perkins Gilman, Henry George, Andrew Carnegie, W.E.B. Dubois, Jane Addams, Edward Bellamy, Samuel Gompers (and, of course, many more). *Also AMST 798a.*

**HIST 738b, Research in Western and Frontier History. John Mack Faragher.**

W 10.30–12.20

Taught with George Miles, curator of Yale's extensive collection of Western Americana at the Beinecke. Meets at the Beinecke. 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 using primary materials at Yale. *Also AMST 738b.*

**HIST 742a, Readings in North American Environmental History. Steven Stoll.**

W 10.30–12.20

Introduction to the essential scholarship of North American environmental history. The seminar assumes no previous course work and students with a wide variety of backgrounds are welcome. We read books and articles with an eye to exploring the different themes, theories, and methods that have shaped environmental history. Our goal is to evaluate these works while trying to discover ways in which each approach might be helpful to our own work. At the same time, we use readings and discussions to think about the more general process of conceiving, conducting, and writing historical research. Subjects include colonialism, capitalism, American Indians, conservation, ecology, and environmentalism.

**HIST 748a, American Conservatism in the Twentieth Century. Beverly Gage.**

Th 3.30–5.20

An examination of historical and historiographical problems in the study of American conservatism. Topics include mass politics, free-market ideology, neoconservatism, anticommunism, and the Christian right. *Also AMST 781a.*

**HIST 757a, Culture in U.S. International and Transnational Histories. Seth Fein.**

T 7–8.50

This reading seminar examines interdisciplinary approaches to the study of “culture” in relations between, within, and among the United States and other nations (mainly since 1900). Discussions and papers focus on comparing methodologies, using theory, doing research, writing history. Topics include globalization, Americanization, transnationalism, and hybridity; gender, national identity, international relations, and state formation; imperialism, post-colonialism, hegemony, and resistance; mass culture, political economy, foreign policy, and postmodernity. *Also AMST 775a.*

**HIST 761a, Race and Medicine in America, 1800–2000. Susan Lederer.**

Th 1.30–3.20

An examination of race and medicine in America, primarily but not exclusively focused on African Americans' encounters with the health care system. Topics include slavery and health; doctors, immigration, and epidemics; the Tuskegee Syphilis Study and the use of minorities as research subjects; and race and gender. *Also AMST 883a, HSHM 637a<sup>II</sup>, WGSS 725a.*

**HIST 764b, Histories of Latinas/os in the Twentieth Century. Stephen Pitti.**

T 10.30–12.20

Readings on topics such as community formation, cultural politics, racialization, and the international migration of Mexican American (Chicana/o), Puerto Rican, Cuban American, and other Latina/os in the United States since roughly 1898. Attention to recently published works in these fields, to the connection with broader concerns in American Studies and Latin American history, and to the intersections between Latina/o history and current scholarship in African American Studies and Asian American Studies. *Also AMST 764b.*

**HIST 768b, Asian American History and Historiography. Mary Lui.**

T 1.30–3.20

This reading and discussion seminar examines Asian American history through a selection of recently published texts and established works that have significantly shaped the field. Major

topics include the racial formation of Asian Americans in U.S. culture, politics, and law; U.S. imperialism; U.S. capitalist development and Asian labor migration; and transnational and local ethnic community formations. The class considers both the political and academic roots of the field as well as its evolving relationship to “mainstream” American history. *Also AMST 768b.*

**HIST 769a, Research Seminar in U.S. Cultural History. Matthew Jacobson.**

M 1.30–3.20

Each student's primary focus throughout the term is on the design and execution of an original, highly polished piece of scholarship (30–40 pages) on any aspect or period of U.S. cultural history. Sessions treat the various elements that go into any large-scale project in historiography: articulating workable research questions; engaging the existing scholarship without duplicating it; identifying and locating sources appropriate to the task; writing proposals; the craft of argumentation; editing and rewriting. We also entertain some of the broader philosophical questions that dog the field, such as “Why study culture?” *Also AMST 769a.*

**HIST 772a, Theorizing the Racial Formation of the United States in the Early Twenty-First Century. Jonathan Holloway.**

T 1.30–3.20

A designated core course for students in the joint Ph.D. program, also open to students in American Studies and History. The interdisciplinary seminar includes readings from the fields of legal studies, cultural studies, literary history, history, politics, and sociology. *Also AFAM 505a, AMST 643a.*

**HIST 773b<sup>U</sup>, A History of American Bodies. Susan Lederer.**

MW 1.30–2.20

A survey of the search for the healthy body in American culture in the nineteenth and twentieth centuries. Topics include the changing American food supply and the rise of “fast foods,” diets and dieting, medicine and nutrition science, cosmetic surgery, and the role of gender, race, and class in shaping expectations about the body. *Also HSHM 675b<sup>U</sup>.*

**HIST 774a, The Problem of Diversity in American Culture. Jennifer Baszile.**

T 10.30–12.20

This reading seminar examines diversity's conception and practice in American culture. In addition to exploring the intellectual origins of diversity, the course also surveys the effect of diversity on academic disciplines, politics, and public policy. This course seeks to understand how diversity shapes the approach to difference in American life. *Also AFAM 762a, AMST 707a.*

**HIST 775a, Readings in the History of Sexuality. George Chauncey, Joanne Meyerowitz.**

W 1.30–3.20

Selected topics in the history of sexuality. Emphasis on key theoretical works and recent historical literature. *Also AMST 866a, WGSS 712a.*

**HIST 776b, Class and Capitalism in the Twentieth-Century United States. Jennifer Klein.**

Th 10.30–12.20

Readings course on class formation, labor, and political economy in the twentieth-century United States; how regionalism, race, and class power shaped development of American capitalism. 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). *Also AMST 780b.*

**HIST 778b, Reconstruction from the Right. Daniel Kevles, Michael Graetz.**

W 2.10–4

Research seminar. Centering on the 1970s, an examination of changes in policy and society that moved the United States from the liberalism of the Kennedy-Johnson years to the conservatism of the Reagan era. Topics to be considered include the backlash against the women's and the civil rights movements; deregulation; tax and economic policies; the rise of the religious right; the federalization of crime; the new immigration and regional migrations; the emergence of the personal computer, biotechnology, and reproductive technologies industries; and energy, environment, and globalization. *Also AMST 778b, PLSC 814b, LAW 21178.*

**HIST 783b, Material Culture in Historical Research. Kariann Yokota.**

W 10.30–12.20

The material objects people produce and consume provide rich texts for historical analysis. This seminar explores how the cultural meanings of objects have been analyzed and understood from various perspectives. Interdisciplinary course readings include the work of historians, anthropologists, cultural theorists, sociologists, postcolonial scholars, writers, curators and archaeologists. Discussions examine the role of material culture in the formation of national, ethnic, gender, and class identities. The course culminates in a final project in which seminar members write a cultural biography of an object of their choice, using the insights and analytical tools they have gained during the term. The seminar is designed to encourage students to think about how an in-depth engagement in the study of material culture can enhance their own historical research and enrich historical understanding of the past. *Also AMST 732b.*

**HIST 793b, Power: Historical and Theoretical Approaches. Jean-Christophe Agnew.**

W 10.30–12.20

An introduction to the widely different ways in which power and its correlative concepts (domination, coercion, oppression, authority, legitimacy, hegemony, resistance, etc.) have been treated by historians, sociologists, anthropologists, and political theorists. Case studies test the various approaches in different contexts. *Also AMST 793b.*

**HIST 805b, Social and Cultural History of Colonial Latin America. Stuart Schwartz.**

M 1.30–3.20

Introduction to the basic themes and literatures of colonial history with emphasis on changing methods and approaches in Latin American, European, and U.S. scholarship.

**HIST 818a, Narratives of Revolution in Cuba. Lillian Guerra.**

W 1.30–3.20

This course explores the revolutionary process in Cuba from the late 1950s to the present with a special emphasis on the first decade after establishment of the Castro-led government. Based on rare and largely forgotten sources that include memoirs, speeches, the contemporary island press, as well as archival film footage, this class seeks to rediscover internal power struggles and disentangle the many discourses that framed Cuba's revolutionary reality.

**HIST 820a, Problems in Modern Mexican History: People, State, and Nation in Historical Motion. Gilbert Joseph.**

Th 3.30–5.20

Focusing on the relationship between forms of the state and grassroots political culture, the course examines prevailing trends and controversies in historical writing on nineteenth- and twentieth-century Mexico. Special attention is given to the "Order and Progress" regime of Porfirio Diaz and to the Mexican Revolution and its legacies.

**HIST 829a, From Medina to Constantinople: The Middle East from 600 to 1517.**  
**Adel Allouche.**

T 1.30–3.20

This 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.

*Also NELC 830a.*

**HIST 838b, Histories of Publics and Public Discussion in the Arabo-Islamic World.**  
**Michael Gasper.**

W 3.30–5.20

The course sets out to chart a history of publics, public discussion, and public spheres in the Middle East region from the eighteenth through the twenty-first century. We contemplate the notion of public spheres and public-ness in the Middle East in light of some recent work into these issues.

**HIST 849b, Agrarian History of Africa.** Robert Harms.

W 1.30–3.20

This course examines changes in African rural life from precolonial times to the present. Issues to be examined include land use systems, rural models of production, gender roles, markets and trade, the impact of colonialism, cash cropping, rural-urban migration, and development schemes. *Also AFST 849b.*

**HIST 856b, Histories and Fiction in Early China.** Annping Chin.

Th 3.30–5.20

This course explores writings from early China where the line between fact and fiction is often blurred. Readings in Chinese include selections from the *Hanfeizi*, Sima Qian's *Shiji*, and Liu Xiang's *Lienü zhuan* and *Shuoyuan*. *Also CHNS 837b.*

**HIST 861a, Issues in Tang, Song, and Yuan History.** Valerie Hansen.

T 1.30–3.20

An introduction to the secondary literature in English about the major issues in Chinese history, 600–1400. Permission of instructor required.

**HIST 866a, China and the West, 1580–1950.** Jonathan Spence.

M 1.30–3.20

This course explores the broad outlines of the many ways China interacted with the West from the early Jesuits to the founding of the People's Republic. Topics to be covered include the sciences, the military, religion and philosophy, literature, narcotics, political structures, and law. Reading and discussion. Chinese not required.

**HIST 867b, Social History of the Chinese Silk Routes.** Valerie Hansen.

W 1.30–3.20

An introduction to artifacts and documents excavated from the most important sites on the Northern and Southern Silk Routes in China, including Niya, Kizil, Turfan, and Dunhuang. All assigned readings in English, but given sufficient student interest, a separate section can be formed for those wishing to read documents in classical Chinese from Turfan and Dunhuang.

**HIST 873b, China, the Qing and Republic, 1620–1950.** Jonathan Spence.

Th 1.30–3.20

This course examines the period of China's last dynasty and the history of the first republic prior to the communist takeover. Topics to be explored include the structure and scope of Manchu empire-building, the nature of rural society, change in women's social and labor practices, the growth of new types of cities, the impact of foreign powers, changes in education and



culture, the imposition of single-party rule, the course of World War II in China, and the dynamics of the communist victory. Reading and discussion. Chinese not required.

**HIST 881a, History of Chinese Science. William Summers.**

TH 1.30–3.20

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. *Also HSHM 680a<sup>u</sup>.*

**HIST 895a, Religion, Caste, Region, and the Indian Nation. Mridu Rai.**

T 10.30–12.20

In Europe the rise of the nation-state was generally paralleled by the development of individual citizenship rights. But in South Asia the colonial state not only conferred on Indians the status of subjects rather than citizens but also recognized communities rather than individuals as bearers of political identities. This course unravels the colonial context that produced this alternative political history, its repercussions for the forging of an Indian nationalism, and its implications for the relations among the individual, the community, the region, and the nation in postcolonial India. The class contextualizes the violent confrontations that these relations interacting with each other often produced.

**HIST 928a, Infections, Public Health, and the State. Frank Snowden.**

TH 3.30–5.20

This course is a comparative examination of public health strategies adopted by Western nations since 1800 with regard to high-impact infectious diseases — cholera, smallpox, tuberculosis, syphilis, malaria, polio, and HIV/AIDS. The course begins with “plague regulations” and then explores such alternative policies as vaccination, the sanatorium, the sanitation idea, the regulation of prostitution, health education, and the reporting and tracing of cases. Attention is also given to state planning to confront the threat of bioterrorism and to the present emergency in sub-Saharan Africa of malaria, TB, and HIV/AIDS. The class considers the strategies of the World Health Organization and of national governments to confront the crisis. This is a reading and discussion class but can be taken as a research seminar with the permission of the instructor. There are no prerequisites and no prior knowledge is assumed. *Also HSHM 732a.*

**HIST 930a, Introduction to the History of Medicine and Public Health.**

**John Harley Warner.**

M 1.30–3.20

An examination of the variety of approaches to the social and cultural history of medicine and public health, taking as a focus nineteenth- and early twentieth-century America. Readings are drawn from recent literature in the field, sampling writings on health care, illness experiences, and medical cultures in Europe, the Americas, Africa, and Asia from antiquity to the twentieth century. Topics include the role of gender, class, ethnicity, race, region, and religion in the experience of sickness and health care; the multiple meanings of science in medicine; the intersection of lay and professional understandings of the body; and the role of the marketplace in shaping professional identities and patient expectations. *Also HSHM 701a.*

**HIST 931b, Introduction to the History of Science. Ole Molvig.**

T 1.30–3.20

Study of secondary literature, recent and older, in the history of the physical and life sciences from the Renaissance to the early twentieth century. Students acquire familiarity with the development of science in general and of its major branches, including its content, instruments and methods, and social-institutional settings, and an acquaintance with various approaches that historians have followed in interpreting these events. *Also HSHM 702b.*

**HIST 936b, Research Seminar in the History of Medicine and Science.****John Harley Warner.**

W 1.30–3.20

An exploration of research methods and the craft of writing the history of medicine and the life sciences. Participants are expected to produce full-length research papers, and these individual research programs are the central focus of the group's discussions. *Also HSHM 918b.*

**HIST 938a<sup>U</sup>, The Engineering and Ownership of Life. Daniel Kevles.**

T 1.30–3.20

The development of biological knowledge and reproductive control in relation to intellectual property rights in living organisms. Topics include agrobusiness, medicine, biotechnology, and patent law. *Also HSHM 676a<sup>U</sup>, LAW 20332.*

**HIST 945a<sup>U</sup>, Science, Arms, and the State. Daniel Kevles.**

M 1.30–3.20

A history of chemical, nuclear, and biological weapons in the twentieth century that focuses on the integration in the United States of national security policymaking, scientific research, and military innovation, including its consequences for the scientific community, the civilian economy, public attitudes toward weapons of mass destruction, and political movements to control them. *Also HSHM 635a<sup>U</sup>.*

**HIST 949a<sup>U</sup>, Science, Technology, and Modernity. Ole Molvig.**

W 3.30–5.20

The seminar explores the intersection of science, technology, and culture from the mid-nineteenth century to the mid-twentieth. Participants are encouraged to integrate a detailed understanding of technical and scientific developments with an informed reading of a variety of social, intellectual, and artistic responses to the challenges posed by modern science and technology. Graduate students complete additional readings and research in consultation with instructor. *Also HSHM 622a<sup>U</sup>.*

**HIST 952a<sup>U</sup>, Memory, Memoirs, and Modern Jewish History. Paula Hyman.**

W 1.30–3.20

An exploration of the representation of Jewish historical experience from the seventeenth to the twentieth century through a selection of memoirs. Focus on the construction of identity, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. *Also JDST 784a<sup>U</sup>, RLST 762a<sup>U</sup>.*

**HIST 965a, Agrarian Societies: Culture, Society, History, and Development.****Steven Stoll, James Scott, Michael Dove.**

M 1.30–5.20

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 historically grounded account of the transformations of rural society. Team taught. *Also ANTH 541a, F&ES 80054a (753a), PLSC 779a.*

**HIST 971a, History and Memory. Jay Winter.**

Th 3.30–5.20

An exploration of the theoretical and practical issues arising from the memory boom in twentieth-century Europe and America. Texts are analyzed on the conceptual differences and overlaps between history and memory, and on the debate among historians and other social scientists on the difference between individual and collective remembrance, on public history, and on the witness in contemporary cultural life.

**HIST 979a<sup>U</sup>, The Holocaust in Historical Perspective. Paula Hyman.**

MW 10.30–11.20, 1 HTBA

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. *Also JDST 788a<sup>U</sup>, RLST 768a<sup>U</sup>.*

**HIST 981a, The Body in Modern Warfare (Nineteenth to Twenty-First Century).****Bruno Cabanes.**

W 3.30–5.20

Covering the period between the 1850s and the Iraq War, this seminar examines modern warfare as bodily experience. We consider the question of gender, the impact of violence on the bodies and spirits of both soldiers and civilians, the experience of mass death and the mourning process, and the veterans' homecomings—especially the reception of those severely wounded or mutilated by war.

**HIST 982b, The Aftermath of War in the Twentieth Century: Historical Perspectives on Demobilization, Return, and Trauma. Bruno Cabanes.**

Th 3.30–5.20

The aftermath of war has been largely neglected by military historians. Yet this period is essential from a number of perspectives, including the reconstruction of identities and the reintegration of soldiers, the construction of wartime and postwar's memories, and the development of individual and collective trauma. In this seminar we examine the sources relevant to the period of the aftermath of war (literary works, medical and psychiatric texts, architecture and commemorative sculpture, and so on) and consider the contribution of the social sciences to its study.

**HIST 985a, Studies in Grand Strategy, Part II. John Gaddis, Paul Kennedy.**

M 3.30–5.20

Part II of the two-term linked seminar offered during the calendar year 2006. Research seminar. *Also PLSC 715a.*

**HIST 985b, Studies in Grand Strategy, Part I. John Gaddis, Paul Kennedy.**

M 1.30–3.20

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 a 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; forms are available at International Security Studies. *Also PLSC 715b.*

**HIST 995a/b, Prospectus Tutorial. Faculty.****HIST 998a/b, Directed Readings. Faculty.**

Offered by permission of instructor and DGS to meet special requirements not covered by regular courses.

**HIST 999a/b, Directed Research. Faculty.**

Offered by permission of instructor and DGS to meet special requirements.

## HISTORY OF ART

56 High, 432.2668

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

### *Chair*

David Joselit (102A OAG, 432.2670, david.joselit@yale.edu)

### *Director of Graduate Studies*

Timothy Barringer (161 ST, 432.8162, timothy.barringer@yale.edu)

### *Professors*

Brian Allen (*Adjunct*), Timothy Barringer, Judith Colton, Edward Cooke, Jr., David Joselit, Diana Kleiner, Amy Meyers (*Adjunct*), Mary Miller, Robert Nelson, Alexander Nemerov, Jock Reynolds (*Adjunct*), Vincent Scully (*Emeritus*), Robert Thompson, Christopher Wood, Mimi Hall Yiengpruksawan

### *Associate Professor*

Noa Steimatsky

### *Assistant Professors*

Anne Dunlop, Milette Gaifman, Sandy Isenstadt, Jacqueline Jung, Christine Mehring, Kishwar Rizvi, Lan-ying Tseng

### *Lecturers*

Theresa Fairbanks, Karen Foster, Pamela Franks, Susan Greenberg, Jennifer Gross, Laurence Kanter, John Marciari, Youngsook Pak

### *Fields of Study*

Fields include Greek and Roman; Medieval and Byzantine; Renaissance; Baroque; eighteenth-, nineteenth-, and twentieth-century European; Modern Architecture; African; African American; American; British; Pre-Columbian; Chinese; Japanese; and film.

### *Special Requirements for the Ph.D. Degree*

Students in the history of art must pass examinations in German or French, and one other language pertinent to their field of study (which may be French or German). One examination must be passed during the first year of study, the other not later than the beginning of the third term. German is required for students in Western art. Students of Chinese art must qualify in Chinese, Japanese, and either German or French, and 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 predissertation requirements, including the prospectus and qualifying examination. Admission to candidacy must take place by the end of the third year.

The faculty considers teaching to be an important part of the professional preparation of graduate students. Students are required to do four terms of teaching. This requirement is fulfilled in the second and third year. They receive a total of one course credit as teaching fellows when they lead a discussion section. In lieu of teaching for one or two terms, students may also serve as a research assistant at either the Yale University Art Gallery or the British Art Center. Application for these R.A. positions is competitive.

### *Combined Ph.D. Programs*

#### HISTORY OF ART AND AFRICAN AMERICAN STUDIES

The History of Art department offers, in conjunction with the Program in African American Studies, a combined Ph.D. in History of Art and African American Studies. Students in the combined-degree program will take three core 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 History of Art offers, in conjunction with Film Studies, 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 History of Art also 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, 56 High Street, PO Box 208272, New Haven CT 06520-8272.

### *Courses*

#### **HSAR 500a, Introduction to Art History. Christopher Wood.**

M 3.30–5.20

How have cultures figured the historicity of art to themselves? How are ideas about representation, virtuality, visibility, ritual, and performance registered in art historical paradigms? How has art-writing interacted with art-making? What is the genealogy of the modern academic discipline of art history? How are art history, art criticism, and philosophy of art differentiated? What are the affinities and tensions between art history and other fields of thought and research? These questions are approached through readings and discussion. This is a foundational course for all graduate students in History of Art.

#### **HSAR 502b, The Writing of Art History. Alexander Nemerov.**

Th 1.30–3.20

This course focuses on models for writing art history essays and books. We consult the writing of art historians and novelists in our investigation of what works, and what does not, in creating arguments about art. We examine styles of ekphrasis as well as more minute questions of writing: epigraphs, opening sentences, opening paragraphs, transitions, concluding paragraphs, concluding sentences, metaphors, similes, italics, and punctuation, among other matters. We also consider techniques of delivering twenty- and fifty-minute lectures.

#### **HSAR 504b, Aspects of Connoisseurship and Conservation. Theresa Fairbanks.**

T 1.30–3.20

A survey of the techniques and materials employed in Western painting, sculpture, and graphic arts from antiquity to the present. Modern examination techniques analyzed as tools for connoisseurship, dating, and authentication, including how age, damage, and restoration change works of art. General concepts of preservation and conservation investigated.

#### **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, Curatorial Training.**

By arrangement with faculty.

**HSAR 562b, Art and Text in Ancient Greece. Milette Gaifman.**

W 2.30–4.20

Since the rise of the Greek polis, Greek visual culture explored the relationship between art and text: in images of mythological scenes, in written descriptions of works of art, and in combining inscribed texts with pictorial representations. The course examines the relationship between word and image and between the visual and the literary in the Archaic and Classical periods. Taking Lessing's *Laokoon* of 1776 as a point of departure, the seminar considers the themes of pictorial narratives, the literary genre of ekphrasis, as well as the role and significance of inscriptions in Greek artistic representations. *Also ARCG 735b, CLSS 826b.*

**HSAR 570a, Becoming Hadrian: Autobiography and Art in the Second Century A.D. Diana Kleiner.**

T 1.30–3.20

Marguerite Yourcenar's famed fictional *Memoirs of Hadrian* serves as the starting point for an exploration of Hadrian and the art he commissioned in Rome and abroad. Hadrian's passion for life, quest after peace, romantic wanderlust, veneration of Greek culture, and craving for love, along with his acceptance of death's inexorableness, led him to commission some of Rome's greatest monuments. The emperor's flair for leadership and talent as an amateur architect inform student projects on the sculpture, mosaics, and buildings of the age, among them the portraiture of Hadrian's lover Antinous, the Pantheon, and Hadrian's Wall in Britain. Special attention is paid to Hadrian's Villa at Tivoli, an empire unto itself where Hadrian's autobiography was fully realized. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. *Also ARCG 749a, CLSS 846a.*

**HSAR 579a, Modernism in the Middle East. Kishwar Rizvi.**

T 10–12

This course studies the concepts that inform the making and reception of modern architecture in the Middle East. In the Islamic world, new fundamentalisms and shifting religious trends have created an environment in which each country must renegotiate its past and reconsider its collective future. Whether by suppressing their Islamic roots, as in the case of republican Turkey, or through reinventing them, as in the case of post-Revolution Iran, such countries must constantly transform their national image. It is through public works, such as architecture and city planning, that they convey their political and religious ideology. This course examines the debates and theories of modern architectural production that have informed the discourse on Islamic architecture by situating cases of colonial and nationalist architecture in the context of their particular social and religious history.

**HSAR 586a, Icons. Robert Nelson.**

T 10–12

Strictly speaking, an icon is any image in Byzantium, especially a religious image, but the term for this seminar applies to smaller-scale devotional art, often on wood, but also including ivory, statelite, enamels, and other materials. After looking at the general history of icons and their devotion from late antiquity to the eleventh century, the seminar concentrates on icons of the high and late Middle Ages with particular attention to the largest collection of surviving icons at the monastery of St. Catherine in the Sinai and an exhibition of its own opening at the Getty Museum in Los Angeles in the fall.

**HSAR 588b, Studies in Medieval Sculpture, 900–1500. Jacqueline Jung.**

T 1.30–3.20

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 shrines — was the artistic medium most familiar, accessible, and powerful to men and women of all social stations and ranks. For much of the history of art history, medieval figural sculpture was the field

on which the greatest practitioners of the discipline, from Panofsky to Shapiro to Baxandell, trained their sights. Readings include classic texts by Hans Nelting, Maxwell Baxandell, Ilene Forsyth, Emile Male, Erwin Panofsky, Meyer Schapiro, and Wilhelm Voge, as well as more recent literature. Reading knowledge of French and German is essential.

**HSAR 590b, The Arthurian Illuminated Manuscript: Yale 229. Howard Bloch.**

W 3:30–5:20

A seminar devoted to a spectacular illustrated manuscript (Beinecke 229) containing several complete works of the thirteenth-century Lancelot Prose Cycle. An online scanned version of the manuscript allows students to work on illustrations and marginalia on their home computers. In English. *Also FREN 807b.*

**HSAR 631a, Ambrogio Lorenzetti: The Rise of Art. Anne Dunlop.**

T 3:30–5:20

This course is a workshop on Trecento and Quattrocento art in Siena, centered on the work and influence of the artist Ambrogio Lorenzetti. The class draws on collections at Yale and elsewhere; the aim is to take a new look at a fundamental moment in art and art theory.

**HSAR 636b, Painting in Early Seicento Italy. John Marciari.**

W 1:30–3:20

This seminar examines selected problems in Italian painting ca. 1590–1640, with particular attention to the questions raised by a series of recent exhibitions and monographs. Our concern is not with “the Baroque” as a general movement, but rather with individual artists and their relationships in selected cities: questions of style, but also of subject matter and con-cettismo, of the rivalries between artists, the influence of patrons, and the critical response by early writers, including Baglione, Bellori, and Mancini. Class discussions focus less on the large fresco schemes than on the altarpieces and easel pictures that relate more directly to the concerns of the connoisseurial class in Rome, Bologna, Naples, and elsewhere. Time at the Yale Art Gallery, the Metropolitan Museum of Art, and the Wadsworth Atheneum is required; reading knowledge of Italian is essential.

**HSAR 638b, The Idol of the Renaissance. Christopher Wood.**

Th 4–6

In the Middle Ages the Christian image defined itself against the empty idols of the pagan past. The painters and sculptors of the Renaissance, paradoxically, re-embraced Graeco-Roman art in hopes of fashioning an even more effective and authentic sacred art. The seminar is about the mutually defining tension between the sacred image and the newly emergent institution of the work of art in the fifteenth and sixteenth centuries. Topics include the rediscovery of the early medieval icon; private and affective relationships to images; the secularization of the cult image; the impact of print technology; Protestant iconophobia and iconoclasm; and the conceptual pressure brought to bear on Christian art by contact with non-European cultures. The course surveys the state of the question, proposes and tests new historiographic models, and provides a framework for individual research projects.

**HSAR 647b, Perspectives on the Panorama. Timothy Barringer, Richard Maxwell.**

T 1:30–3:20

This course explores the cultural, aesthetic, and historical significance of the panorama. The first panoramas were gigantic 360-degree paintings generating a sense of immersion in an event or environment. Later panoramas took many shapes, anticipating the formats of photography, film, and digital imagery. We treat the panorama as a utopian, imperial, and didactic medium, tracing its impact on the fine arts, literature, and popular culture. The course coincides with an international conference on the panorama sponsored by the Yale Center for British Art. *Also CPLT 647b.*



**HSAR 687a, Donald Judd: Artist, Critic, Designer, Activist. Christine Mehring.**

T 1.30–3.20

In this seminar the monographic focus on Donald Judd functions as a matrix to examine broader issues that have become central to postwar art. Judd's multiple roles as artist, critic, designer, and activist form the basis for discussions about canon formation and artistic self-definition, the status of artists' writings, collaborations, and curating with respect to what has come to be known as "relational aesthetics," the relationship between art and political action. This seminar travels as a group to Marfa, Texas, to visit the Chinati Foundation and the Judd Foundation.

**HSAR 694b, Postwar Art in Europe 1945–1972. Christine Mehring.**

M 3.30–5.20

A seminar debunking the myth about how New York stole the Idea of Modern Art and examining European Art "coming into its own." During this period, European artists increasingly disentangled themselves from a crippling competition with American art and began to focus on issues and ways of making that largely emerged out of their specific historical, social, political, cultural contexts. A central issue is a continental, pan-European identity, ways in which European art defined itself through and redefined national identities. The class is structured around artistic practices, including the monochrome, performance art, pop art, materials, and activism.

**HSAR 700a, Modern Visions. Sandy Isenstadt.**

W 3.30–5.20

The premise of this seminar is that modernism in architecture may be defined as much by the perceptual ambitions of its patrons as by the formal innovations of its producers, and that it may be understood in terms of a set of visual and spatial practices rather than a palette of forms such as cubic masses, flat roofs, and large windows. In an attempt to discern cultural preoccupations with modern visions, and to distinguish questions of reception from those of formal organization, students are asked to review popular and technical journals contemporary with new buildings and the relevant professional discussions of them. This is a research seminar. It is intended to be driven by the particular interests of enrolled students. Session themes and secondary readings are suggested, but designated students propose primary readings and provide visual material that serves as the subject of weekly class meetings.

**HSAR 701a, Ethics of Images. David Joselit.**

W 1.30–3.20

This wide-ranging class considers the ethical and political nature of how images circulate. While it includes a primary focus on modern art, it necessarily considers how images were theorized and exercised power and influence in earlier eras. Authors tentatively include Plato, Aristotle, Hans Belting, Jacques Rancière, Michael Fried, Leo Bersani, Judith Butler, Laura Mulvey, Susan Sontag, Kobena Mercer, Georges Did-Huberman, Lisa Tickner, and David Freedberg. *Also WGSS 703a.*

**HSAR 707b, Issues in Modern Art. David Joselit.**

W 1.30–3.20

Unlike most seminars, the primary work in this course consists of looking as opposed to reading. Its objective is to develop the skills of formal analysis that are necessary for even the most theoretical art history. Each week the group visits the Yale University Art Gallery, or other museums and galleries in New York, and spends the entire session examining and discussing one or two works of modern art. Readings include important texts on form, formalism, and its aftermath by such authors as Susan Sontag, Yve-Alain Bois, and Roland Barthes.

**HSAR 727b, The Face on Film. Noa Steimatsky.**

Th 2–5:30, screenings w 9 P.M.

The human face is a paradigmatic arena in which the largest questions on referentiality, the inscription of identity and subjectivity, and the articulation of interiority in art intersect. This seminar explores cinema's intervention vis-à-vis portraiture's traditional concerns, the narrative, discursive, ideological uses of facial representation, and its modern transfigurations. In extending its photographic basis to consider the parameters of movement, the incorporation of speech, and the shifting trajectory of the look, our discussion juxtaposes narrative fiction film in relation to documentary and experimental "cinematic portraits." We explore the close-up, the regime of the shot-reaction short, the debates surrounding identification, expressivity, and notions of animism in cinema, in light of theoretical writings and of classical and experimental films by such makers as Epstein, Kuleshov, Dreyer, Bresson, Pasolini, Hitchcock, Warhol, Cronenberg. *Also FILM 827b.*

**HSAR 778b<sup>u</sup>, From West Africa to the Black Americas: The Black Atlantic Visual Tradition. Robert Thompson.**

TTh 11:30–12:45

Art, music, and dance in the history of key classical civilizations south of the Sahara — Mali, Asante, Dahomey, Yoruba, Ejagham, Kongon — and their impact on the rise of New World art and music. *Also AFAM 728b<sup>u</sup>, AFST 778b<sup>u</sup>.*

**HSAR 779a<sup>u</sup>, New York Mambo: Microcosm of Black Creativity. Robert Thompson.**

TTh 11:30–12:45

Art, music, and dance in the history of key classical civilizations of the world of New York mambo and salsa. Emphasis on Palmieri, Cortijo, Roena, Harlow, and Colon. Examination of parallel traditions, e.g., New York Haitian art, Dominican meringue, reggae and rastas of Jamaican Brooklyn, and the New York school of Brazilian Capoeira. *Also AFAM 729a<sup>u</sup>.*

**HSAR 781a, Problem and Theory in Afro-Atlantic Architecture I: Africa.****Robert Thompson.**

Th 3:30–5:20

The seminar addresses a new frontier — rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture. Topics include the architecture of Djenné, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of African influence on the architecture of the Americas — the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Columbia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Columbia. *Also AFAM 739a, AFST 781a.*

**HSAR 781b, Problem and Theory in Afro-Atlantic Architecture II: The Black Americas. Robert Thompson.**

Th 3:30–5:20

A continuation of HSAR 781a. *Also AFAM 739b, AFST 781b.*

**HSAR 789a, Materiality of Death in Chinese Art. Lan-ying Tseng.**

T 1:30–3:20

This seminar examines how the abstract notion of death was materialized in early China, focusing on major archaeological discoveries in the second half of the twentieth century. Special attention is given to the analysis of burial context and funerary furnishing to address how a tomb can be read as a place. Issues developed from case studies include replication, ritual, body, fantasy, gender, and patronage. Chinese is not required. *Also ARCG 789a.*

**HSAR 801a, The Image of the Geisha in Modern Visual Culture.**

**Mimi Yiengpruksawan.**

w 3.30–5.20

The evocative image of the *geisha* has figured in Euro-American and East Asian visual culture for more than a century of international engagement and identity formation. The seminar examines what might be termed the image discourse of the geisha in modernism with specific attention to the role of fantasy and imagination in its development.

## HISTORY OF SCIENCE AND MEDICINE

201 Hall of Graduate Studies, 432.1356

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

### *Chair*

Daniel Kevles

### *Director of Graduate Studies*

John Harley Warner (L-132 Sterling Hall of Medicine, 785-4338)

### *Faculty*

Daniel Kevles (*History*), Susan Lederer (*History of Medicine*), Ole Molvig (*History*), David Musto (*Child Study Center*), Naomi Rogers (*Women's, Gender & Sexuality Studies; History of Medicine*), Frank Snowden (*History*), Bruno Strasser (*History of Medicine*), William Summers (*Molecular Biophysics & Biochemistry*), Frank Turner (*History*), John Harley Warner (*History of Medicine; History*)

### *Affiliated Faculty*

Asger Aaboe (*Emeritus, History of Science*), Toby Appel (*Librarian for Medical History*), Cynthia Connolly (*Nursing*), Joseph Fruton (*Emeritus, Biochemistry*), Robert Gordon (*Geology & Geophysics; Applied Mechanics*), Veronika Grimm (*Classics*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Ann Hanson (*Classics*), Bettyann Kevles (*History*), Jennifer Klein (*History*), Martin Klein (*Emeritus, Physics*), Michael McBride (*Chemistry*), Joanne Meyerowitz (*History*), Sherwin Nuland, Franklyn Prochaska (*History*), 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. Special fields represented include American science and medicine; Asian science and medicine; Arabic 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 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, 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.

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 of it.

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 year, all students will be advised by the director of graduate studies. Students are encouraged to discuss their interests and program of study with other members of the faculty. At the beginning of the second year, each student is to obtain an adviser who 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 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.

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. Students are also encouraged to participate in the programs to develop teaching skills offered by the Graduate School.

### *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 Medical Scientist Training Program Office in the School of Medicine (<http://info.med.yale.edu/mdphd/phd/index.html>) and from the Web site of the History of Medicine and Science ([www.med.yale.edu/histmed](http://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 and submit an acceptable master's paper. Course work must include the graduate seminar HSHM 701a/702b and one additional graduate seminar in history of medicine or science. The remaining courses are to be chosen in consultation with the director of graduate studies.

For more information about the History of Science and Medicine program and admission to the Graduate School, see [www.yale.edu/hshm/](http://www.yale.edu/hshm/) and [www.yale.edu/graduateschool/admissions/](http://www.yale.edu/graduateschool/admissions/); or write to Barbara McKay ([barbara.mckay@yale.edu](mailto:barbara.mckay@yale.edu)).

### *Courses*

**HSHM 622a<sup>u</sup>, Science, Technology, and Modernity. Ole Molvig.**

<sup>w</sup> 3.30–5.20

The seminar explores the intersections of science, technology, and culture from the mid-nineteenth century to the mid-twentieth. Participants are encouraged to integrate a detailed understanding of technical and scientific developments with an informed reading of a variety of social, intellectual, and artistic responses to the challenges posed by modern science and technology. Graduate students complete additional readings and research in consultation with the instructor. *Also HIST 949a<sup>u</sup>.*

[HSHM 623b<sup>u</sup>, History of the Modern Sciences in Society.]

[HSHM 624b<sup>u</sup>, Science, Feminism, and Modernity.]

[HSHM 625a<sup>u</sup>, Women and Medicine in America from the Colonial Era to the Present.]

[HSHM 631b<sup>u</sup>, The Cultures of Western Medicine: A Historical Introduction.]

**HSHM 635a<sup>u</sup>, Science, Arms, and the State. Daniel Kevles.**

W 1.30–3.20

A history of chemical, nuclear, and biological weapons in the twentieth century that focuses on the integration in the United States of national security policy making, scientific research, and military innovation, including its consequences for the scientific community, the civilian economy, public attitudes toward weapons of mass destruction, and political movements to control them. *Also HIST 945a<sup>u</sup>.*

[HSHM 636a<sup>u</sup>, Technology and Society from the Industrial Revolution.]

**HSHM 637a<sup>u</sup>, Race and Medicine in America, 1800–2000. Susan Lederer.**

Th 1.30–3.20

An examination of race and medicine in America, primarily but not exclusively focused on African Americans' encounters with the health care system. Topics include slavery and health; doctors, immigrants, and epidemics; the Tuskegee Syphilis Study and the use of minorities as research subjects; and race and genetic disease. *Also AMST 883a, HIST 761a, WGSS 725a.*

**HSHM 675b<sup>u</sup>, A History of American Bodies. Susan Lederer.**

MW 1.30–2.20

A survey of the search for the healthy body in American culture in the nineteenth and twentieth centuries. Topics include the changing American food supply and the rise of "fast foods," diets and dieting, medicine and nutrition science, cosmetic surgery, and the role of gender, race, and class in shaping expectations about the body. *Also HIST 773b<sup>u</sup>.*

**HSHM 676a<sup>u</sup>, The Engineering and Ownership of Life. Daniel Kevles.**

T 1.30–3.20

The development of intellectual property rights in living organisms and their parts in relation to the advance of biological knowledge and control of reproduction. Topics include agribusiness, medicine, biotechnology, and patent law in international context. *Also HIST 938a<sup>u</sup>, LAW 20332.*

[HSHM 677a<sup>u</sup>, Genetics, Reproduction, and Society.]

[HSHM 678a<sup>u</sup>, Alcohol and Other Drugs in American Culture.]

**HSHM 680b<sup>u</sup>, History of Chinese Science. William Summers.**

Th 1.30–3.20

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. *Also HIST 881a.*

**HSHM 701a, Introduction to the History of Medicine and Public Health.**

John Harley Warner.

M 1.30–3.20

An examination of the variety of approaches to the social and cultural history of medicine and public health. Readings are drawn from recent literature in the field, sampling writings on health care, illness experiences, and medical cultures in Europe, the Americas, Africa, and Asia from antiquity to the twentieth century. Topics include the role of gender, class, ethnicity, race, region, and religion in the experience of health care and sickness; the intersection of lay and professional understandings of the body; and the role of the marketplace in shaping professional identities and patient expectations. *Also HIST 930a.*

**HSHM 702b, Introduction to the History of Science. Ole Molvig.**

T 1.30–3.20

Study of secondary literature, recent and older, in the history of the physical and life sciences from the Renaissance to the early twentieth century. Students acquire familiarity with the development of science in general and of its major branches, including its content, instruments and methods, and social-institutional settings, and an acquaintance with various approaches that historians have followed in interpreting these events. *Also HIST 931b.*

[HSHM 723b, Making the Modern Body.]

[HSHM 725a, History of Disease and Public Health in Western Societies.]

[HSHM 726b, Medicine, Public Health, and Colonialism, 1750–1950.]

**HSHM 732a, Infection, Public Health, and the State. Frank Snowden.**

Th 3.30–5.20

This course is a comparative examination of public health strategies adopted by Western nations since 1800 with regard to high-impact infectious diseases — cholera, smallpox, tuberculosis, syphilis, malaria, polio, and HIV/AIDS. The course begins with “plague regulations” and then explores such alternative policies as vaccination, the sanatorium, the sanitation idea, the regulation of prostitution, health education, and the reporting and tracing of cases. Attention is also given to state planning to confront the threat of bioterrorism and to the present emergency in sub-Saharan Africa of malaria, TB, and HIV/AIDS. The class considers the strategies of the World Health Organization and of national governments to confront the crisis. This is a reading and discussion class, but it can be taken as a research seminar with the permission of the instructor. There are no prerequisites, and no prior knowledge is assumed. *Also HIST 928a.*

[HSHM 733a, The Grounding of Modern American Medicine.]

[HSHM 736a, Health Politics, Body Politics.]

[HSHM 912a, Reading Seminar in the History of Disease and Public Health in America.]

[HSHM 913b, Reading Seminar in the History of Life Sciences.]

**HSHM 914a or b, Research Tutorial I.**

By arrangement with faculty.

**HSHM 915a or b, Research Tutorial II.**

By arrangement with faculty.

**HSHM 918b, Research Seminar in the History of Medicine and the Life Sciences.**

John Harley Warner, Bruno Strasser.

M 1.30–3.20

An exploration of research methods and the craft of writing the history of medicine and the life sciences. Participants are expected to produce full-length research papers, and these individual research programs are the central focus of the group’s discussions. *Also HIST 936b.*

**HSHM 920a or b, Independent Reading.**

By arrangement with faculty.

**HSHM 930a or b, Independent Research.**

By arrangement with faculty.



## IMMUNOBIOLOGY

The Anlyan Center (TAC) S531, 785.3857

Ph.D. (M.S., M.Phil. en route)

### *Chair*

Richard Flavell

### *Director of Graduate Studies*

Alfred Bothwell (TAC 641, 785.3857, [alfred.bothwell@yale.edu](mailto:alfred.bothwell@yale.edu))

### *Director of Graduate Admissions*

David Schatz (TAC S625, 737.2255, [david.schatz@yale.edu](mailto:david.schatz@yale.edu))

### *Professors*

Jeffrey Bender (*Internal Medicine*), Alfred Bothwell, Kim Bottomly, Joseph Craft (*Internal Medicine*), Peter Cresswell, Richard Flavell, Sankar Ghosh, Kevan Herald, Paula Kavathas (*Laboratory Medicine*), Ruslan Medzhitov, Ira Mellman (*Cell Biology*), Jordan Pober, Nancy Ruddle (*Epidemiology & Public Health*), David Schatz, Mark Shlomchik (*Laboratory Medicine*), Robert Tigelaar (*Dermatology*)

### *Associate Professors*

Akiko Iwasaki, Warren Shlomchik (*Internal Medicine*), Bing Su

### *Assistant Professors*

Tian Chi, Susan Kaech

## *Fields of Study*

The graduate program in Immunobiology is designed to prepare students for independent careers in research and teaching in Immunology or related disciplines. Training and research focus on the molecular, cellular, and genetic underpinnings of immune system function and development, and on host-pathogen interactions. Specific areas of interest include: B- and T-cell development, activation and effector functions; the role of cytokines in immunoregulation; intracellular signaling and the control of transcription in lymphocytes; antigen processing and presentation; immunoglobulin and T-cell receptor gene rearrangement; B-cell memory; the immunobiology of vascular endothelial cells; innate immunity; and B- and T-cell tolerance. Mechanisms of autoimmunity and immunodeficiency are a major interest, and a number of important human diseases are under study, including diabetes, systemic lupus erythematosus, multiple sclerosis, AIDS, and a variety of other infectious diseases.

The 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. Students enter the Immunobiology graduate program after completing their first year in the Biological and Biomedical Sciences (BBS) graduate program. Students from any of the tracks of BBS may enter the program. Hence, Immunobiology has close ties with other graduate programs in the biological sciences at Yale.

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. Three laboratory rotations provide first-year students with a variety of research opportunities available at Yale. First-year students are considered BBS (Biological and Biomedical Science) students. The “BBS” has more than 200 faculty participants to whom students have full access.

### *Special Admissions Requirements*

Applicants should have strong previous research experience and a strong academic background in biology, chemistry, and genetics with course work in physics and mathematics preferred. Submission of the GRE General Test is required. Submission of the Subject Test in Biology or Biochemistry is preferred.

To enter the Ph.D. program, students apply to an interest-based track within the inter-departmental graduate program in the Biological and Biomedical Sciences.

### *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

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.

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.

*An Immunobiology seminar course may be taken for audit if the student has previously taken seven graded courses and has already completed an Immunobiology seminar for a grade.*

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 an advisory committee made up of faculty from the Section of Immunobiology, as well as the director of graduate studies.

*Honors:*

The Graduate School uses grades of Honors, High Pass, or Fail. Students are required to earn a grade of Honors in at least two courses in the first two years, and are expected to maintain a High Pass average. There is no foreign language requirement.

*Teaching:*

Students are required to serve as 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
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)

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 BBS, Biological and Biomedical Sciences Program, and the more than 200 participating faculty.

### *Courses*

For a complete listing of immunology-related courses, visit <http://info.med.yale.edu/bbs/>

#### **IBIO 530a, Biology of the Immune System. Sankar Ghosh.**

MWF 9.30–10.20

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens; autoimmunity. *Also MCDB 530a<sup>II</sup>.*

#### **IBIO 531b, Advanced Immunology. Ruslan Medzhitov and staff.**

MW 4–6

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.

**IBIO 537a, Advanced Immunology Seminar: Transplantation.** Warren Shlomchik,  
Jordan Pober, David Rothstein.  
th 4–6

Students gain a comprehensive and detailed understanding of the immunology of solid organ and allogeneic bone marrow transplantation. Students read classic and current literature to address the roles of antibody, T-cells, regulatory cells, antigen presenting cells, vascular endothelial cells, cytokines, and chemokines in both organ rejection and graft versus host disease. Emphasis is placed on how these elements are coordinated and how they could be modified to achieve tolerance and accommodation, which are essential for improving outcomes in clinical transplantation.

**IBIO 538b, Advanced Immunology Seminar: Chromatin and Gene Expression.**  
Tian Chi, Richard Flavell, Sankar Ghosh.  
th 4–6

We discuss the roles of chromatin in gene repression as well as activation, in conferring specificities to ubiquitous signaling pathways, and in epigenetic cellular memory which is essential for lineage commitment and is involved in all human diseases. We also discuss the enzymatic machines that manipulate chromatin structure. The immune system is used as a key model for exploring these issues.

**IBIO 600a, Introduction to Research.** Alfred Bothwell and staff.  
w 5

Introduction to the research interests of the faculty. Required for all first-year Immunology students. Pass/fail.

**IBIO 603, 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](http://www.seop.yale.edu). For teaching credit. Also *GENE 603a and b*.

**INTERNATIONAL AND DEVELOPMENT ECONOMICS**

Economic Growth Center

27 Hillhouse, 432.3610

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 often from developing countries, but in each cohort a small number of students come from the U.S. and Europe. Students in the program have worked in central banks, foreign ministries, planning agencies, and other public and private agencies concerned with international economics and development, although many enter the program directly from their undergraduate school. We do not exclude any candidate on the basis of their country of origin or experience.

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 GREs and the Test of English as a Foreign Language (TOEFL) examination are also required.

Yale fellowship funds are not available for the IDE Program, and we require 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 these are required; the remaining three are graduate electives. The required courses are ECON 545a, Microeconomics; ECON 546b, Macroeconomics; ECON 558a, Econometrics; ECON 702b International Economics; and ECON 732, Economic Development. 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 program, for example, could be completed during this time.

A joint program option for study with the School of Forestry & Environmental Studies is also available. Application to the School of Forestry must be made simultaneously with the application to the IDE program. Admission to this joint program 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 degree.

Prospective applicants are encouraged to visit the IDE Program website at [www.yale.edu/ide](http://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](mailto:ide@yale.edu).

## INTERNATIONAL RELATIONS

MacMillan Center for International and Area Studies

210 Luce Hall, 34 Hillhouse, 432.3418

M.A.

*Chair*

John Gaddis (*History*)

*Associate Chair and Director of Graduate Studies*

Cheryl Doss (223 Luce Hall, 432.9395, [cheryl.doss@yale.edu](mailto:cheryl.doss@yale.edu))

*Professors*

Abbas Amanat (*History*), Jack Balkin (*Law*), Ivo Banac (*History*), Michele Barry (*Medicine*), Beatrice Bartlett (*History*), Seyla Benhabib (*Political Science*), Frank Bia (*Medicine*), Paul Bracken (*Management*), Gary Brewer (*Forestry & Environmental Studies; SOM*), 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*), Eduardo Engel (*Economics*), Laura Engelstein (*History*), J. Joseph Errington (*Anthropology*), Daniel Esty (*Forestry & Environmental Studies; Law*), Robert Evenson (*Economics*), Owen Fiss (*Law*), Paul Freedman (*History*), Ute Frevert (*History*), John Gaddis (*History*), Pinelopi Goldberg (*Economics*), Timothy Guinnane (*Economics*), Koichi Hamada (*Economics*), Thomas Hansen (*Anthropology*), Valerie Hansen (*History*), Robert Harms (*History*), Paula Hyman (*History*), Gilbert Joseph (*History*), Donald Kagan (*History*), Stathis Kalyvas (*Political Science*), Stephen Kellert (*Forestry & Environmental Studies*), William Kelly (*Anthropology*), Paul Kennedy (*History*), Daniel Kevles (*History*), Benedict Kiernan (*History*), Harold Koh (*Law*), Anthony Kronman (*Law*), Theodore Marmor (*Management*), Enrique Mayer (*Anthropology*), Robert Mendelsohn (*Forestry & Environmental Studies*), John Merriman (*History*), Michael Merson (*Epidemiology & Public Health*), William Nordhaus (*Economics*), Sharon Oster (*Management*), Merton Peck (*Economics*), Gustav Ranis (*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*), Lamin Sanneh (*Divinity; History*), Peter Schuck (*Law*), T. Paul Schultz (*Economics*), Stuart Schwartz (*History*), James Scott (*Political Science*), Martin Shubik (*Management*), Helen Siu (*Anthropology*), Stephen Skowronek (*Political Science*), Frank Snowden (*History*), Jonathan Spence (*History*), T. N. Srinivasan (*Economics*), Peter Swenson (*Political Science*), Ivan Szelenyi (*Sociology*), Frank Turner (*History*), Christopher Udry (*Economics*), John Wargo (*Forestry & Environmental Studies*), Jay Winter (*History*), Derek Yach (*Epidemiology & Public Health*)

*Associate Professors*

Michael Auslin (*History*), Marian Chertow (*Forestry & Environmental Studies*), Nora Groce (*Epidemiology & Public Health*), Oona Hathaway (*Law*), Ellen Lust-Okar (*Political Science*), Michael Mahoney (*History*), Rohini Pande (*Economics*), Linda-Anne Rebhun

(*Anthropology*), Nicholas Sambanis (*Political Science*), Steven Stoll (*History*), James Vreeland (*Political Science*)

#### *Assistant Professors*

Jennifer Bair (*Sociology*), Brian Cowan (*History*), Keith Darden (*Political Science*), Thad Dunning (*Political Science*), Seth Fein (*History*), Beverly Gage (*History*), Michael Gasper (*History*), Kari Hartwig (*Epidemiology & Public Health*), Susan Hyde (*Political Science*), Dean Karlan (*Economics*), Nathaniel Keohane (*Management*), Kaveh Khoshnood (*Epidemiology & Public Health*), Pierre Landry (*Political Science*), Richard Lindsey (*Management*), Nikolay Marinov (*Political Science*), Mridu Rai (*History*), Rose Razaghian (*Political Science*), Vivek Sharma (*Political Science*), Hong Wang (*Epidemiology & Public Health*)

#### *Lecturers*

Michael Boozer (*Economics*), Pia Rebello Britto (*International Affairs*), Theodore Bromund (*History*), Robert Brubaker (*South Asian Studies*), Cheryl Doss (*Economics*), David Ekbladh (*International Affairs*), Stuart Gottlieb (*International Affairs*), Debbie Humphries (*Epidemiology & Public Health*), Isam Khafaji (*International Affairs*), Allison Kingsley (*Political Science*), Jean Krasno (*Political Science*), Francesco Tonon Meggiolaro (*International Affairs*), Beth Daponte Osborne (*Management*), Michele Ruta (*International Affairs*), Nancy Ruther (*Political Science*), James Sutterlin (*Political Science*), Amy Young (*Anthropology*)

#### *Adjunct & Visiting Professors*

Gerald Baier (*International Affairs*), Mine Eder (*International Affairs*), Elizabeth Susan Kassab (*International Affairs; Near Eastern Languages & Civilizations*), Shaul Mishal (*International Affairs*), William Odom (*Adjunct, Political Science*), Patricia Pessar (*Adjunct, Anthropology; American Studies*)

#### *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 international affairs but also supports students interested in going on for a Ph.D. degree in economics, history, or political science. Joint degrees, as well as concentrations within the M.A. program, are offered with the School of Management, the Law School, the School of Forestry & Environmental Studies, and the Department of Epidemiology and Public Health.

#### *Special Admissions Requirements*

Applicants must take the GRE General Test; students whose native language is not English must pass the Test of English as a Foreign Language (TOEFL) with a minimum score of 610 on the paper-based test or 253 on the computer-based test. Entering students must have taken introductory courses in microeconomics and macroeconomics prior to matriculation.



### *Special Requirements for the Master's Degree*

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 graduate-level courses in economics (one economic analysis and one international economics); 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 IR registrar.

Beyond the core courses, each student must identify a coherent set of courses and demonstrate their academic integrity as a proposed concentration for approval by the director of graduate studies. The concentrations require a minimum of eight courses in the fields selected. Some of the courses are 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.

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.

### **POLITICAL ECONOMY OF TRADE, DEVELOPMENT, OR BUSINESS**

Within a broad field of political economy, students generally specialize in one of the professional arenas of trade, international business, or international development by taking eight courses beyond the core. They must take three to five additional courses in economics and politics directly related to their professional specialization and at least one of these courses must be in quantitative methods in the first term to prepare for advanced course work. Students specializing in trade or business must complete their concentration by taking an additional three to five relevant courses in law, management, finance, health resource administration, and/or environmental and natural resources policy. Students focused on development should complete their concentration with three to five relevant additional courses in anthropology, sociology, public health, management, and/or environmental and natural resources policy.

### **INTERNATIONAL SECURITY**

A specialization in international security is available in conjunction with International Security Studies (ISS). Concentrations in security studies are usually based on courses in history, political science, law, and management. Concentrations of security studies are often combined with a focus on a world region. Other courses can be selected in consultation with the director of graduate studies of the IR program.

**WORLD REGIONS**

It is also possible to undertake concentrations with emphasis on a single geographic region by electing additional courses relating to a specific area. MacMillan Center area studies councils, including African Studies, European Studies, Latin American and Iberian Studies, and Middle East Studies, offer graduate certificates in their areas of study. The South Asian, Southeast Asia, and East Asian Studies councils also provide a wealth of research, teaching, and enrichment activities without formal certificates. M.A. degrees in African Studies, East Asian Studies, and European and Russian Studies are available through these MacMillan Center councils.

**NATURAL RESOURCE MANAGEMENT AND ENVIRONMENTAL POLICY**

A concentration in natural resource management and environmental studies requires a student to meet two basic objectives. First, to develop core knowledge in the natural sciences that is relevant to natural resource management and the environment. Second, to understand the social, economic, and political setting through which natural resources are utilized. To achieve the first objective, a student will normally complete, while at Yale, a minimum of four natural science courses concerning the problems of managing air, water, or land, or plant or animal resources. To achieve the second objective, a student will normally complete four courses at Yale that deal with the economic, political, or social aspects of natural resource management and the environment. In addition, a student concentrating in natural resources also may enroll in the summer technical training modules in plant identification, vegetation measurement, and land measurement. The School of Forestry & Environmental Studies teaches these immediately prior to the beginning of the fall term. Students in the IR program who wish to concentrate in F&ES should design an individualized program with a faculty member in the school in conjunction with the DGS of the IR Program.

**LAW AND HUMAN RIGHTS**

For those concentrating in international law, four term courses are required in the Law School. In addition, a student must select four additional courses outside the Law School related to issues of international law and human rights.

**PUBLIC HEALTH**

Students wishing to concentrate in public health should take between four and six courses in the Department of Epidemiology and Public Health. These should include basic courses in health services administration and epidemiology as well as specialized courses in international health and environmental health. Students in the International Relations program who wish to concentrate in public health should design an individualized program with a faculty member in that department in conjunction with the DGS of the IR Program.

**ACADEMIC DISCIPLINES**

For those who wish to concentrate in a single discipline like history, economics, or political science, an additional six courses in the chosen field beyond the core requirement are

required. In economics and political science, at least one of these courses must be in quantitative methods, taken in the first term to set the stage for more advanced course work. In history, courses must include at least one research seminar, two in modern history, including diplomacy and international relations, and two in modern history of an area or country outside North America and Europe. In political science, courses must include one additional course beyond the core in international relations, in comparative politics or a region or country, and in political economy. In economics, the concentration must include at least one term course in the economics of a world region, in development economics, and in international economics.

#### OTHER

Other individually developed concentrations are possible provided they are well conceived, intellectually coherent, and relevant to the student's career direction. In all instances, approval must be obtained from the director of graduate studies.

#### *Language Requirements*

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. For international students whose native language is not English, the language requirement may be fulfilled by demonstrated competence in English. Students pursuing joint-degree programs must fulfill all language requirements before beginning the program because of the compressed schedule for other course work. 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.

#### *Summer Internship Requirement*

All students enrolled in the master's degree program in International Relations 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 will be fulfilled by obtaining experience through employment or an internship. The requirement may also be fulfilled by completing language study or other relevant course work, or by completing research of an approved topic.

Each first-year student must file a form with the director of the Office of Career and Alumni Services before June 1 stating the nature of his or her summer internship or approved alternative. In cases where there are questions as to whether the proposed summer activity satisfies the requirement, the director of the Office of Career and Alumni Services will consult with the director of graduate studies.

#### *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 core and concentration, and a maximum of an additional two courses may be 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 IR 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.

For information on the Certificate of Concentration in Development Studies or the Certificate of Concentration in Security Studies, see the section on the International Affairs Council under Non-Degree-Granting Programs, Centers, and Research Institutes in this bulletin.

For more information, visit [www.yale.edu/macmillan/iac/maininternational.htm](http://www.yale.edu/macmillan/iac/maininternational.htm), e-mail [international.relations@yale.edu](mailto: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 520a, Comparative Federalism. Gerald Baier.**

TH 3.30–5.20

The course gives students a sense of the variety of state and governmental arrangements that are commonly called “federal.” It includes a survey of federal theory and practice in both traditional and emerging federations.

### **INRL 535b<sup>u</sup>, Researching Ethnic Politics. Thad Dunning.**

T 1.30–3.20

Attention is given to questions of research design, as they pertain to research on ethnic politics. While engaged with fundamental, substantive questions and topics, the course is also especially concerned with how to do research on ethnic politics. Preference is given to undergraduates in international studies or political science, M.A. students in international relations, and graduate students in political science. *Also PLSC 675b<sup>u</sup>.*

### **INRL 545b, The Dynamics of Russian Politics. William Odom.**

T 1.30–3.20

Consideration of the question “Whither Russia?” with emphasis on comparative analytic concepts. Issues of political stability, constitutionalism, and institutions for political participation and governing examined in light of contemporary events and of the Soviet legacy. *Also PLSC 744b<sup>u</sup>.*

### **INRL 549b, The European Union’s Contemporary Challenges.**

**Francesco Tonon Meggiolaro.**

HTBA

Each year, this 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. *Also E&RS 652b.*

**INRL 555a, Theories in International Relations. Nikolay Marinov.**

M 3:30–5:20

This course provides an introduction to the major concepts and theories in the field of International Relations. By the end of the course, students should be familiar with some of the major debates in the field, and be comfortable using IR concepts and theories to understand and explain events in international politics. The course is a reading-intensive seminar, and the weekly meetings are structured around student-led presentations and discussions of the assigned readings for the week. The student presentations should provide a brief overview of the main arguments of the readings and raise questions for group discussion. All students should prepare to participate in the group discussion by preparing discussion notes, which are turned in at the end of each session of class. There are approximately 150–200 pages of required reading per week. *Also PLSC 685a.*

**INRL 560a, Economic Analysis. Cheryl Doss.**

MW 9–10:15

Introduces IR 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 cost-benefit analysis. These articles represent research from both developed and developing economies. Prerequisite: Principles of Microeconomics. *Also ECON 544a.*

**INRL 561b, International Economic Analysis. Cheryl Doss.**

MW 9–10:15

A continuation of 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. *Also ECON 708b.*

**INRL 582a<sup>U</sup>, Contemporary Political Economy of Turkey and the Middle East. Mine Eder.**

T 1:30–3:20

Examination of current problems and prospects that Turkey and the Middle East economies face. Exploration of the links between state building, economic development, and democratization in the region. Comparative discussion of how Turkey diverges from other Middle East economies.

**INRL 584a<sup>U</sup>, Palestinian Politics since 1948. Shaul Mishal.**

T 9:30–11:20

An examination of key social and political issues in a context of fundamental changes in the external and internal environments since the first Arab-Israeli war of 1948 and up to the rise of Hamas to power in January 2006.

**INRL 585b, Modern Arab Thought. Elizabeth Susan Kassab.**

Th 3:30–5:20

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. *Also NELC 507b<sup>U</sup>.*

**INRL 591b, Grand Strategies of the Great Powers. Theodore Bromund.**

Th 12.30–3.20

An examination of the rise and fall of the powers, their grand strategies in peace and war, and the strategic decision making of their leaders, within the context of the changing structure of the international system from the eighteenth century to today.

**INRL 595b, Formal Models of Comparative Politics. Thad Dunning.**

HTBA

We discuss and dissect recent models of the political regime type, political transitions, the separation of powers in democracies, and other topics. The goal is to become better consumers and critics of models, as well as to learn technique through discussion of leading exemplars. A previous course in game theory is recommended. *Also PLSC 736b.*

**INRL 610, Topics in Modern Middle East Studies. Amy Young.**

W 12–1.30

This yearlong 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. Other course requirements include three discussion papers responding to seminar lectures of the student's choice and a final research paper on a topic to be developed by the student and instructor. Students who register and fulfill these requirements receive credit for one term course.

**INRL 625b, Empire in Early South Asia: Historical Patterns and Material Consequences. Robert Brubaker.**

HTBA

The Indian subcontinent has cycled through alternating periods of large-scale political integration and subsequent fragmentation, with empires playing a particularly prominent role in integrating various regions during periods of supra-regional organization. This course examines the nature of these geographically extensive and culturally diverse polities through an interdisciplinary approach that seeks to juxtapose, combine, and synthesize insights derived from historical and archaeological research.

**INRL 640b, Democracy Promotion: Theory and Practice. Susan Hyde.**

HTBA

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 practice of international democracy promotion. It covers 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, the relationship between domestic and international actors in democratization, and 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.

**INRL 650a, Non-State Actors in World Politics. Susan Hyde.**

T 3.30–5.20

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.

**INRL 651b, Development as History: From Colonialism to Modernization to Globalization. David Ekbladh.**

HTBA

This course explores the evolving concept of development and how it can serve as a means to execute, support, or justify various ideological, state, and geopolitical programs. Historically, the concept of development has been subsumed under a host of labels ranging from “civilization” to “modernization” to “globalization.” The course examines the multiple, changing, and contested meanings of the concept in different times and places by different historical actors.

**INRL 662b, Political Economy of Conflict Zones: Social Stratification, Greed, and Corruption. Isam Khafaji.**

HTBA

Since the end of the cold war, bloody civil and regional wars have erupted in Eastern Europe, Africa, Asia, and the Middle East, costing hundreds of thousands of lives and wasting opportunities for societal prosperity and progress. Much of the scholarly work in this area has focused on prescribing policies to heal civil conflicts and wars. Yet very little has been done in studying the politics, economics, and social structures of war-torn societies. This course focuses on this latter issue, examining questions, including: Which regions/countries are more susceptible to civil conflicts and under what conditions? How do civil conflicts transform into civil wars and why? Are civil wars waged in order to divide a country, or are they (costly) bargaining strategies to control a country? Under what circumstances does the state collapse? What are the relationships between political actors/agendas and the fighting militias? Who finances civil wars, and why? How do ordinary people survive in conflict situations? What economic activity and social life occurs in conflict zones, and how are services provided? Who profiteers from conflicts, and how?

**INRL 700a, The Foundations and Evolution of the International System.****Theodore Bromund.**

Th 1.30–3.20

Study of core concepts in the international system, including religion, sovereignty, war, finance, and human rights, through readings that present continuities, changes, and contrasting points of view about the system and its structure. Focus on the development of research, writing, and speaking skills. For first-year IR students.

**INRL 705b, The Economics and Politics of the World Trading System.****Michele Ruta.**

HTBA

This course introduces students to the theory of political economy of international trade and links this theory to current issues and open questions. We study the economics and politics of multilateral trade agreements (GATT and the WTO) and of regional agreements (e.g., the

EU, Asean, and Mercosur) and the political economy of international factor mobility (immigration and foreign direct investments). We conclude with a critical discussion of policy controversies in the current world trading system (e.g., labor standards, the environment, national independence).

**INRL 708b<sup>u</sup>, Development Economics Policy. Dean Karlan.**

MW 9–10.15

This course provides an overview of development economics policy, with a specific focus on how we learn what works, what does not work, and why, in the world of poverty alleviation interventions. We discuss methodological issues with respect to how one evaluates interventions and policies (e.g., when and how to employ randomized control trials), the economic intuitions and concerns regarding different interventions, as well as policy issues related to replicating and scaling successful development projects. We primarily (but not exclusively) cover four sectors as examples throughout the course: microfinance (including credit, savings, and insurance), health, education, and agriculture.

**INRL 713b, Shifting the Development Policy Paradigm. Pia Rebello Britto.**

HTBA

Increasingly international organizations and governments around the world are becoming interested in developing global and national policies to serve one of the most vulnerable segments of the population — children. This course focuses on how to develop policies that have a positive social, political, and economic impact on children's lives. The course begins with a theoretical overview of current policy trends, both at the global and national levels. Students then work in groups on a selected country to develop national-level policies, applying the conceptual knowledge gained in the first part of the course to the country's specific political context, economic needs, and social situation.

**INRL 720a, Central Issues in American Foreign Policy. Stuart Gottlieb.**

W 2–3.20

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 in INTS 376a lectures required.

**INRL 725b, Terrorism and Counterterrorism. Stuart Gottlieb.**

W 2–3.20

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.

**INRL 729b, Weapons of Mass Destruction. Stuart Gottlieb.**

M 3.30–5.20

This seminar examines the history, evolution, and current issues associated with weapons of mass destruction (WMD), broadly conceived. Our primary focus is on the development and proliferation of WMD, the impact they have had, and continue to have, on the security of states and on the international system, and the various strategies employed to try to limit their spread and effects.



**INRL 730a<sup>U</sup>, The United Nations and the Maintenance of International Security.**  
**Jean Krasno.**

W 1.30–3.20

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 IR students and IS/PLSC undergraduates only.

**INRL 743b, The Political Economy of Foreign Investment. Allison Kingsley.**

HTBA

The emergence of functioning capital markets in developing countries is a threshold issue for economic growth and political development. Integrating political science theories with readings from the law, economics, and finance literatures, this course critically assesses public and private foreign investment. Focus is on whether investment is primarily a function of the investor's endowments or those of the investment. In particular, investment decisions are analyzed through two competing models — the investment model and the liquidity model — with the use of large-N evidence and relevant case studies from emerging markets, such as Egypt, Kazakhstan, Turkey, Brazil, Mexico, Russia.

**INRL 900a or b, Directed Reading.**

By arrangement with faculty.

## INVESTIGATIVE MEDICINE

Department of Medicine

Edward S. Harkness Building (ESH), basement 18–20, 785.6842  
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*), Joseph Craft (*Internal Medicine*), Thomas Gill (*Internal Medicine*), Fred Gorelick (*Internal Medicine*), Jeffrey Gruen (*Pediatrics*), Harlan Krumholz (*Internal Medicine*), Eugene Shapiro (*Pediatrics*), Gerald Shulman (*Internal Medicine*), Mary Tinetti (*Internal Medicine*)

*Affiliated Professors*

James Dziura (*Internal Medicine; Pediatrics*), David Fiellin (*Internal Medicine*), William Philbrick (*Internal 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 disease-oriented and patient-oriented investigation. The program provides the student with individualized experience encompassing formal course work and practical experience, under the supervision and mentorship of a senior faculty member.

Students will enter the program with a broad range of experience and interests. Students can undertake thesis work in a variety of disciplines. These include:

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 who have completed two or more years of postgraduate clinical training.

Prospective students who are already in a residency or subspecialty clinical fellowship program at Yale may apply to the Investigative Medicine program anytime during the first two years of that training (approximate). Application to the program may be made concurrently with application for residency or fellowship training in a clinical depart-

ment 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. 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 which 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*

1. IMED 620 Translational Research and Molecular Tools
2. IMED 625 Principles of Clinical Research
3. IMED 630 Ethical and Practical Issues in Clinical Investigation
4. IMED 635 Directed Reading in Investigative Medicine
5. IMED 645 Introduction to Biostatistics in Clinical Investigation
6. IMED 655 Grants, NIH, and Manuscripts
7. CBIO 601 Molecular and Cellular Basis of Human Disease (spring and fall)
8. Elective
9. Elective

#### *Course Requirements for Clinically Based Patient-Oriented Research*

1. IMED 620 Translational Research and Molecular Tools
2. IMED 630 Ethical and Practical Issues in Clinical Investigation
3. IMED 635 Directed Reading in Investigative Medicine
4. IMED 655 Grants, NIH, and Manuscripts
5. IMED 660 Methods in Clinical Research (summer)
6. IMED 661 Methods in Clinical Research (fall)
7. IMED 662 Methods in Clinical Research (spring)
8. Elective
9. Elective

## *Courses*

### **IMED 620a, Translational Research and Molecular Tools. Karen Anderson.**

MTWThF 2–5

**Structure-Based Drug Design:** In this section, students learn the underlying principles in structure-based drug design. Lectures are supplemented with computer laboratory sessions devoted to practical learning of basic principles in protein structure determination, analysis, and relationship to molecular drug design. Clinically relevant examples of this approach are considered. **Genomics:** In this section, students are exposed to a variety of essential molecular approaches from theoretical background to experimental design and clinical applications. Subjects include bioinformatics resources and databases, sequence homology searching and alignment, evolutionary relationships, gene and protein prediction, sequence analysis tools, microarray platforms and informatics, PCR-related techniques and primer design, SNP analysis, and inhibitory RNA methods. Lectures are supplemented by computer laboratory sessions to reinforce ideas and to provide practical experience. Consent of instructor required. Two weeks, Structure-Based Drug Design, July 17–July 21; Genomics, August 14–August 18.

### **IMED 625a, Principles of Clinical Research. Eugene Shapiro.**

MTWThF 2–4

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, methods for qualitative research, 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 18–29.

### **IMED 630a, Ethical and Practical Issues in Clinical Investigation. Henry Binder.**

T 3:30–5

This term-long 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. This course provides guidelines and a framework for the clinical investigator to obtain funding for, conduct, and present a clinical study. Consent of instructor required.

### **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. Twelve sessions are required; dates/times by arrangement. Consent of instructor required.

### **IMED 645a, Introduction to Biostatistics in Clinical Investigation. Henry Binder.**

MTWThF 8:30–11:30

This 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. Two weeks, July 11–22.

**IMED 650a, Seminars in Clinical Investigation. Eugene Shapiro.**

W 2-4

In this term-long seminar course a range of topics is covered in the format of an interactive seminar. Topics including 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.

**IMED 655b, Grants, NIH, and Manuscripts. Eugene Shapiro.**

W 2-4

In this term-long course, students gain intensive, practical experience in evaluating and preparing grants, 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.

**IMED 660a, 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.

## ITALIAN LANGUAGE AND LITERATURE

82–90 Wall Street, 432.0595

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

### *Chair*

Giuseppe Mazzotta

### *Director of Graduate Studies*

Millicent Marcus [F] (82–90 Wall, Rm 426, 432.0599, millicent.marcus@yale.edu)

Giuseppe Mazzotta [Sp] (82–90 Wall, Rm 404, 432.0598, giuseppe.mazzotta@yale.edu)

### *Professors*

Francesco Casetti (*Visiting* [Sp]), Millicent Marcus, Giuseppe Mazzotta, Silvano Nigro (*Visiting* [F])

### *Assistant Professor*

Francesca Cadel

### *Senior Lector 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 individual courses of study, 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 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 Program in Film Studies, 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. For further details, see 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 560a, Age of Disenchantment. Giuseppe Mazzotta.**

T 3.30–5.20

This course focuses on the literary debates, theological arguments, and scientific shifts taking place between the Council of Ferrara-Florence (1437) and the Council of Trent and beyond, by reading key texts by Valla, Cusa, Pulci, Luther, Erasmus, Ariosto, Campanella, Bruno, Galileo, and Bellarmine. It examines issues such as crisis of belief, the authority of the past, the emergence of freedom, new aesthetics, and the effort to a new theological language for modern times.

#### **ITAL 565b, Petrarch: Emergence of Modernity. Giuseppe Mazzotta.**

T 3.30–5.20

This course focuses on Petrarch's grand project of re-founding culture, and seeks to define its substance and contours: his rediscovery of "discourse" of Rome; his engagement with Saint Augustine's sense of political foundation; the reconfiguration of the "self"; his debts to and polemics with the sciences; and his rethinking of the medieval traditions of encyclopedism.

#### **ITAL 595a, Cinematic Neorealism. Millicent Marcus.**

W 3.30–5.20, screenings M 7

The course considers the complex relationship between the theory and practice of Italian cinematic neorealism. We screen a film weekly and analyze it in the context of an evolving theoretical paradigm, beginning with Rossellini's *Open City* (1945) and *Paisa* (1946), and flashing back to the proto-neorealist *Ossessione* (Visconti, 1942). We devote a great deal of attention to De Sica's contributions to neorealism, including *Shoeshine* (1946), *Bicycle Thief* (1948), *Miracle in Milan* (1951), and *Umberto D* (1952), in addition to De Santis's *Bitter Rice* and Visconti's *La terra trema* (1948). The course also includes a study of the movement's afterlife in *Bellissima* (Visconti, 1951), and the recent revisitations of neorealism in *Iceberg Thief* (Nichetti, 1989) and *Celluloide* (Lizzani, 1996), before concluding with Gianni Amelio's *Stolen Children* (1992), which has been hailed as the harbinger of a realist revival in the 1990s. *Also FILM 732a<sup>II</sup>*.

#### **ITAL 662a, Romanticism and the Baroque. Silvano Nigro.**

M 3.30–5.20

This course, which is taught in Italian, deals primarily with Alessandro Manzoni's critical reading of the Baroque as well as with the exploration of the kinship between the Baroque and romanticism.

#### **ITAL 803b, Cinema: Experience and Reflexivity. Francesco Casetti.**

W 3.30–5.30, screenings SU 7

To attend a film was a new form of experience within the framework of twentieth-century modernity. This seminar explores the meanings, functions, and rituals of film reception, with a stress on "classical" forms (1920s and 1930s) and their transformations in modern and post-modern cinema. We analyze films that openly display on screen the act of vision (from Keaton's *Sherlock Junior* to Visconti's *Bellissima*), and we study critical texts that describe or problematize this reflexive practice (from Victor Freeburg to Jean Epstein to Filmology). *Also CPLT 943b, FILM 803b*.



## LINGUISTICS

370 Temple, Rm 204, 432.2450  
M.A., M.Phil., Ph.D.

### *Chair*

Louis Goldstein

### *Director of Graduate Studies*

Stanley Insler (323 HGS, 432.2455, stanley.insler@yale.edu)

### *Professors*

Stephen Anderson (*on leave* [F]), Paul Bloom, Carol Fowler (*Adjunct*), Roberta Frank, Louis Goldstein, Stanley Insler, Frank Keil, Hugh Stimson, Zoltán Szabó (*on leave* [Sp])

### *Associate Professor*

Maria Piñango

### *Assistant Professors*

Maria Babyonyshev, Darya Kavitskaya

### *Lecturer*

Ashwini Deo

### *Director, African Language Program*

Ann Biersteker

### *Director, Center for Language Study*

Nina Garrett

### *Supporting Faculty in Other Departments*

J. Joseph Errington (*Anthropology*), William Hallo (*Near Eastern Languages & Civilizations*)

### *Fields of Study*

Fields include linguistic theory (phonology, morphology, syntax, semantics, pragmatics), experimental phonetics, brain and language, language and cognition, historical linguistics, and African linguistics.

### *Special Requirements for the Ph.D. Degree*

*Language Requirements:* Students must demonstrate knowledge of two research languages, either by passing a translation examination in the language, or by presenting a piece of research which relies in significant part on sources in the foreign language. A one-term language description course, a field methods course, or a course in the structure of a non-Indo-European language is also required. (See [www.yale.edu/linguist/phd\\_requirements.html](http://www.yale.edu/linguist/phd_requirements.html) for additional details.)

*Course Requirements:* Sixteen term courses at the graduate level. Required courses in syntax, phonology, phonetics, morphology, semantics, and historical linguistics will be taken during the first two years. Remaining course work during the first two years in residence will be selected so as to prepare the student in some substantial subfield of linguistics. After the first two years, students are required to enroll in at least one seminar course each term until they advance to candidacy.

*Program Requirements:* At the end of the second year, each student will submit a portfolio of work demonstrating the ability to conduct linguistic research, including satisfactory performance on an examination in some subfield of linguistics, and three samples of work, one each in the areas of syntax, phonology, and historical linguistics. By the end of the third year, the student should have presented, to the department or at a conference, two substantial research papers of publishable quality in different areas of linguistics. By the end of the seventh term, students must defend a dissertation prospectus.

*Dissertation Requirements:* Students are expected to complete their dissertations by the end of the sixth year. An open dissertation defense is required after submission.

*Teaching Fellow and Research Assistantship Requirements:* Teaching experience is regarded 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 in the third or fourth years of study. Two additional terms of assistantship are also required, either in the form of additional participation in the Teaching Fellow Program, through participation in externally supported, supervised research (e.g., NSF Fellowship), or by serving as an assistant on a research project. Research assistantships are provided by the Linguistics faculty (e.g., from research grants) and by various Yale and Yale-affiliated units. Before accepting a research assistantship in fulfillment of the academic requirement, students must receive approval from the director of graduate studies. To be approved, an assistantship must meet the following criteria: (1) It must be under the supervision of a departmental faculty member or faculty at an affiliated unit, such as the Haskins Laboratories or the Yale School of Medicine. (2) It must provide research experiences that complement the student's academic plan of study. (3) It must provide at least 10 hours of experience per week. If a research assistantship is accepted in fulfillment of the department's academic requirement and if the assistantship provides a stipend less than the standard departmental stipend, a University Fellowship will be provided to bring the combined stipends up to the standard departmental stipend.

### *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 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

### LING 510b, Introduction to Linguistics. Darya Kavitskaya.

MW 11.30–12.45

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.

### LING 512b<sup>u</sup>, Historical Linguistics. Ashwini Deo.

TTh 9–10.15

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.

### LING 513a<sup>u</sup>, Introduction to Indo-European Linguistics. Stanley Insler.

T 1.30–3.20

Location in space and time of the major branches of Indo-European; history of Indo-European studies, especially the development of methodology; sketch of the phonology, morphology, syntax, and lexicon of proto-Indo-European, with main developments of these in the daughter languages.

### LING 515<sup>u</sup>, Elementary Sanskrit I. Stanley Insler [F]. Ashwini Deo [Sp].

MWF 9.30–10.20

Careful study of Sanskrit grammar both in its historical development and as the synchronic systems attested in classical Sanskrit. Comparisons with other Indo-European languages. Close reading of later Sanskrit texts.

### LING 517a<sup>u</sup>, Language and Mind. Maria Piñango.

TTh 11.30–12.45

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. Representation of language in the brain. Use of linguistic knowledge in speaking: processing. Comparison between human spoken natural language and other systems (signed languages; nonhuman communication).

### LING 520a<sup>u</sup>, General Phonetics. Louis Goldstein.

TTh 4–5.15

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.

### LING 530b<sup>u</sup>, Evolution of Language. Stephen Anderson.

TTh 4–5.15

An exploration of the origin and evolution of human language from an interdisciplinary perspective. Topics include the design features of language, the structure of evolutionary theory, cognitive continuity and discontinuity with other species, domain specificity and generality of the language faculty, adaptationist and exaptationist approaches to language evolution, language learning in humans and other primates, and the evolution of particular languages with reference to linguistic typology. No prerequisites.

**LING 532a<sup>U</sup>, Introduction to Phonological Analysis. Darya Kavitskaya.**

MW 1–2.15

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.

**LING 535b<sup>U</sup>, Phonological Theory II. Stephen Anderson.**

MW 1–2.15

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 instructor.

**[LING 541b<sup>U</sup>, Language and Computation.]****LING 553a<sup>U</sup>, Syntax I. Maria Babyonyshev.**

TTh 1–2.15

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.

**LING 563b<sup>U</sup>, Language Acquisition. Maria Babyonyshev.**

TTh 2.30–3.45

Language learnability, acquisition of the lexicon. Development of syntactic knowledge. Parameter-setting model of language acquisition and maturation. Experimental methods in developmental psycholinguistics.

**LING 580b<sup>U</sup>, Morphology. Maria Piñango.**

MW 11.30–12.45

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 LING 553a, or permission of instructor.

**[LING 582a<sup>U</sup>, Introduction to Old Norse.]****[LING 592b, Historical Syntax.]****[LING 593a<sup>U</sup>, Historical Morphology.]****[LING 602b<sup>U</sup>, Comparative Old Germanic.]****LING 614b<sup>U</sup>, Structure of Yorùbá. Oluseye Adesola.**

TTh 4–5.15

Examination of selected grammatical topics in Yorùbá, including word order, constituent structure, serial verb constructions, nominalization, focus constructions, and tense marking. Discussion of broader issues of typology, language acquisition, and language universals. Prerequisite: LING 153a.

**LING 621b<sup>U</sup>, The Relation of Speech to Language. Carol Fowler.**

TTh 11.30–12.45

A study of the relation between the speech signal and the linguistic message it conveys. Special attention to those characteristics of speech that fit it to humans and make it a uniquely efficient vehicle of communication. Prerequisite: LING 120a.

**[LING 622b<sup>U</sup>, Topics in Phonetics.]**

[LING 624a<sup>u</sup>, Formal Foundations of Linguistic Theories.]

[LING 625, Second-Year Sanskrit.]

**LING 631b<sup>u</sup>, Neurolinguistics. Maria Piñango.**

TTH 1–2.15

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.

**LING 636b<sup>u</sup>, Articulatory Phonology. Louis Goldstein.**

TTH 4–5.15

Introduction to phonology as a system for combining units of speech (constriction gestures of the vocal organs) into larger structures. Course includes both theory (reading) and practice (analysis of articulatory movement data; modeling using techniques of dynamical systems). Emphasis on universal vs. language-particular aspects of gestural combination and coordination.

**LING 640b<sup>u</sup>, Topics in Phonology: Prosody. Darya Kavitskaya.**

W 7–8.50

Topics in the prosodic systems of the world's languages. Discussion of stress, pitch accent, tone, and their interaction with intonation. Development and typology of prosodic systems and theoretical approaches to prosody.

[INDC 642a, Old Iranian.]

[LING 642a<sup>u</sup>, Topics in Phonology: Phonetic and Phonological Components of Syllable Weight.]

[LING 647b<sup>u</sup>, Structure of Swahili.]

**LING 648b<sup>u</sup>, Structure of Modern Turkish. Fatima-Nihan Ketrez.**

MW 11.30–12.25, 1 HTBA

A study of the phonological and morphosyntactic properties of Modern Turkish. Topics include the sound system, vowel harmony, word stress, word formation, argument structure, relative clauses, tense, aspect and modality, complex predicates, specificity, definiteness, and word order. Discussion of data from first and second language acquisition, with a focus on how such data contribute to an understanding of the structure of Turkish. Prerequisite: LING 553a or TKSH 102, or consent of instructor.

**LING 649b<sup>u</sup>, Introduction to the Slavic Languages. Robert Greenberg.**

T 3.30–5.20

This course explores the historical development of the Slavic languages from the time of an assumed Slavic unity through the modern period. Linguistic, cultural, historical, and social factors are considered to explain how more than a dozen Slavic languages emerged as standard languages in the past two centuries. Topics include the role of elites in shaping new Slavic languages, the influence of neighboring languages on the development of Slavic, and the natural linguistic differentiation that occurred in the Slavic lands. No previous knowledge of Slavic languages is required. *Also SLAV 771b<sup>u</sup>.*

**INDIC 652b, Vedic Prose. Stanley Insler.**

T 1.30–3.20

Exploration of the varieties of Vedic prose from *Brāhmaṇas*, *Upanishads*, and *Sūtras*. Year of Sanskrit required.

**LING 654b<sup>U</sup>, Syntax II. Maria Babyonyshev.**

TTh 11.30–12.45

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.

**LING 656b<sup>U</sup>, Grammatical Relations. Laurence Horn.**

MW 2.30–3.45

Descriptive and theoretical approaches to grammatical relations (subject, object, etc.) and their role in syntax, argument structure, and universal grammar. Comparison of diverse models: traditional approaches, case grammar, relational grammar, lexical-functional grammar, GB and its developments. Grammatical relations and thematic roles (theta-roles). Grammatical relations in typological and historical perspectives. Prerequisite: LING 553a or permission of instructor.

**LING 660a<sup>U</sup>, Topics in Syntax: The Syntax-Semantics Interface. Maria Piñango.**

Th 3.30–5.20

Exploration of the psychological reality of specific proposals regarding how syntactic structure and semantic structure come together (e.g., how meaning is derived from sentence organization). These proposals are examined through an experimental psycholinguistic (real-time parsing) and neurolinguistic (lesion studies and neuroimaging) perspective. Specific phenomena to be evaluated include anaphora resolution, control, and argument and event structure. *Also PSYC 650a<sup>U</sup>.*

**LING 662a<sup>U</sup>, Topics in Syntax: Acquisition of Movement. Maria Babyonyshev.**

T 3.30–5.20

Issues associated with the acquisition of movement. Topics include the order of acquisition of movement operations, difficulties associated with each operation, existing theoretical models of these difficulties, the implications of child data for the syntactic theories of movement, and the distinct properties of movement operations in second language acquisition and in impaired acquisition. *Also PSYC 649a<sup>U</sup>.*

**LING 663a<sup>U</sup>, Semantics. Ashwini Deo.**

MW 2.30–3.45

Truth-conditional and lexical semantics. Survey of propositional, predicate, and modal logic. Compositional theories of sense and reference. Opacity, intentionality, and belief contexts; entailment and presupposition. The relations between semantics and pragmatics, and between semantics and syntax.

**LING 670a<sup>U</sup>, Topics in Semantics: Variation and Change in Tense-Aspect Categories. Ashwini Deo.**

F 1.30–3.20

Cross-linguistic differences in the distribution and interpretation of tense and aspect from a comparative and historical perspective. Re-evaluation of descriptive and empirical accounts from the grammaticalization and typology literature as informed by formal semantic research on tense/aspect categories.

**LING 675a<sup>U</sup>, Pragmatics. Laurence Horn.**

MW 11.30–12.45

Context-dependent aspects of meaning and inference. Speech act theory, presupposition, implicature. Role of pragmatics in the lexicon and in meaning change. The semantics-pragmatics distinction from different perspectives; the position of pragmatics in linguistic theory.

**LING 676b<sup>U</sup>, Implicature and Pragmatic Theory. Laurence Horn.**

Th 3.30–5.20

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. Experimental studies of scalar implicature and the grammar/pragmatics interface. The viability of conventional implicature.

[LING 720b<sup>U</sup>, Basics of Digital Signal Processing and Speech Acoustics.]

[LING 760b, Seminar in Information Structure.]

**INDIC 771b, Middle Indic: Pali and Prakrit. Stanley Insler.**

Th 1.30–3.20

Introduction to the old Indic vernaculars. Readings from the Buddhist Canon, Inscriptions of Aśoka and Prakrit literary texts.

**LING 777b, Current Research in Phonetics. Louis Goldstein.**

F 3.30–5.20

Intensive discussion of selected research topics in phonetics, primarily in the areas of gestural structure and coordination, dynamical modeling, and articulatory-acoustic relations. Experimental, analytical, and simulation methods will be evaluated. Students are expected to have ongoing research projects and to present regular reports on their progress.

**LING 790a, Research Methods in Linguistics. Darya Kavitskaya.**

W 3.30–5.20

This course provides an introduction to research methods in linguistics. Observational and experimental approaches to research in the field. Topics include collection and organization of linguistic data, basic field methods, use of language corpora and databases. Introduction to research in language acquisition and language change. This is a required course for first-year graduate students.

**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.

The following courses are also of particular value to students in Linguistics:

**ANTH 513a<sup>U</sup>, Language, Culture, and Ideology. J. Joseph Errington.****ANTH 570b<sup>U</sup>, Language, Politics, and Society in Colonial India.**

Elayaperumal Annamalai.

**ANTH 619a<sup>U</sup>, Language and the Public Sphere. J. Bernard Bate.****ENGL 500a, Old English. Fred Robinson.****ENGL 500b, *Beowulf*. Roberta Frank.**

**PHIL 567a<sup>u</sup>, Mathematical Logic. Sun-Joo Shin.**

**PHIL 630a<sup>u</sup>, Propositions and Events. Zoltán Szabó.**

**PSYC 524a<sup>u</sup>, Concepts and Categorization. Woo-Kyoung Ahn.**



## MANAGEMENT

135 Prospect, 432.3955  
M.A., M.Phil., Ph.D.

### *Director of Graduate Studies*

Subrata Sen (52 Hillhouse, Rm 221, 432.6028, [subrata.sen@yale.edu](mailto: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, Jonathan Ingersoll, Edward Kaplan, Owen Lamont, Lode Li, Theodore Marmor, Barry Nalebuff, Sharon Oster, Benjamin Polak, Douglas Rae, K. Geert Rouwenhorst, Peter Schott, Fiona Scott-Morton, Martin Shubik, Matthew Spiegel, K. Sudhir, Shyam Sunder, Arthur Swersey, Jacob Thomas, Victor Vroom, Amy Wrzesniewski

### *Associate Professors*

Jonathan Koppell, Nathan Novemsky

### *Participating Faculty from the School of Management*

Keith Chen, James Choi, Lauren Cohen, Martijn Cremers, Erica Dawson, Stanley Garstka, Alessandro Gavazza, Roger Ibbotson, Nathaniel Keohane, Erin Mansur, B. Cade Massey, Dina Mayzlin, Brian Mittendorf, Rodney Parker, Antti Petajisto, Jiwoong Shin, Joseph Simmons, Heather Tookes, Hongjun Yan, X. Frank Zhang

### *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 (see Degree Requirements), among which are 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 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 two courses that are outside of the student's depth area. At least one of these courses must be from an *applied* area of management different from the student's own depth area. Breadth courses are selected by the student with the consent of the area faculty and the DGS.

*Course requirement:* Each student must complete a total of sixteen courses, achieving a grade of Honors in at least two courses, and a High Pass average in the other fourteen 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 sixteen 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 and 702b, Seminar in Accounting Research I and III.** Jacob Thomas, Frank Zhang.

F I - 4

This course examines research into accounting institutions. Topics are generally drawn from areas of income measurement, managerial evaluation, industry structure and regulation in the accounting industry, informational efficiency of public markets, and asset valuation models under incomplete markets.

**MGMT 703a, Experimental Economics. Shyam Sunder.**

T 1.30–3.20

This term-long seminar introduces participants to experimental methods in economics research and conducts a survey of experimental results. Depending on the interests of the participants, we cover topics from auctions, asset markets, game theory, monetary theory, public goods, corporate finance, market microstructure, institutional economics, and so on. The seminar participants are expected to design and conduct their own experiment and write a term paper. Enrollment limited. Permission of instructor required. *Also ECON 488a.*

**MGMT 710a, Mathematical Models for Management. Susana Mondschein.**

MW 10–11.20

Students learn how to formulate and solve optimization problems. Topics covered include linear and integer programming, non-linear optimization, dynamic programming, and queueing theory. Many real problems from various areas in manufacturing and service operations are covered throughout the course.

**MGMT 740a, Financial Economics I. Zhiwu Chen.**

T 2.30–5.30

Current issues in theoretical financial economics addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area. *Also ECON 670a.*

**MGMT 741b, Financial Economics II. Jonathan Ingersoll.**

Current issues in theoretical financial economics addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area. *Also ECON 671b.*

**MGMT 742a, Corporate Finance and Market Microstructure. Matthew Spiegel.**

MW 2.30–4

This 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 offers, and mergers and acquisitions. The market microstructure half of the course 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 751b, Seminar in Marketing I. K. Sudhir.**

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. Nathan Novemsky.**

F 11.30–1

**MGMT 753a, Behavioral Decision Making I. Ravi Dhar.**

T 4.10–7.10

This 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, and other topics. 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. *Also PSYC 553a.*

**MGMT 755a, Analytical Methods in Marketing.** Dina Mayzlin, Jiwoong Shin.

M 1-4

This half-semester Ph.D.-level course focuses on an in-depth introduction to analytical methods in the marketing field. The topics covered include (1) dynamic competition, (2) price signaling and equilibrium refinements, (3) price discrimination, (4) product differentiation, (5) network effects, and (6) asymmetric information and strategic investment. At the end of the term, the students are asked to present an original model of an interesting marketing phenomenon.

**MGMT 780a and b, Ph.D. Student Research Workshop.** Subrata Sen.

M 4.10-5.10

**MGMT 781a and b, Accounting/Finance Workshop.** Antti Petajisto.

F 11.30-1

**MGMT 782-01a and b, Doctoral Student Pre-Workshop Seminar/Accounting.**  
Subrata Sen.

F 10.20-11.20

**MGMT 782-02a and b, Doctoral Student Pre-Workshop Seminar/Financial Economics.** Subrata Sen.

F 10.20-11.20

**MGMT 782-03a and b, Doctoral Student Pre-Workshop Seminar/Marketing.**  
Subrata Sen.

F 10.20-11.20

**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, 432.4172

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

### *Chair*

Andrew Casson

### *Director of Graduate Studies*

Roger Howe [F]

Mikhail Kapranov [Sp]

### *Professors*

Donald Brown (*Economics*), Andrew Casson, Ronald Coifman, Michael Frame (*Adjunct*), Igor Frenkel, Howard Garland, Roger Howe, Peter Jones, Ravindran Kannan (*Computer Science*), Mikhail Kapranov, Bruce Kleiner, Alexander Lubotzky (*Adjunct*), Gregory Margulis, Yair Minsky, Vincent Moncrief (*Physics*), Steven Orszag, David Pollard (*Statistics*), Vladimir Rokhlin (*Computer Science*), Gregg Zuckerman

### *Gibbs Assistant Professors*

Baris Coskunuzer, Philip Gressman, Daniel Krashen, Treit Le, Yiqiang Li, Matvei Libine, Alina Marian, Karin Melnick, Kevin Wortman

### *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; kleinian groups, low dimensional topology and geometry; finite and infinite groups; 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.

### *Honors Requirement*

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see page 464).

### *Master's Degrees*

*M.Phil.* In addition to the Graduate School requirements (see Degree Requirements under Policies and Regulations), a student must undertake a reading program of at least two terms' duration in a specific significant area of mathematics under the supervision of a faculty adviser and demonstrate a command of the material studied during the reading period at a level sufficient for teaching and research.

*M.S. (en route to the Ph.D.).* A student must complete six term courses with at least one Honors grade, pass one language examination, perform adequately on the general qualifying examination, and be in residence at least one year.

*Master's Degree Program.* Students may also be admitted to a terminal master's degree program that has the same requirements as the M.S. en route to the Ph.D., except that a sophisticated computer language may be substituted for French, German, or Russian in fulfillment of the language requirement. Full-time students must complete the program in two years, part-time students in three years. No financial aid is available.

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<sup>U</sup>, Modern Algebra I.** Alina Marian.

MW 2.45–4

**MATH 501b<sup>U</sup>, Modern Algebra II.** Mikhail Kapranov.

TTh 2.30–3.45

**MATH 515b<sup>U</sup>, Intermediate Complex Analysis.** Staff.

MW 2.30–3.45

**MATH 520a<sup>U</sup>, Measure Theory and Integration.** Howard Garland.

TTh 1–2.15

**MATH 525b<sup>U</sup>, Introduction to Functional Analysis.** Gregory Margulis.

TTh 1–2.15

**MATH 544a, Introduction to Algebraic Topology.** Staff.

HTBA

[**MATH 545b, Introduction to Algebraic Topology II.**]

## MECHANICAL ENGINEERING

Dunham Laboratory, 432.4250

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

### *Chair*

Mitchell Smooke

### *Professors*

David Bercovici, Ira Bernstein (*Emeritus*), Boa-Teh Chu (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Robert Gordon, Shun-Ichiro Karato, Amable Liñan-Martinez (*Adjunct*), Marshall Long, Manohar Panjabi, Daniel Rosner, Ronald Smith, Mitchell Smooke, George Veronis, Peter Wegener (*Emeritus*), Forman Williams (*Adjunct*)

### *Associate Professors*

Jacek Cholewicki, Corey O'Hern, Udo Schwarz, David Wu

### *Assistant Professors*

Jerzy Blawdziewicz, Eric Dufresne, David LaVan, John Morrell, Ainissa Ramirez

### *Lecturers*

Beth Anne Bennett, Kailasnath Purushothaman

### *Fields of Study*

*Mechanics of Fluids:* 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; combustion and flames; computational methods for fluid dynamics and reacting flows; laser diagnostics of reacting and nonreacting flows.

*Mechanics of Solids/Material Science:* Mechanisms of deformation, mass transport, and nucleation within material systems through experimental, analytic, and computational studies; mechanical testing of small-scale structures; characterization of microscale inhomogeneities in plastic flow; impact loading of materials; diffusion of dopants within semiconductor films; evolution of surface roughness during plastic deformation; ion implantation-induced disorder in crystalline films; incorporation of microstructural information into constitutive laws; electromigration in metallic interconnects; transient nucleation in multicomponent systems; jamming in particulate systems such as glasses, colloids, granular materials; materials science of thin films; phase transformations; MEMS materials; atomic-scale investigations of surfaces, surface interactions, and surface properties (nanomechanics); nanotribology (atomic mechanisms of friction); and nanoelasticity.

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

## MEDIEVAL STUDIES

53 Wall, Rm 310, 432.0672

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

*Chair and Director of Graduate Studies*

Anders Winroth

### *Professors*

R. Howard Bloch, Gerhard Böwering, Carlos Eire, Margot Fassler, Roberta Frank, Paul Freedman, Harvey Goldblatt, Beatrice Gruendler, Dimitri Gutas, Valerie Hansen, James John [F], Bentley Layton, Ivan Marcus, Dale Martin, John Matthews, Giuseppe Mazzotta, María Rosa Menocal, Alastair Minnis, Robert Nelson, Lee Patterson, Denys Turner, Anders Winroth

### *Associate Professors*

Matthew Giancarlo, Jaime Lara

### *Assistant Professors*

Jessica Brantley, Óscar Martín, Nicole Rice, Youval Rotman

### *Lecturers*

Adel Allouche, Marcia Colish, Walter Goffart, Susanne Roberts, 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. Proficiency in Latin 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. 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 director of graduate studies. 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 predisertation 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.

*Master's Degree Program.* For this 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 551a, Music, Liturgy, and Historiography in Medieval England.**

**Margot Fassler.**

M 1.30–3.20

The seminar offers an introduction to medieval musical and liturgical sources, structures, and genres, using English materials from the eleventh through the fourteenth century. It welcomes students into the scriptoria and classrooms of medieval cantors — the figures responsible for the music, liturgy, and history writing in most centers — and examines how they formulated liturgical structures, managed the “timescape,” wrote and produced codices, taught liturgical music, created characters through saints' lives, and used music and liturgy to shape historical understanding and promote particular political and religious agendas.

#### **MDVL 552a, Latin Palaeography. James John.**

TRH 4–5.15

A descriptive survey of scripts from Roman to Renaissance times, with practice in reading, localizing, and dating them. *Also CLSS 601a.*

**MDVL 553a, Seminar on Beinecke Library Ms. 439: The Scribal Pattern Book of Gregorius Bock. James John.**

W 1.30–3.20

A comprehensive study of the manuscript's origin, its scribe, its numerous text and initial alphabets, and its accompanying illustrative text. *Also CLSS 621a.*

**MDVL 554b, Greek Paleography. Youval Rotman.**

Th 1–2.50

This seminar follows the development of Greek writing and the Greek book from Late Antiquity to the Early Modern period, while examining different types of scripts. The main goal of this seminar is to provide graduate students with the ability to approach and read Greek manuscripts. *Also CLSS 695b, HIST 526b.*

## MICROBIOLOGY

Boyer Center for Molecular Medicine, 295 Congress Ave., BCMM 366B, 737.2404  
M.Phil., Ph.D.

*Director of Graduate Studies*

Joann Sweasy

*Student Services Officer*

Darlene Smith

### *Professors*

Serap Aksoy (*Epidemiology & Public Health*), Sidney Altman (*Molecular, Cellular & Developmental Biology*), Norma Andrews (*Microbial Pathogenesis*), Kim Bottomly (*Immunobiology*), Michael Cappello (*Pediatrics*), Yung-chi Cheng (*Pharmacology*), Donald Crothers (*Emeritus, Chemistry*), 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*), L. Nicholas Ornston (*Molecular, Cellular & Developmental Biology*), Curtis Patton (*Epidemiology & Public Health*), John Rose (*Pathology*), Nancy Ruddle (*Epidemiology & Public Health*), Clifford Slayman (*Cellular & Molecular Physiology*), Dieter Söll (*Molecular Biophysics & Biochemistry*), William Summers (*Therapeutic Radiology*), Peter Tattersall (*Laboratory Medicine*), Elisabetta Ullu (*Internal Medicine*)

### *Associate Professors*

Susan Baserga (*Therapeutic Radiology*), S. P. Dinesh-Kumar (*Molecular, Cellular & Developmental Biology*), Craig Roy (*Microbial Pathogenesis*), Joann Sweasy (*Therapeutic Radiology*), Christian Tschudi (*Epidemiology & Public Health; Internal Medicine*), Sandra Wolin (*Cell Biology; Molecular Biophysics & Biochemistry*), Liangbiao Zheng (*Epidemiology & Public Health*)

### *Assistant Professors*

Hervé Agaisse (*Microbial Pathogenesis*), Louis Alexander (*Epidemiology & Public Health*), Roger Ely (*Chemical & Environmental Engineering*), Akiko Iwasaki (*Epidemiology & Public Health*), Christine Jacobs-Wagner (*Molecular, Cellular & Developmental Biology*), Susan Kaech (*Immunobiology*), Barbara Kazmierczak (*Internal Medicine*), John MacMicking (*Microbial Pathogenesis*), Robert Means (*Pathology*), Walther Mothes (*Microbial Pathogenesis*), Michael Robek (*Pathology*), Paul Turner (*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.

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.

### *Special Requirements for the Ph.D.*

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 assure 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 level. 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.

## 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.

## Courses

**MBIO 642a, Roles of Microorganisms in the Living World.** L. Nicholas Ornston, Dieter Söll, Diane McMahon-Pratt.

TTh 11.30–12.45

A topical course exploring the biology of microorganisms. Emphasis on mechanisms underlying microbial adaptations and how they influence biological systems. Prerequisites: biology, chemistry, biochemistry. *Also* EMD 642a, GENE 642a, MCDB 642a.

**MBIO 670a,b, Laboratory Rotation.** Joann Sweasy.

Rotation in three laboratories. Required for all first-year graduate students.

**MBIO 684b, Molecular and Cellular Processes of Parasitic Eukaryotes.** Diane McMahon-Pratt, Christian Tschudi.

F 12–1.30

An advanced graduate-level seminar course in modern parasitology. The class is focused on the reading and critical evaluation of papers from the current literature selected by the students in cellular and molecular mechanisms of parasitism. Prerequisites: EMD 680a is highly recommended; permission of the instructor. *Also* EMD 684b.

**MBIO 685b, Molecular Mechanisms of Microbial Pathogenesis.** Jorge Galán, Norma Andrews, Craig Roy, Walter Mothes, John MacMicking, Hervé Agaisse.

TF 10–11.30

The 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.

**MBIO 700a, Seminal Papers on the Foundations of Modern Microbiology.** Peter Tattersall.

W 5–6.30

A required course for Microbiology first- and second-year students; not for credit. The course is offered every second year, alternating with MBIO 703a, so that it can be taken once during each student's tenure in the program. 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 has a major impact on current biomedical research.

**MBIO 701a,b, Research in Progress.** Joann Sweasy.

M 2

All students, beginning in their third year, are required to present their research once a year at the Graduate Student Research in Progress, held on Mondays at 2 P.M. 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.

**MBIO 702a,b, Microbiology Seminar Series. Joann Sweasy.**

<sup>th</sup> 4

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.

**MBIO 703a, Evasion of Host Defenses by Viruses, Bacteria, and Eukaryotic Parasites. Peter Tattersall.**

w 5–6.30

A required course for Microbiology first- and second-year students; not for credit. The course is offered every second year, alternating with MBIO 700a, so that it can be taken once during each student's tenure in the program. Students present and discuss papers on the strategies employed by microbial organisms to evade either cell-intrinsic defenses, such as the induction of programmed cell death, or response operating at the level of the organism, such as adaptive immunity.

**MBIO 734a, Molecular Biology of Animal Viruses. Daniel DiMaio, George Miller, Peter Tattersall, Walther Mothes, Jack Rose, Robert Means, Michael Robek.**

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions. *Also GENE 734a.*

## MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

301 Josiah Willard Gibbs Laboratories, 432.5662  
M.S., M.Phil., Ph.D.

### *Chair*

Scott Strobel

### *Director of Graduate Studies*

Mark Solomon (301 JWG, 432.5662, [nessie.stewart@yale.edu](mailto:nessie.stewart@yale.edu))

### *Professors*

Ronald Breaker (*Molecular, Cellular & Developmental Biology*), Gary Brudvig (*Chemistry*), Donald Crothers (*Emeritus, Chemistry*), Donald Engelman, Joseph Fruton (*Emeritus*), Alan Garen, Sankar Ghosh (*Immunobiology*), Nigel Grindley, Andrew Hamilton (*Chemistry*), Mark Hochstrasser, William Konigsberg, Peter Lengyel (*Emeritus*), Richard Lifton (*Genetics; Internal Medicine/Nephrology*), I. George Miller (*Pediatric Infectious Diseases; Epidemiology & Public Health*), Peter Moore (*Chemistry*), Thomas Pollard (*Molecular, Cellular & Developmental Biology*), Anna Pyle, Charles Radding (*Emeritus, Genetics*), Lynne Regan, Frederic Richards (*Emeritus*), Gaston Schmir (*Emeritus*), Robert Shulman (*Emeritus*), Sofia Simmonds (*Emeritus*), Michael Snyder (*Molecular, Cellular & Developmental Biology*), Dieter Söll, Joan Steitz, Thomas Steitz, Scott Strobel, William Summers (*Therapeutic Radiology*), Patrick Sung, Kenneth Williams (*Adjunct, Research*)

### *Associate Professors*

Susan Baserga, Enrique De La Cruz, Mark Gerstein, Lise Heginbotham, Michael Koelle, Anthony Koleske, Andrew Miranker, Mark Solomon, Vinzenz Unger, Sandra Wolin (*Cell Biology*)

### *Assistant Professors*

Thomas Biederer, João Cabral, Yorgo Modis, Elizabeth Rhoades, 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 inter-departmental 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 650a and 651b, 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 strongly encouraged to take (or to have taken the equivalent of) the core graduate courses offered by the department in biochemistry, molecular genetics, and structural biology (MB&B 705a, 720a, 721b, 730a, 743b). 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 attend the two departmental seminars: MB&B 675a, Seminar for First-Year Students, and 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 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. 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, are (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. 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 page 464). 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 is encouraged but not required. With DGS approval, 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 are not admitted for this degree.

*M.S.* May be awarded to a student 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.

*M.S. (for industrial affiliates).* Scientists working in industry may attend courses and conduct research projects leading to the M.S. degree. Information may be obtained from the director of graduate studies.

More detailed program materials are available upon request to the Director of Admissions, Department of Molecular Biophysics and Biochemistry, Yale University, PO Box 208114, New Haven CT 06520-8114.

### *Courses*

[MB&B 523a, Biological Physics.]

**MB&B 600a<sup>U</sup>, Principles of Biochemistry I.** Michael Koelle, Thomas Biederer.

TRH 11.30–12.45

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.

**MB&B 601b<sup>U</sup>, Principles of Biochemistry II.** Scott Strobel, Nigel Grindley, Anthony Koleske.

TTH 11.30–12.45

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.

**MB&B 602a, Molecular Cell Biology.** Sandra Wolin, Mark Solomon, Vinzenz Unger, and staff.

MW 1.45–3

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. *Also CBIO 602a, MCDB 602a.*

**MB&B 625a<sup>U</sup>, Basic Concepts of Genetic Analysis.** Tian Xu, Michael Koelle, and staff.

MW 11.30–12.45

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. *Also GENE 625a, MCDB 625a<sup>U</sup>.*

**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. *Also MCDB 630b.*

**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 660Lb<sup>U</sup>, Laboratory for Biochemistry and Biophysics.** Alan Garen, William Konigsberg, Aruna Pawashe.

TTH 1–5

An intensive introduction to the principles and applications of experimental techniques currently used in biochemistry, biophysics, and molecular biology. Prerequisite: biochemistry (may be taken concurrently). Preregistration required; e-mail Alan Garen by the end of reading period in the fall term.

**MB&B 675a, Seminar for First-Year Students.** Andrew Miranker, Thomas Biederer.

F 4

Required for all first-year MB&B graduate students.

**MB&B 676b, Responsible Conduct of Research.** Thomas Biederer and staff.

F 4

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.

**MB&B 705a<sup>U</sup>, Molecular Genetics of Prokaryotes. Nigel Grindley, Patrick Sung.**

MW 11.30–12.45

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Required: previous or concurrent introductory courses in genetics and biochemistry. *Also GENE 705a, MCDB 505a.*

**MB&B 710b4, Electron Cryo-Microscopy for Protein Structure Determination.**

Fred Sigworth, Vinzenz Unger.

TTh 9–10.15

Understanding cellular function requires structural and biochemical studies at an ever-increasing level of complexity. The course is an introduction to the concepts and applications of high-resolution electron cryo-microscopy. This rapidly emerging new technique is the only method that allows biological macromolecules to be studied at all levels of resolution from cellular organization to near atomic detail. *Also C&MP 710b.*

**MB&B 720a<sup>U</sup>, Macromolecular Structure and Biophysical Analysis.**

Andrew Miranker, João Morais Cabral, Anna Pyle.

TTh 11.30–12.45

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.

**MB&B 721b<sup>U</sup>, Macromolecular Interactions and Dynamic Properties. Anna Pyle,**

Enrique De La Cruz, Donald Engelman.

MW 11.30–12.45

This 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.

**MB&B 730a, Methods and Logic in Molecular Biology. Mark Solomon,**

Anthony Koleske, Lynne Regan.

TTh 5–8

This 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.

**MB&B 743b<sup>U</sup>, Advanced Eukaryotic Molecular Biology. Mark Hochstrasser,**

Anthony Koleske.

TTh 11.30–12.45

Selected topics in regulation of chromatin structure and remodeling, mRNA processing, mRNA stability, translation, protein degradation, DNA replication, DNA repair, site-specific DNA recombination, somatic hypermutation. Prerequisite: biochemistry or permission of the instructor. *Also GENE 743b, MCDB 743b.*

**MB&B 749a<sup>U</sup>, Medical Impact of Basic Science. Lynne Regan, Mark Hochstrasser,**

Andrew Miranker, Patrick Sung.

TTh 1–2.15

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. *Also GENE 749a.*

**MB&B 750a2, Biological Membranes.** Thomas Biederer, Donald Engelman.

TTH 10–11.15

Biological membranes and their resident proteins are essential for cellular function; yet comparatively little is known about their structure and dynamics. This class provides an introduction to the biochemistry and biophysics of lipids, lipid bilayers, and lipid-derived second messengers. In addition, structural as well as functional aspects of the different classes of membrane proteins are discussed along with an outline of experimental approaches used to achieve an understanding of membrane protein structure and function at a molecular level. Prerequisite: biochemistry.

**MB&B 752a<sup>U</sup>, Genomics and Bioinformatics.** Dieter Söll, Mark Gerstein, Michael Snyder.

MW 1–2.15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, comparative genomics, geometric analysis of protein structure, and macromolecular simulation. Prerequisite: EEB 122b and MATH 115, or permission of the instructor. *Also CB&B 752a, CPSC 752a<sup>U</sup>, MCDB 752a<sup>U</sup>.*

**MB&B 760b3<sup>U</sup>, Principles of Macromolecular Crystallography.** João Morais Cabral, Thomas Steitz.

TTH 9–10.15

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. Prerequisites: physical chemistry and biochemistry.

**MB&B 761b4, X-Ray Crystallography Workshop.** Yong Xiong, João Morais Cabral, Yorgo Modis, and staff.

HTBA

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 multiwavelength anomalous diffraction and molecular replacement, solvent flattening, non-crystallographic 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. Prerequisites: MB&B 760b3 and a working exposure to the Unix operating system.

**MB&B 765b<sup>U</sup>, Enzyme Mechanisms.** Enrique De La Cruz, Gary Brudvig, Anna Pyle, Thomas Steitz.

MW 9–10.15

An advanced course on the structure, function, and reaction mechanisms of protein and nucleic acid enzymes. The course covers the theoretical and practical aspects of steady-state and transient kinetic methods, kinetic isotope effects and transition-state theory, with emphasis on how these methods in combination with high-resolution structures have provided a molecular understanding of the catalytic strategy of enzymes. Topics include mechanisms of

the classic metabolic enzymes; molecular motors, polymerases, and machines; electron transfer, redox enzymes, and their higher-order complexes; ribozymes and DNA enzymes; and the design and selection of novel enzymes. Prerequisites: physical chemistry and biochemistry.

**MB&B 800a, Advanced Topics in Molecular Medicine.** Susan Baserga, William Konigsberg, George Miller, and staff.

M II—I

This seminar course, which covers topics in the molecular mechanisms of disease, illustrates timely issues in areas such as protein chemistry and enzymology, intermediary metabolism, nucleic acid biochemistry, gene expression, and virology. M.D. and M.D./Ph.D. students only. Prerequisite: biochemistry (may be taken concurrently).

**MB&B 900a or 901b, Reading Course in Biophysics.** Mark Solomon.

Directed reading course in biophysics. Term paper required. By arrangement with faculty.

**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.

**MB&B 904a or 905b, Reading Course in Biochemistry.** Mark Solomon.

Directed reading course in biochemistry. Term paper required. By arrangement with faculty.

*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, 432.3538

M.S., Ph.D.

### *Chair*

Thomas Pollard

### *Director of Graduate Studies*

Shirleen Roeder (804 KBT, 432.3501, shirleen.roeder@yale.edu)

### *Professors*

Sidney Altman, Kim Bottomly (*Immunology*), Ronald Breaker, John Carlson, Lynn Cooley (*Genetics*), Stephen Dellaporta, Xing-Wang Deng, Paul Forscher, 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*), Steven Segal (*Cellular & Molecular Physiology*), Michael Snyder, Robert Wyman

### *Associate Professors*

Craig Crews, Savithramma Dinesh-Kumar, Frank Slack, Hugh Taylor (*Obstetrics/Gynecology*), Weimin Zhong

### *Assistant Professors*

Martín García-Castro, Scott Holley, Christine Jacobs-Wagner, Elke Stein, David Wells

### *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, 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 track, 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. 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.

### *Honors Requirement*

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see page 464).

### *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](http://info.med.yale.edu/bbs)), MCGD Track.

### Courses

**MCDB 500a<sup>U</sup>, Biochemistry.** L. Nicholas Ornston, Ronald Breaker, Donald Engelman.

MWF 9.30–10.20

An introduction to the biochemistry of animals, plants, and microorganisms, emphasizing the relations of chemical principles and structure to the evolution and regulation of living systems.

**MCDB 505a, Molecular Genetics of Prokaryotes.** Nigel Grindley, Patrick Sung, and staff.

MW 11.30–12.45

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. *Also* GENE 705a, MB&B 705a<sup>U</sup>.

**MCDB 530a<sup>U</sup>, Biology of the Immune System.** Sankar Ghosh and staff.

MWF 9.30–10.20

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens; autoimmunity. *Also* IBIO 530a.

**MCDB 550a<sup>U</sup>, Physiological Systems.** Mark Saltzman and staff.

MWF 9.30–10.20

Regulation and control in biological systems, emphasizing human physiology and principles of feedback. The physiology of membranes and membrane transport systems is discussed. The cellular and molecular principles of organ and tissue physiology are explained by coverage of major human physiological systems, including renal, cardiovascular, respiratory, endocrine, digestive, and nervous systems. *Also* C&MP 550a, ENAS 550a<sup>U</sup>.

**MCDB 555a<sup>U</sup>, Molecular Basis of Development.** Xing-Wang Deng, Martín García-Castro, Frank Slack, Weimin Zhong.

TTh 2.30–3.45

Current understanding of the molecular mechanism of cell signaling and development in multicellular organisms. Topics include the basics of cell signaling and experimental model organisms, cell proliferation and death, cell specification and determination, cell migration, hormonal regulation, and environmental regulation.

**MCDB 560b<sup>U</sup>, Cellular and Molecular Physiology: Molecular Machines in Human Disease.** Emile Boulpaep, Michael Caplan, Mark Mooseker.

MWF 9.30–10.20

This course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiologic 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 physiologic 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. *Also C&MP 560b, ENAS 570b<sup>U</sup>.*

**MCDB 570b<sup>U</sup>, Biotechnology.** Michael Snyder, Kenneth Nelson, Joseph Wolenski, Eugene Davidov.

MW 11.30–12.45

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, industrial agents, or for the further study of biological systems.

**MCDB 600Lb, Advanced Biological Techniques.** Michael Snyder, Xing-Wang Deng, Martin Garcia-Castro, Kenneth Nelson, Joseph Wolenski, David Austin.

MW 1–5

A laboratory course to familiarize graduate students with state-of-the-art technologies in molecular biology, genomics. Students carry out research projects and incorporate their own projects into the lab. The class meets for two afternoons each week and consists of 2–3 week modules covering the following topics: microarray analysis, plant genetic engineering, mouse genetic engineering, imaging/microscopy, ribozyme enzymol/engineering, phage display/chemical biology.

**MCDB 602a, Molecular Cell Biology.** Sandra Wolin, Thomas Pollard, Graham Warren.

MW 1.45–3

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. *Also CBIO 602a, MB&B 602a.*

**MCDB 603a, Seminar in Molecular Cell Biology.** Sandra Wolin, Thomas Pollard, Graham Warren.

603a-1: Th 9–10.30

603a-2: Th 10.30–12

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. *Also CBIO 603a.*

**MCDB 625a<sup>U</sup>, Basic Concepts of Genetic Analysis.** Tian Xu, Michael Koelle, Richard Lifton, Shirleen Roeder, Michael Stern, Kevin White.

MW 11.30–12.45

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. *Also GENE 625a, MB&B 625a<sup>U</sup>.*

**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. *Also MB&B 630b.*

**MCDB 642a, Roles of Microorganisms in the Living World. L. Nicholas Ornston, Diane McMahon-Pratt, Dieter Söll.**

TTh 11.30–12.45

A topical course exploring the biology of microorganisms. Emphasis on mechanisms underlying microbial adaptations and how they influence biological systems. *Also EMD 642a, GENE 642a, MBIO 642a.*

**MCDB 660a, Structure, Function, and Development of Vascular Plants. Graeme Berlyn.**

TTh 2.30–3.45

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.

**MCDB 670b, Advanced Seminar in Biochemistry and Genetics. Sidney Altman, Ronald Breaker, Stephen Dellaporta, Frank Slack.**

W 1.30–3.45

New aspects of the molecular biology of RNA, ribonucleoproteins, and prions. Topics include the localization and function of RNA and ribonucleoproteins; the role of RNA in dosage compensation, chromosome silencing, and gene regulation; novel ribozymes and RNA technology; prions. Discussion; involvement and attendance are required.

**MCDB 677b, Mechanisms of Development. Lynn Cooley, Xing-Wang Deng, Valerie Reinke, Frank Slack, Michael Stern.**

M 9.45–11, F 2–3.15

An advanced course on the mechanisms of animal development focusing on the genetic specification of cell organization and identity during embryogenesis and somatic differentiation. The use of evolutionarily conserved signaling pathways to carry out developmental decisions in a range of animals is highlighted. Course work includes student presentations, critical analysis of primary literature, and a research proposal term paper. *Also GENE 777b.*

**MCDB 720a<sup>U</sup>, Neurobiology. Haig Keshishian, Paul Forscher.**

MWF 11.30–12.20

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. *Also NBIO 720a, NSCI 720a.*

**MCDB 721La<sup>U</sup>, Laboratory for Neurobiology. Haig Keshishian, Robert Wyman.**

T or W 1.30–6

Optional laboratory. Introduction to the neurosciences. Projects include the study of neuronal excitability, sensory transduction, CNS function, synaptic physiology, and neuroanatomy.

**MCDB 735b<sup>U</sup>, Seminar in Brain Development and Plasticity. Weimin Zhong, Elke Stein.**

MW 2.30–3.45

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. *Also NSCI 504b.*

**MCDB 743b, Advanced Eukaryotic Molecular Biology. Mark Hochstrasser, Patrick Sung.**

TTh 11.30–12.45

Selected topics in regulation of chromatin structure and remodeling, mRNA processing, mRNA stability, translation, protein degradation, DNA replication, DNA repair, site-specific

DNA recombination, somatic hypermutation. Prerequisite: biochemistry or permission of the instructor. *Also* GENE 743b, MB&B 743b<sup>II</sup>.

**MCDB 750b, Core Topics in Biomedical Informatics.** Perry Miller and staff.

HTBA

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, interoperability 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. Prerequisite: previous computer programming experience and permission of the instructor. *Also* CB&B 750b.

**MCDB 752a<sup>II</sup>, Genomics and Bioinformatics.** Dieter Söll, Mark Gerstein, Michael Snyder.

MW 1–2.15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, geometric analysis of protein structure, and macromolecular simulation. *Also* CB&B 752a, CPSC 752a<sup>II</sup>, MB&B 752a<sup>II</sup>.

**MCDB 861b<sup>II</sup>, Global Problems of Population Growth.** Robert Wyman.

TRH 2.30–3.45

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.

**MCDB 900a, First-Year Introduction to Research.** Shirleen Roeder.

Lab rotations, grant writing, and ethics for Molecular Cell Biology, Genetics, and Development track students. *Also* CBIO 900a, GENE 900a.

**MCDB 901b, First-Year Introduction to Research.** Michael Stern, Carl Hashimoto.

Lab rotations, seminars for Molecular Cell Biology, Genetics, and Development track students. *Also* CBIO 901b, GENE 901b.

**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 their 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

143 Elm, 432.2985  
M.A., M.Phil., Ph.D.

### *Chair*

Patrick McCreless

### *Director of Graduate Studies*

Daniel Harrison (143 Elm, 432.2985, daniel.harrison@yale.edu)

### *Professors*

Richard Cohn, Margot Fassler, Michael Friedmann (*Adjunct*), Daniel Harrison, James Hepokoski, Patrick McCreless, Ellen Rosand, Craig Wright

### *Associate Professors*

Kathryn Alexander (*Adjunct*), David Clampitt, Robert Fink (*Visiting* [F]), Richard Lalli (*Adjunct*), Michael Veal

### *Assistant Professors*

Seth Brodsky, Gundula Kreuzer, Ian Quinn, Sarah Weiss

### *Fields of Study*

Fields include music theory and music history. (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 sixteen courses, are normally required, twelve of which must be graduate seminars offered within the Department of Music. Students in the music theory program must pass examinations in two foreign languages: German and normally French, Latin, or Italian. For students in the music history program, German and two other languages are required. Language examinations, with dictionary, are administered at the beginning of each term. A musicianship exam (ear training, keyboard, and basic theory and analysis) is given to all entering students. Admission to candidacy for the Ph.D. must occur before the end of the third year of study. It is granted if the student has received a grade of Honors in four term department seminars, has passed the language and qualifying examinations, and has submitted an acceptable dissertation prospectus. The departmental qualifying examination is given near the beginning of the

third year. Students attend a weekly prospectus/dissertation seminar during the third year of study. Before the end of that year, the student must submit a dissertation prospectus for faculty approval.

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 also 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.

*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.

Program materials are available upon request to the Director of Graduate Studies, Department of Music, Yale University, PO Box 208310, New Haven CT 06520-8310.

### *Courses*

#### **MUSI 510a, On Meaning and Music in World Religions. Philip Bohlman.**

W 1.30–3.20

With this seminar we examine the ways in which world music reflects fundamental theological concepts in world religions. We take as our point of departure that music affords humans throughout the world different ways of being in the world and understanding the sacred dimensions of life and death. Whereas Western religions are integrated into the course for comparative reasons, our focus is directed beyond primarily European and North American religious experience. Course topics unfold in such a way that we call into question traditional assumptions of what music is and how its performance becomes a vessel for expressing human interaction with the sacred. Both textual (e.g., prayer, liturgy, congregational song) and contextual (e.g., pilgrimage, ritual) practices of music are crucial to our discussion. *Also REL 843.*

#### **MUSI 532a, Practicum in German Translation. Gundula Kreuzer.**

F 9.30–11.30

Intensive work in translating German, using texts in music history and theory drawn from a broad range of historical periods. The practicum considers various theories of translation and practices different strategies for gaining facility in both quick paraphrase and accurate and idiomatic scholarly translation. Prerequisite: an elementary course in German or the equivalent.

lent knowledge. This course may supplement but cannot replace one of the three required departmental seminars offered this term. It may be taken in preparation of the German exam but can also benefit students wishing to keep up their language skills, particularly those who will need more expertise in German for their dissertation research.

**MUSI 804a, Music, Liturgy, and Historiography in Medieval England.**

**Margot Fassler.**

M 1.30–3.30

The seminar offers an introduction to medieval musical and liturgical sources, structures, and genres, using English materials from the eleventh through the fourteenth century. It welcomes students into the scriptoria and classrooms of medieval cantors — the figures responsible for the music, liturgy, and history writing in most centers — and examines how they formulated liturgical structures, managed the “timescape,” wrote and produced codices, taught liturgical music, created characters through saints’ lives, and used music and liturgy to shape historical understanding and promote particular political and religious agendas.

**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 825b, The Operas of Vivaldi. Ellen Rosand.**

T 1.30–3.30

Vivaldi was celebrated in his own day as much for his operas (more than fifty) as for his concertos (more than 500). Yet musicological scholarship has only recently begun to do justice to the theatrical works. Editions and recordings have accumulated over the past decade to the point where many of the operas are now available for critical scrutiny. The seminar considers several individual works within the context of eighteenth-century *opera seria*. It investigates issues of borrowing, pasticcio, recycling, and revision that characterize Vivaldi’s operatic output and the implications of such creative expedients for interpretation.

**MUSI 835a, Theorizing the Classical Music Canon: Rise and Fall. Robert Fink.**

Th 1.30–3.30

Academic musicology has become aware of the ideology of the “canon” in classical music precisely at the moment of its irreversible decline. If we do indeed inhabit a “postclassical” or “postcanonic” moment in the history of Western art music, it is also a uniquely opportune moment to examine the rise and fall of the idea of a canon in Western classical music. Hierarchies of taste have been most influentially theorized in recent sociology of culture, and the seminar begins by investigating the challenging anti-canonic work of Pierre Bourdieu. After a wide-ranging general survey of what canon means in such disciplines as religious and biblical studies, literature, and art history, we examine the matrix within which our eighteenth- and early nineteenth-century idea of a “classical music” arose and trace the concomitant rise of the classical canon as a performing repertoire. Finally, we examine recent stinging critiques of classical music institutions and their inherent cultural contradictions and, on the other hand, evaluate a growing shelf of booklength apologias for classical music in a postclassical era.

**MUSI 840b, Composing at the Turn of the Millennium: Who’s Keeping Score?**

**Seth Brodsky.**

Th 1.30–3.30

What is the current cultural position of the living composer, as a writer of musical works and an heir of the “literate tradition,” at the turn of the millennium? How do musical texts of the last decade help us to engage this question? In this seminar we look at some of the newest scores from composers, including (but not limited to) Adams, Adès, Boulez, Golijov,

Gubaidulina, Lang, Neuwirth, Rihm, and Sciarrino. We examine these texts from multiple theoretical, analytical, and critical perspectives, including: the problematics of the work-concept (Goehr), Adorno's continuing relevance (or lack thereof) to new music, issues of orality and literacy (Derrida, Ong), and the cultural machines of aesthetic autonomy (Bourdieu, Ziporyn).

**MUSI 850a, Sonata Theory. James Hepokoski.**

W 9.30–12

A course in practical analysis, introducing the techniques, concepts, and terminology of a single methodology. Sonata Theory is a genre-based approach to analyzing sonata form and the multimovement sonata, ca. 1770–1820, and its principles are adaptable to sonata-based structures throughout the ensuing century. The method is grounded in a theory of dialogical form, entailing an examination of hierarchies of compositional options and principles of deviation from those options. The seminar includes a consideration of fundamental issues involved in sonata hermeneutics. Basic texts: Hepokoski-Darcy, *Elements of Sonata Theory* (2006), and selected scores of Haydn, Mozart, Beethoven, and others.

**MUSI 902a, Post-Tonal Analysis. Michael Friedmann.**

T 10–12

Introduction to a range of approaches to the analysis of post-tonal twentieth-century music. The theoretical core material is set theory, which finds its primary application in analyzing pitch structures and transformational processes but also deals with rhythm and contour. Critical readings of theory and analysis are complemented by the study of works by Schoenberg, Webern, Stravinsky, Bartók, Varèse, and others.

**MUSI 904a, The Pedagogy of Music Theory. Daniel Harrison.**

M 10–12

An examination of various “systems of presentation” (Schoenberg) for material common to music theory courses at the college level. Various current texts and approaches are evaluated, rehearsed, and critiqued, and their role in the curricula of both liberal-arts and conservatory degree programs is considered. Some historical methods are also surveyed in connection with the history of institutional music instruction. Special problems in the teaching of music are covered: aural and keyboard skills, tutorial and private lessons, the appropriate role of technology, and introductory approaches useful for general students (those without previous formal training).

**MUSI 906b, Tonality: Syntax, Cognition, History. Ian Quinn.**

T 10–12

The seminar investigates the cognitive dimensions of harmonic tonality by studying musical phenomena, the conceptual frameworks with which they coevolved, and the mental processes they engage. Readings are drawn from historical sources (including treatises by Rameau, Kirnberger, Fétis, and Riemann, and a selection of thoroughbass manuals) and modern sources (including Dahlhaus, Lerdahl, Krumpholtz, Brown, and Harrison). Techniques in software-assisted corpus analysis such as those employed by Huron and Temperley are also explored.

**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 931b, Critical Approaches to Popular Music. Michael Veal.**

W 3:30–5:30

A survey of current scholarly approaches to popular music scholarship, including work associated with the Frankfurt and Birmingham schools, the disciplines of cultural anthropology and ethnomusicology, and the practice of music journalism. The seminar focuses on history, criticism, and interpretation and also contains a music analytical component.

**MUSI 950b. Shostakovich. Patrick McCreless.**

M 1:30–3:30

The seminar develops an understanding of Shostakovich's musical *œuvre*, focusing on a number of central works. We achieve a balance between critical and analytical approaches, between consideration of the composer's whole output and detailed consideration of individual pieces, and between a study of cultural context and a study of the music itself.

**MUSI 998a, Prospectus Workshop. Ellen Rosand.**

T 4–5:30

**MUSI 999b, Dissertation Colloquium. Ellen Rosand.**

T 4–5:30

## NEAR EASTERN LANGUAGES AND CIVILIZATIONS

314 Hall of Graduate Studies, 432.2944

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

### *Chair*

John Darnell

### *Director of Graduate Studies*

John Darnell (320 HGS, 432.2159, john.darnell@yale.edu)

### *Professors*

John Darnell, Benjamin Foster, Beatrice Gruendler, Dimitri Gutas, Bentley Layton, Harvey Weiss

### *Assistant Professors*

Eckart Frahm, Colleen Manassa, Hala Kh. Nassar

### *Lecturers*

Adel Allouche, Karen Foster, Kathryn Slanski

### *Senior Lectors*

Fereshteh Amanat-Kowssar, Ayala Dvoretzky, Bassam Frangieh

### *Lectors*

Muhammad Aziz, Shiri Goren, Robert Hawley, Ghassan Husseinali, Elizabeth Susan Kassab (*Visiting*), Nihan Ketrez, Boutheina Khaldi, Yechiel Schur

### *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, e.g., for native speakers of French or German, may be made by the department upon recommendation of the director of graduate studies.

### *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 Medicine and Science, Judaic Studies, Italian, Linguistics, Medieval Studies, Political Science and Sociology, Philosophy, Religious Studies, Spanish and Portuguese, or others, by permission of the director of graduate studies. 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 director of graduate studies 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.

*M.A.* Applicants who do not wish to enroll in the Ph.D. program may pursue a Master of Arts degree. Students enrolled in such 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.

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<sup>U</sup>, Elementary Akkadian.** Elizabeth Payne.

MWF 11.30–12.45

**AKKD 502, Advanced Akkadian.** Benjamin Foster.

M 2.30–4.20

**AKKD 505a, Historical and Archival Texts from Assyria.** Eckart Frahm.

Th 2–4

Reading of royal inscriptions, letters, and other texts from the Neo-Assyrian period.

**AKKD 504b, Second-Millennium Legal and Archival Texts.** Kathryn Slanski.

Th 2–4

**AKKD 506b, Selected Mesopotamian Texts: Bilingual.** Eckart Frahm.

T 2–4

Reading of Sumero-Akkadian historical and literary texts, incantations, and laments.

**[AKKD 544b, Mesopotamian Selected Texts: Scholarly Texts.]**

**ARBC 501<sup>U</sup>, Elementary Modern Standard Arabic.** Muhammad Aziz [501-1,2], Ghassan Husseinali [501-3].

501-1: MTWThF 1.30–2.20

501-2: MTWThF 12.30–1.20

501-3: MTWThF 3.30–4.45

Develops a basic knowledge of modern standard Arabic. Emphasis on grammatical analysis, vocabulary acquisition, and the development of reading and writing skills.

**ARBC 502<sup>U</sup>, Spoken Modern Standard Arabic.** Muhammad Aziz [502-1,2], Ghassan Husseinali [502-3].

502-1: TTh 2.30–3.45

502-2: WF 2.30–3.45

502-3: MF 3.30–4.45

A supplement to the elementary course in modern standard Arabic, emphasizing oral skills. Prerequisite: ARBC 501<sup>U</sup>.

**ARBC 503<sup>u</sup>, Intermediate Modern Standard Arabic. Boutheina Khaldi.**

503-1: MTWThF 1.30–2.20

503-2: MTWThF 12.30–1.20

Intensive review of grammar; readings from contemporary and classical Arab authors with emphasis on serial reading of unvoweled Arabic texts, prose composition, and formal conversation. Prerequisite: ARBC 501.

**ARBC 504<sup>u</sup>, Advanced Modern Standard Arabic. Ghassan Husseinali.**

TTh 1–2.15

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 503 or permission of instructor.

**ARBC 505a<sup>u</sup> or b<sup>u</sup>, Arabic Seminar. Dimitri Gutas [F], Beatrice Gruendler [Sp].**

T 3.30–5

Study and interpretation of classical Arabic texts for advanced students. Prerequisite: ARBC 504.

**ARBC 506b<sup>u</sup>, Modern Arabic Seminar. Bassam Frangieh.**

506b-1: TTh 1.30–3.20

506b-2: TTh 3.30–5.20

Study and interpretation of modern Arabic prose and poetry for advanced students. Prerequisite: ARBC 504.

[ARBC 511a, Greco-Arabic Seminar.]

[ARBC 514<sup>u</sup>, Introduction to Judeo-Arabic.][ARBC 552b<sup>u</sup>, Gender and Nationalism in Arab Women's Literature.]

[ARBC 564b, Poetic Motif and Literary Theft.]

[ARBC 572b<sup>u</sup>, Greek into Arabic into Latin: Foundations of Western Culture.]

[ARBC 573b, Introduction to Medieval Arabic Literary Criticism.]

ARBC 849a or b, Directed Readings: Arabic. Staff.

[CPTC 501<sup>u</sup>, Biblical Coptic: Elementary Course.]**CPTC 502b<sup>u</sup>, Introduction to Gnostic Texts in Coptic. Bentley Layton.**

MW 2.30–3.15

Readings in Gnostic and Valentinian literature from Nag Hammadi, in several dialects of Coptic. Prerequisite: CPTC 501 or equivalent. *Also RLST 653b<sup>u</sup>.*

**CPTC 503a<sup>u</sup>, Egyptian Monastic Literature in Coptic. Bentley Layton.**

MW 2.30–3.15

Readings in the early Egyptian classics of Christian asceticism in Sahidic Coptic, including the desert Fathers and Shenoute. Prerequisite: CPTC 501 or equivalent. *Also RLST 658a<sup>u</sup>.*

**EGYP 501<sup>u</sup>, Introduction to Classical Hieroglyphic Egyptian. David Klotz.**

TTh 9–10.15

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.

**EGYP 502a<sup>u</sup>, Intermediate Egyptian I: Literary Texts. Colleen Manassa.**

Th 2.30–4.20

Close reading of Middle Egyptian literary texts, and introduction to hieratic (cursive) Egyptian script. Readings include the Middle Kingdom stories of *Sinuhe* and *The Eloquent Peasant* and excerpts from wisdom literature. Prerequisite: EGYP 501.

**EGYP 502b<sup>u</sup>, Intermediate Egyptian II: Historical Texts. Colleen Manassa.**

Th 2.30–4.20

Close reading of Middle Egyptian historical texts in original hieroglyphic script. Initial survey of ancient Egyptian historiography and grammatical forms peculiar to this genre of texts. Prerequisite EGYP 501.

[EGYP 566b, Late Period Historical Texts: Napatan Historical Inscriptions.]

[EGYP 567b, Temple Inscriptions: Medinet Habu.]

[EGYP 577a, Egyptian Rock Inscriptions.]

**EGYP 578a, The Egyptian Netherworld Books. John Darnell.**

M 3.30–5.20

Study of the Underworld texts from the royal tombs of the New Kingdom. Readings from the *Amduat*, the *Book of Gates*, the *Book of Caverns*, the *Book of the Creation of the Solar Disk*, the *Book of the Day and the Night*, the cryptographic *Books of the Solar-Osirian Unity*, the *Book of the Heavenly Cow*, and the *Book of Nut*. Discussions of the significance of these texts for understanding Egyptian religion, and the possible contributions of these compositions to the Hermetica and Christian Gnosticism.

**EGYP 591b, Ancient Egyptian Love Poetry. John Darnell.**

M 3.30–5.20

Egyptian love poetry, concentrating on the major documents. Most readings in hieratic, with discussions of the grammar of literary Late Egyptian, its relationship to non-literary Late Egyptian and late Middle Egyptian. Readings in comparative texts and investigation of iconographic parallels.

**HEBR 501<sup>u</sup>, Elementary Modern Hebrew. Ayala Dvoretzky [501-1], Shiri Goren [501-2].**

501-1: MTWThF 9.30–10.20

501-2: MTWThF 3.30–4.20

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.

**HEBR 502<sup>u</sup>, Intermediate Modern Hebrew. Ayala Dvoretzky [502-1], Yechiel Schur [502-2].**

502-1: MW 11.30–12.45, I HTBA

502-2: TTh 2.30–3.45, I HTBA

Continuation of modern Hebrew, with literary readings selected from contemporary prose and verse. Review and continuation of grammatical study leading to a deeper comprehension of style and usage, under the guidance of a native speaker. Prerequisite: HEBR 501<sup>u</sup> or equivalent.

**HEBR 503a, Advanced Modern Hebrew. Shiri Goren.**

MW 1–2.15

Ideological and social discourse. An examination of major controversies in Israeli society. Readings include newspaper editorials and academic articles as well as documentary and his-

tory-related material. Advanced grammatical structures are introduced and practiced. Conducted in Hebrew. Prerequisite: HEBR 502<sup>U</sup> or equivalent.

**HEBR 504b<sup>U</sup>, Introduction to Modern Israeli Literature.** Ayala Dvoretzky.

MW 1–2.15

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<sup>U</sup> or equivalent.

**HEBR 505a, Contemporary Israeli Society in Film.** Shiri Goren.

MW 1–2.15

Examination of major themes in Israeli society through film, with emphasis on language instruction. Topics include migration, gender and sexuality, Jewish/Israeli identity, and private and collective memory. Readings in Hebrew and English for socio-historical background and bases for class discussion.

**HEBR 507b, Medieval Commentaries on the Pentateuch.** Yechiel Schur.

TTh 9–10.15

Readings from commentaries on the Pentateuch by medieval Jewish writers, with attention to the methodological and metaphysical assumptions of commentators. Close study of word usage, grammatical concepts, and the development of the Hebrew language.

**HEBR 508a, Reading Medieval Hebrew Texts.** Yechiel Schur.

TTh 9–10.15

Readings from medieval Hebrew texts in a variety of genres such as prose, poetry, tomb inscriptions, legal texts, Hebrew translations, and philosophical treatises.

**HEBR 509b, Reading Academic Texts in Modern Hebrew.** Yechiel Schur.

TTh 1–2.15

This course addresses the linguistic needs of English-speaking students who would like to be able to read with ease and accuracy contemporary Hebrew-language scholarship in the fields of Judaic studies, history, political science, sociology, Near Eastern studies, and other related fields. In particular, this course confronts reading comprehension problems through straightforward exposition of the grammar supported by examples from scholarly texts.

[HEBR 513a<sup>U</sup>, Mishnaic Hebrew Grammar.]

[MESO 531, Beginning Sumerian.]

[MESO 532b, Intermediate Sumerian.]

**MESO 533a or b, Advanced Sumerian.** Benjamin Foster.

MW 2–4

[MESO 539a or b, Directed Readings: Sumerian.]

**MESO 543a, Neo-Assyrian History.** Eckart Frahm.

T 2–4

Introduction to the history of the Neo-Assyrian empire from ca. 1000 to 612 B.C.E.

[MESO 559a or b, Directed Readings: Assyriology.]

[MESO 571a or b, Tales from before Homer: An Introduction to Sumerian and Babylonian Literature.]

[MESO 572a or b, Prophecy in Mesopotamia.]

[MESO 573a or b, Neo-Babylonian and Late-Babylonian Texts.]

[NELC 503a, *The Art of Ancient Palaces.*]

**NELC 504a<sup>u</sup>, *Art of the Ancient Near East and Aegean.* Karen Foster.**

MW 2.30–3.45

Introduction to the art and architecture of Mesopotamia, Egypt, and the Aegean, with attention to cultural and historical contexts.

**NELC 506a, *History of Mesopotamia.* Benjamin Foster.**

W 2–4

Historical survey of Mesopotamia. Content varies from year to year, and the course may be repeated for credit.

**NELC 506b, *Israeli Identity and Culture.* Shiri Goren.**

TRH 1–2.15

Introduction to contemporary culture and representations of Israeli society. Reading focuses on themes of national and personal identity formation, gender, Zionism and Postzionism, the writings of women, Israeli-Palestinians, Russian immigrants, and Jews of North African origin.

**NELC 507b<sup>u</sup>, *Modern Arab Thought.* Elizabeth Susan Kassab.**

TH 3.30–5.20

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. *Also INRL 585b.*

**NELC 509b<sup>u</sup>, *The Age of Akhenaton.* John Darnell, Karen Foster.**

MW 11.30–12.45

Study of the unique period of Egyptian Pharaoh Akhenaton (reigned ca. 1353–1336 B.C.E.), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives, considered within their wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. The course examines the international diplomacy and solar theology of the period, and places the famous artistic developments of Akhenaton in context. Reading of primary source material in translation. *Also ARCG 744b<sup>u</sup>.*

[NELC 510a<sup>u</sup>, *Conflicts that Shaped Pharaonic Egypt.*]

[NELC 511b<sup>u</sup>, *Ancient Egypt from the Ramesside to the Ptolemaic Periods.*]

[NELC 512b<sup>u</sup>, *Egyptian Religion through the Ages.*]

**NELC 513, *Readings in Egyptian History.* Colleen Manassa.**

**NELC 515b, *The Bible in its Ancient Near Eastern Setting.* Eckart Frahm.**

MW 2.30–3.45

History of the Assyrian, Babylonian, and Persian empires of the first millennium B.C.E., and how their rise and fall influenced the politics, religion, and literary traditions of Biblical Israel. Topics include the role of prophecy and (divine) law, political and religious justifications of violence, the birth of monotheism, and the historical reliability of the Hebrew Bible.

[NELC 516a or b, *Mythology of the Ancient Near East.*]

[NELC 520a or b, *Parallel Worlds: Ancient Egypt and Mesopotamia.*]

[NELC 521b, *Seminar in the Philosophy of Avicenna.*]

**NELC 527<sup>u</sup>, *Structure of Modern Turkish.* Nihan Ketz.**

MW 11.30–12.20



**NELC 534a<sup>u</sup>, Seminar: The Making of Monasticism. Bentley Layton.**

T 1.30–3.20

The history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity, with special attention to the eastern Mediterranean world. *Also HIST 531a<sup>u</sup>, RLST 659a<sup>u</sup>.*

**NELC 544b, Mesopotamian Selected Texts: Bilingual. Eckart Frahm.**

T 2–4

Reading of Sumero-Akkadian historical and literary texts, incantations, and laments.

[NELC 545b, Neo-Babylonian.]

[NELC 551a<sup>u</sup>, East Meets West: Drama and Theater in the Arab World.]**NELC 563b, From Pictograph to Pixel: Changing Ways of Human Communication.**

John Darnell, Beatrice Gruendler, Michael Fischer.

TTh 11.30–12.45

An exploration of the five pivotal stages in the development of human communication throughout world history: pictographic and syllabic ways of writing, the consonantal or phonetic alphabet, the invention of paper, movable type, and acoustic/electronic/digital media and the Internet. These technologies are considered for their innovative features, new capabilities, social and ideological implications, and the instrumental roles they played in contemporary periods of change.

[NELC 566a, Late Period Historical Texts: Napatan Historical Inscriptions.]

**NELC 587b<sup>u</sup>, Environmental History of the Near East. Harvey Weiss.**

Th 9.30–11.20

Natural and anthropogenic climate and environmental changes of the Holocene studied in the lake, marine, and terrestrial records of West Asia. Periodic adaptations to these changes through the modern period within regional habitat-tracking, agricultural innovation and pastoralism, political expansion and disintegration, and ideological reformulation.

**NELC 588b<sup>u</sup>, Civilizations and Collapse. Harvey Weiss.**

Th 2.30–4.20

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. *Also ANTH 773b<sup>u</sup>, ARCG 773b<sup>u</sup>.*

**NELC 726a<sup>u</sup>, History of Christianity in the Ancient World: Jesus to Augustine.**

Bentley Layton.

The rise of Christianity and the development of Western culture into the Middle Ages, including the creation of Christian orthodoxy; religious, political, social, gender, literary, and theological history of Christian religion in many forms. No previous background assumed.

[NELC 735b<sup>u</sup>, Gnostic Religion and Literature].**NELC 736b, The Manichaean World Religion. Bentley Layton.**

W 4–6

Recent research on the world religion of Mani, founded in the third century. Its spread to Africa, Europe, the Middle East, and central Asia, as attested in text, art, and archaeology. An exploratory seminar, with no special prerequisites. Texts are read in modern translation. Grades of Satisfactory/Unsatisfactory are assigned.

[NELC 829a, History of the Arabic Language.]

**NELC 830a, From Medina to Constantinople: The Middle East from 600 to 1517. Adel Allouche.**

T 1.30–3.20

This 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.

*Also HIST 829a.*

**NELC 844b, Arabic Paleography. Adel Allouche.**

Th 1.30–3.20

**NELC 849a or b, Directed Readings: Arabic. Dimitry Gutas [F], Beatrice Gruendler [Sp].****NELC 850a, Introduction to Arabic and Islamic Studies. Dimitri Gutas.**

W 2.30–4.20

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.

**PERS 501<sup>U</sup>, Elementary Persian (Farsi). Fereshteh Amanat-Kowssar.**

MTWThF 9.30–10.20

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.

**PERS 502<sup>U</sup>, Intermediate Persian (Farsi). Fereshteh Amanat-Kowssar.**

MTWThF 10.30–11.20

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.

**[PERS 503a<sup>U</sup>, Persian Seminar: Identity and Change.]****PERS 504a, Thematic Survey of Modern Persian Literature.**

Fereshteh Amanat-Kowssar.

MW 11.30–12.45

A thematic survey course on Modern Persian literature. Themes such as depiction of women, minorities, the West and Westerners, language and society are looked at and discussed in work of writers such as Jalal Al-Ahmad, Sadeq Chubak, Simin Daneshvar, Sadiq Hedayat, and others. Course is offered for those who have completed PERS 502 or have equivalent proficiency.

**PERS 859a or b, Directed Readings: Persian.****SMTC 501b, Introduction to Comparative Semitics. Robert Hawley.**

HTBA

**SMTC 511, Introduction to Ugaritic. Robert Hawley.**

HTBA

**SMTC 521<sup>U</sup>, Elementary Syriac. Robert Hawley.**

HTBA

The Mesopotamian Christian form of Aramaic widely used in the Roman and Byzantine Near East. Thorough grounding in grammar and vocabulary as a basis for reading biblical, historical, poetic, and theological texts.

[SMTC 522a, Syriac Prose Texts.]

[SMTC 522b, Syriac Poetic Texts.]

**SMTC 531a<sup>u</sup>, Aramaic Survey I: First Millennium B.C.E. Robert Hawley.**

HTBA

This course introduces different dialects of Aramaic attested in the first millennium B.C.E. and consists of seminars in which prepared readings are analyzed and discussed with reference to historical and philological problems. Prerequisite: knowledge of Hebrew.

[SMTC 532b<sup>u</sup>, Aramaic Survey II: Dialects of the Common Era.]

[SMTC 542b, Ethiopic.]

**TKSH 501<sup>u</sup>, Elementary Turkish. Nihan Ketrez.**

MTWThF 10.30–11.20

Development of a basic knowledge of modern Turkish, with emphasis on grammatical analysis, vocabulary acquisition, and the training of reading and writing skills.

**TKSH 502<sup>u</sup>, Intermediate Turkish. Nihan Ketrez.**

TTh 11.3–12.45

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 instructor.

## NEUROBIOLOGY

C303 Sterling Hall of Medicine, 785.4323  
M.S., M.Phil., Ph.D.

### *Chair*

Pasko Rakic

### *Director of Graduate Studies*

Amy Arnsten (SHM B428, 785.4431, amy.arnsten@yale.edu)

### *Director of Medical Studies*

Michael Schwartz (SHM C327B, 785.4324, michael.schwartz@yale.edu)

### *Professors*

Amy Arnsten, Colin Barnstable, Benjamin Bunney, Pietro De Camilli, Nihal de Lanerolle, Joel Gelernter, Charles Greer, Tamas Horvath, Jeffery Kocsis, Robert LaMotte, Csaba Leranth, David McCormick, Pasko Rakic, Joseph Santos-Sacchi, Ilsa Schwartz, Gordon Shepherd, Stephen Strittmatter, Xiao-Jing Wang, Stephen Waxman

### *Associate Professors*

Meenakshi Alreja, Hal Blumenfeld, Charles Bruce, Sabrina Diano, Murat Gunel, Anthony Koleske, Daeyeol Lee, Marina Picciotto, Michael Schwartz, Ning Tian, Flora Vaccarino, Christopher van Dyck

### *Assistant Professors*

Stacy Castner, Wei Chen, Mark Laubach, Rick Matthews, James Mazer, Dhasakumar Navaratnam, Nenad Sestan, Graham Williams, Mark Yeckel

### *Fields of Study*

Fields include the development, neuronal organization, and function of the mammalian central nervous system. The range of methods includes molecular and cellular neurobiology, neuroanatomy, receptor biochemistry, neuropharmacology, neurophysiology, and behavior. An integrative, multidisciplinary approach is encouraged.

### *Special Requirements for the Ph.D.*

## 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 these six science courses, students must also take the Bioethics course.

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## LABORATORY ROTATIONS

Two rotations are required; 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 (NSCI 510). 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 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 and is proctored by the DGS. The student may refer to the papers and his/her notes but not to the Internet. The answers are distributed to the faculty, and several days later an oral exam is held to further evaluate the student's knowledge. A fifth faculty member (a reader) chosen by the student is also 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:

1. The student should discuss with his/her mentor an appropriate topic and research plan for the thesis proposal, as well as discuss likely names of faculty to serve on the thesis committee.
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 from 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.
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, it is hoped that students will convene the thesis committee meetings prior to August 1.

The student should meet with his/her thesis committee on a yearly basis to update progress and problems. A one-page summary of this meeting, signed by the mentor 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 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 3 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 DGS's 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 Medical School requirements.

*Year Seven:* Student completes all remaining requirements and graduates in May.

While this is considered a guideline for a typical M.D./Ph.D. student, we recognize that not every student will follow this path. Any digression from this timeline must be discussed and approved by the DGS, with appropriate notes to the student's file and copies to the M.D./Ph.D. office. Continued participation in the Neurobiology program is subject to the satisfactory completion of requirements in a timely fashion. If any question arises about the satisfactory progress of a student, and the qualifying examination committee or the thesis committee cannot agree on an appropriate resolution, then the Neurobiology faculty will meet to determine a course of action.

### *Master's Degrees*

*M.Phil.* See Degree Requirements under Policies and Regulations. Awarded only to students who are continuing for the Ph.D. degree. Students are not admitted for this degree.

*M.S.* Awarded only to students who are not continuing for the Ph.D. 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, 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. Each student may participate in a weekly physiology conference with a faculty member, covering such topics as vision, sensory physiology, motor systems, simple nervous systems, or general neurophysiology. 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. *Also NSCI 510b.*

**NBIO 501a, Principles of Neuroscience. Marina Picciotto, Mark Yeckel.**

WF 3.15–4.45

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. *Also NSCI 501a.*

**NBIO 502a, Structure and Function of Neocortex. Faculty.**

This seminar/lecture 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. Permission of instructor required.

**[NBIO 507b, Cellular and Molecular Mechanisms of Neurologic Disease.]****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. *Also NSCI 539b.*

**NBIO 510, 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 recombinant DNA technology, deoxyglucose metabolic method, fluorescent and immunocytochemical methods. Electron microscopy encompasses transmission, electronmicroscopic autoradiography, and immuno-peroxidase methodology. Choice of techniques and hours to be arranged with individual faculty or staff members of the Department of Neurobiology.

**NBIO 511, Introduction to Techniques Used in Electrophysiological Analysis at the Cellular Level. 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 or staff members of the Department of Neurobiology.

[NBIO 520a, Vision: Cellular and Network Dynamics of the Cerebral Cortex.]

[NBIO 524a, The Regulation of Cell Fate during CNS Development.]

[NBIO 530b, Neurobiology of Schizophrenia.]

**NBIO 535b, History of Modern Neuroscience. Gordon Shepherd.**

This course covers the rise of modern brain research during the twentieth century, with a focus on the classical work in and around the 1950s when the discoveries of DNA, the action potential, chemical and electrical synapses, synaptic potentials, second messengers, nerve growth factor, cortical columns, Hebbian synapses, REM sleep, the major bioactive drugs, hippocampus and memory, and more laid the foundations of modern neuroscience. The class studies the classical papers for insight into the fundamental problems that still define most of the research and concepts of brain research today. *Also NSCI 535b.*

**NBIO 550, Introduction to Neuroinformatics. Gordon Shepherd, Perry Miller, and staff.****NBIO 570a, Cellular and Network Dynamics of Sensory and Motor Functions. Charles Bruce and faculty.****NBIO 601, Topics in Olfactory Physiology. Gordon Shepherd.**

Advanced tutorial course.

**NBIO 610b, Fundamentals in Neurophysiology. Vincent Pieribone, Fred Sigworth.**

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

**NBIO 720a, Neurobiology. Haig Keshishian, Paul Forscher.**

MWF 11.30–12.20

Examination of the excitability of the nerve cell membrane provides a starting point for the study of molecular, cellular, and intracellular mechanisms underlying the generation and control of behavior. *Also MCDB 720a<sup>II</sup>, NSCI 720a.*

## NEUROSCIENCE

L-200 Sterling Hall of Medicine, 785.5932

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

### *Directors of Graduate Studies*

Haig Keshishian (*Molecular, Cellular & Developmental Biology*) (KBT 640, 432.3478,  
haig.keshishian@yale.edu)

Charles Greer (*Neurosurgery; Neurobiology*) (FMB 412, 785.4034,  
charles.greer@yale.edu)

### *Professors*

George Aghajanian (*Psychiatry; Pharmacology*), Amy Arnsten (*Neurobiology, Psychology*), Colin Barnstable (*Ophthalmology & Visual Science; Neurobiology*), Linda Bartoshuk (*Surgery; Psychology*), Walter Boron (*Cellular & Molecular Physiology*), Benjamin Bunney (*Psychiatry; Pharmacology; Neurobiology*), John Carlson (*Molecular, Cellular & Developmental Biology*), Marvin Chun (*Psychology*), Lawrence Cohen (*Cellular & Molecular Physiology*), Pietro De Camilli (*Cell Biology*), Ronald Duman (*Psychiatry; Pharmacology*), Barbara Ehrlich (*Pharmacology; Cellular & Molecular Physiology*), Paul Forscher (*Molecular, Cellular & Developmental Biology*), Charles Greer (*Neurosurgery; Neurobiology*), Marcia Johnson (*Psychology; Psychiatry*), Leonard Kaczmarek (*Pharmacology; Cellular & Molecular Physiology*), Haig Keshishian (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics; Molecular, Cellular & Developmental Biology; Psychiatry*), Jeffery Kocsis (*Neurology; Neurobiology*), Robert LaMotte (*Anesthesiology; Neurobiology*), Thomas Lentz (*Cell Biology*), Laura Manuelidis (*Neuropathology*), David McCormick (*Neurobiology*), Mark Mooseker (*Molecular, Cellular & Developmental Biology; Cell Biology; Pathology*), Angus Nairn (*Psychiatry; Pharmacology*), Pasko Rakic (*Neurobiology*), Robert Roth (*Psychiatry; Pharmacology*), Gary Rudnick (*Pharmacology*), W. Mark Saltzman (*Chemical Engineering; Biomedical Engineering*), Joseph Santos-Sacchi (*Surgery; Neurobiology*), Ilsa Schwartz (*Surgery; Neurobiology*), Gordon Shepherd (*Neurobiology*), Robert Sherwin (*Internal Medicine*), Frederick Sigworth (*Cellular & Molecular Physiology; Biomedical Engineering*), Stephen Strittmatter (*Neurology; Neurobiology*), Allan Wagner (*Psychology*), 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*), Hilary Blumberg (*Psychiatry; Diagnostic Radiology; Biomedical Engineering*), Charles Bruce (*Neurobiology*), R. Todd Constable (*Diagnostic Radiology; Neurosurgery*), Nihal de Lanerolle (*Neurosurgery; Neurobiology*), Lise Heginbotham (*Molecular Biophysics & Biochemistry*), Tamas Horvath (*Comparative Medicine; Neurobiology*), James Howe (*Pharmacology*), Michael Koelle (*Molecular Biophysics & Biochemistry*), Anthony Koleske (*Molecular Biophysics & Biochemistry; Neurobiology*), Gero Miesenböck (*Cell Biology; Physiology*), Marina Picciotto (*Psychiatry; Pharmacology; Neurobiology*), Vincent Pieribone (*Neurobiology*), George Richerson (*Neurology;*

*Cellular & Molecular Physiology*), Michael Schwartz (*Neurobiology*), Jane Taylor (*Psychiatry; Psychology*), Flora Vaccarino (*Child Study Center; Neurobiology*), Michael Westerveld (*Neurosurgery*), Anne Williamson (*Neurosurgery*), Weimin Zhong (*Molecular, Cellular & Developmental Biology*)

#### *Assistant Professors*

Patrick Allen (*Psychiatry*), Robert Beech (*Psychiatry*), Thomas Biederer (*Molecular Biophysics & Biochemistry*), Hal Blumenfeld (*Neurology; Neurobiology*), Angélique Bordey (*Neurosurgery; Cellular & Molecular Physiology*), Wei Chen (*Neurobiology*), Sabrina Diano (*Obstetrics, Gynecology & Reproductive Services; Neurobiology*), Ralph DiLeone (*Psychiatry*), Maria Donoghue Velleca (*Neurobiology*), Karyn Frick (*Psychology*), Jeremy Gray (*Psychology*), Hür Köser (*Electrical Engineering*), Sven-Eric Jordt (*Pharmacology*), Mark Laubach (*Neurobiology*), David LaVan (*Mechanical Engineering*), Erin Lavik (*Biomedical Engineering*), Michael Levene (*Biomedical Engineering*), James Mazer (*Neurobiology*), Rory McCrimmon (*Internal Medicine*), Dhasakumar Navaratnam (*Neurology; Neurobiology*), Michael Nitabach (*Cellular & Molecular Physiology*), Maria Mercedes Piñango (*Linguistics*), Laurie Santos (*Psychology*), Samuel Sathyanesan (*Psychiatry*), Glenn Schafe (*Psychology*), Nenad Sestan (*Neurobiology*), Dana Small (*Psychology; Surgery*), Matthew State (*Child Study Center; Genetics*), Elke Stein (*Molecular, Cellular & Developmental Biology*), Ning Tian (*Ophthalmology & Visual Science*), Susumu Tomita (*Cellular & Molecular Physiology*), Vinzenz Unger (*Molecular Biophysics & Biochemistry*), David Wells (*Molecular, Cellular & Developmental Biology*), Mark Yeckel (*Neurobiology*), David Zenisek (*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.

### *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 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.

*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, Principles of Neuroscience.** Marina Picciotto, Mark Yeckel.

WF 3.15–4.45

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. *Also NBIO 501a.*

[NSCI 502b, Cell Biology of the Nerve Cell.]

[NSCI 503b, Molecular Neurobiology.]

### **NSCI 504b, Seminar in Brain Development and Plasticity.** Weimin Zhong.

MW 2.30–3.45

Weekly seminars (Monday) and discussion sessions (Wednesday) to explore recent advances in our understanding of brain development and plasticity, including neuronal determination, axon guidance, synaptogenesis, and developmental plasticity. *Also MCDB 735b<sup>u</sup>.*

[NSCI 506b, Introduction to Brain and Behavior.]

[NSCI 507b, Cellular and Molecular Mechanisms of Neurological Disease.]

### **NSCI 510b, Structural and Functional Organization of the Human Nervous System.**

Michael Schwartz, Pasko Rakic.

An integrative overview of the structure and function of the human brain pertaining to major neurological and psychiatric disorders. *Also NBIO 500b.*

### **NSCI 514b, Neurodevelopment and Neuropsychiatric Disorders.** Flora Vaccarino

This course considers the development of the central nervous system as it applies to neuropsychiatric disorders. We focus on the mechanisms that regulate progenitor cell proliferation, the acquisition of regional and cellular identity, neuronal migration, and cell death. Information drawn from these basic developmental mechanisms is used to discuss the newest emerging ideas about the pathogenesis of disorders such as autism, Tourette's syndrome, depression, and other affective disorders.

### **NSCI 519a/b, Tutorial.**

By arrangement with faculty and approval of the director of graduate studies.

[NSCI 521a, Neuroimaging in Neuropsychiatry I: Imaging Methods.]

[NSCI 522b, Neuroimaging in Neuropsychiatry II: Clinical Applications.]

### **NSCI 535b, History of Modern Neuroscience.** Gordon Shepherd.

In this course we focus on the original breakthroughs that led to major lines of research being pursued today. Subjects include classic papers in the discoveries of DNA, action potential, synaptic transmission, growth factors, second messengers, neurotransmitters, Hebb synapse, dendrites, hippocampus and memory, cortical columns, REM sleep, neuroendocrine system, instrumental conditioning, reticular activating system, psychoactive drugs, computer modeling, and artificial intelligence. *Also NBIO 535b.*

[NSCI 539b, Synaptic Organization of the Nervous System.]

[NSCI 540a, Introduction to Statistics in Psychology.]

[NSCI 571b, Neurophysiology.]

### **NSCI 580a, The MAP Kinase Pathway and Cognitive Disorders.** Paul Lombroso.

This seminar begins with a review of the classical MAP kinase pathway. Over the last decade, it has become clear that the function of this pathway in the brain differs from its function elsewhere in the body in that it plays a key role in learning and memory. The course begins with



readings of seminal papers establishing the importance of MAP kinase in the induction, expression, and maintenance of LTP. Given the importance of the MAP kinase pathway in the establishment and consolidation of long-term memories, it should not be surprising that disruptions in this pathway lead to cognitive deficits. The seminar moves on to the molecular bases of several developmental disorders in which mutations have been found in key players of the MAP kinase pathway. Some of the disorders that covered include neurofibromatosis, fragile X syndrome, Rubenstein-Taybi syndrome, and Coffin-Lowry syndrome. Students are assigned papers and lead the discussions at each of the meetings.

**NSCI 580b, Bioethics in Neuroscience. Charles Greer.**

Th 4–5:30

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 Pass/Fail and is based on attendance/participation, weekly reaction papers, and a final term paper.

**NSCI 585a, Stem and Progenitor Cells in the Adult Nervous System.**

Eleni Markakis, Angélique Bordey.

This seminar course, through original papers in the literature, examines our current knowledge of adult neurogenesis and neural stem/progenitor cells. We study the advantages and disadvantages of transplantation techniques vs. recruitment of endogenous progenitors for repair of the damaged nervous system, in a variety of animal models. The focus is on consensus work, but we also delve into the controversies of neural stem cell research. The strengths and limitations of various techniques are examined. The term ends with a survey of progenitor cells used in clinical trials.

**NSCI 600a, Experimental Methods in Neuroscience. R. Todd Constable.**

TR 2–4

This course examines the experimental techniques currently available for the neuroscientist. It explores the kinds of information obtainable in studying phenomena ranging from electrophysiological recordings of individual neurons, to metabolic processes, ensembles of neurons, to behavioral output. Techniques covered include microscopic methods (light, electron), electrophysiology (extracellular/intracellular single-cell recordings, multiple cell recording methods, brain slices), macroscopic methods (ERP, MEG, TMR), metabolic measures (microdialysis, biosensors, MR spectroscopy), imaging approaches (optical tomography, PET, SPECT, functional MRI), and interventional techniques (lesions, cortical stimulation, knockout genetics, surgery, drugs). The knowledge gained from each of these approaches, the limitations of the methods, and future developments are considered.

[NSCI 605b, Pathways of Discovery in Neuroscience.]

[NSCI 611a, Stem Cells and Approaches to Repair in the Nervous System.]

[NSCI 612b, Molecular Transport and Intervention in the Brain.]

[NSCI 645a, Foundations of Behavioral Neuroscience.]

[NSCI 646, Advances in Cognitive Neuroscience: Prefrontal Cortex and Memory.]

[NSCI 648b, Cellular Analysis of Learning and Memory: Vertebrate Model Systems.]

[NSCI 654b, Sensory Processes.]



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**NSCI 720a, Neurobiology. Haig Keshishian, Paul Forscher.**

MWF 11.30–12.20

Examination of the excitability of the nerve cell membrane provides a starting point for the study of molecular, cellular, and intracellular mechanisms underlying the generation and control of behavior. *Also MCDB 720a<sup>U</sup>, NBIO 720a.*

The following course is also of particular value to students in Neuroscience:

**MCDB 721La<sup>U</sup>, Laboratory for Neurobiology. Haig Keshishian, Robert Wyman.**

## NURSING

100 Church Street South, 785.2393

M.Phil., Ph.D.

### *Dean*

Margaret Grey

### *Director of Graduate Studies*

Marjorie Funk (737.2346, marjorie.funk@yale.edu)

### *Professors*

Jane Dixon, Marjorie Funk, Margaret Grey, Ruth McCorkle, Gail Melkus, Lawrence Scahill, Ann Williams

### *Associate Professors*

Deborah Chyun, Sally Cohen, Barbara Guthrie, M. Tish Knobf, Lois Sadler, Sheila Santacroce, Sandra Talley

### *Assistant Professors*

Meg Bourbonniere, Cynthia Connolly, Karel Koenig

## *Fields of Study*

Fields include chronic illness (diabetes, cardiovascular disease, cancer, HIV/AIDS); self- and family management; maternal and child health; policy and politics of nursing organizations; health services; health disparities and care of vulnerable populations; acute and critical care; children with mental health disorders; nursing history; end of life and palliative care; global health; health promotion; environmental health; gerontology and long-term care; and school- and community-based interventions. Students choose to emphasize either clinical research or health systems and policy research.

## *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, with grades of at least High Pass, B, 3.0, or equivalent. The Graduate Record Examination (GRE) General Test taken no more than five years prior to application is required. The Test of English as a Foreign Language (TOEFL) exam is required of all applicants for whom English is a second language. This requirement can be waived if the applicant has completed a master's degree from an accredited college or university in the United States or another English-speaking country. Samples of written work (e.g., published article, thesis, literature review) and a curriculum vitae are required. Qualified applicants will be invited for interview with two members of the doctoral faculty.

### *Special Requirements for the Ph.D. Degree*

Completion of 10 required core courses and 6 cognates 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.

#### RESEARCH ASSISTANT AND TEACHING FELLOW EXPERIENCE

During the first two years of the program, students are Research Assistants with faculty mentors and participate in the mentor's ongoing research. Students are expected to devote approximately 16 hours per week to their Research Assistant activities.

In year 3, participation in the Teaching Fellowship Program will begin. Two terms are required. Typically, Teaching Fellows assist with the teaching of larger master's level courses during their third and/or fourth year of doctoral study after they have completed their required courses.

#### EXAMINATIONS

Successful completion of three examinations is required.

1. The *Preliminary Examination* is taken in June after the first year of course work has been completed. A grade of High Pass or better in each core course is required. The Preliminary Examination is intended to allow the student to demonstrate mastery of doctoral course work. 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 semester, 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- to 20-minute formal presentation of the proposed study and answers questions regarding the research and related topics. Successful completion of the Qualifying Examination is required for candidacy for the doctoral degree.
3. The *Final Oral Examination* is based on the dissertation. The dissertation is intended to demonstrate that the student is competent in the chosen area of study and has conducted independent research. The Final Oral Examination typically lasts 1.5 to 2 hours. The student gives a 15- to 20-minute formal presentation of the dissertation and answers questions. Successful completion of the Final Oral Examination is required before the Ph.D. can be awarded.

### *Master's Degree*

*M.Phil. (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 Research Assistant experience, and must pass the Preliminary Examination. This degree is normally granted only to students who are withdrawing from the Ph.D. program.

For information on the terminal master's degree offered by the Yale School of Nursing (Master of Science in Nursing), 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](mailto:frank.grosso@yale.edu).

### *Courses*

**NURS 529aa, Statistics for Clinical Nursing Research. Marjorie Funk.**

This course presents the descriptive and inferential techniques that are most commonly used in nursing studies. It covers the conceptualization of the technique and the ability to select the appropriate technique to answer a research question or test a hypothesis. An additional emphasis is on the interpretation of statistical analyses in articles reporting research findings to enhance evidence-based practice. Two hours per week. Students must complete this course or waive it by examination before enrolling in NURS 917b.

**NURS 901a, Methods for Nursing Research. Jane Dixon.**

This advanced course in research methods provides an opportunity to evaluate various research designs used to investigate problems of importance to nursing. Emphasis is placed on the interrelationships of the clinical problem, state of knowledge, and study design and method. The goal is to facilitate appropriate decision making about research methods. Although the primary focus is on quantitative approaches, qualitative methods are also considered. Required of all doctoral students. Three hours per week.

**NURS 903a, Measurement of Clinical Variables. Jane Dixon.**

The course focuses on theories 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 is employed. This course is required of second-year doctoral students and is also open to advanced graduate students in other departments. Three hours per week.

**NURS 904a/b/c, Doctoral Independent Study. Doctoral Faculty.**

This elective is initiated by the student and negotiated with faculty. The purpose is to allow in-depth pursuit of an individual area of interest. A written proposal must be submitted and signed by the student, the faculty member(s), and the director of graduate studies.

**[NURS 905b, Creating Method: Issues in Nursing Research.]**

**NURS 907, Dissertation Seminar. Lawrence Scahill.**

This required course provides the student with guidance in the development of the dissertation proposal. Using a seminar format, students actively participate in scientific writing, scientific presentations, and criticism. Meets every other week for two hours over the full academic year. Prerequisites: completion of the first year of doctoral study or the equivalent, and NURS 901a. Co-requisite: NURS 903a.

**NURS 911a/b, Doctoral Research Practicum. Marjorie Funk.**

This course focuses on the development of the doctoral student's research skills under the direction of a mentor. The theory component focuses on an overview of the research process, while the mentored research practicum emphasizes collaboration between mentor and student in the development of specific research skills. Required of all students for the first two years of doctoral study. One hour every other week.

**NURS 913a, Conceptual Basis for Nursing Science. Robin Whittemore.**

This course examines the nature of scientific knowledge and the development of the conceptual underpinnings of nursing science. The contribution to nursing science of various approaches to knowledge synthesis and theory development is emphasized. Approaches to concept analysis, development, and critique are examined. Students are expected to complete a formal analysis of a concept of interest to them and to critique the contribution of the concept to nursing science. Required of all doctoral students. Three hours per week.

**NURS 917b, Advanced Statistics for Clinical Nursing Research. Kristopher Fennie.**

This course covers selected topics related to multivariate statistical techniques commonly employed in nursing studies. Topics include analysis of variance, multiple regression, mixed models, logistic regression, Poisson regression, factor analysis, structural equation modeling, and survival analysis. The emphasis is on attaining a conceptual understanding of these statistical techniques and associated models, selecting appropriate technique(s) for a given clinical research problem, conducting computer-assisted analyses, and correctly expressing the results of such analyses. Computing assignments are carried out using SAS. Required of all doctoral students. Prerequisite: successful completion of NURS 529a, Statistics for Clinical Nursing Research, or waiver of NURS 529a by examination. Three and one-half hours per week.

**[NURS 921b, Seminar on Research in Care of Patients with Diabetes.]****NURS 923a, Current Issues in Cardiovascular Nursing Research. Deborah Chyun, Marjorie Funk.**

In this course students examine current issues in cardiovascular nursing research. Topics vary each year to reflect the current state of the science. Prerequisite: clinical background in cardiovascular nursing and doctoral-level standing. Open to others with permission of the instructors. Two hours every other week and 30 hours at the Scientific Sessions of the American Heart Association. Offered every other year.

**NURS 925b, Qualitative Research in Nursing. Lois Sadler.**

This 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. Offered every other year.

**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 the current state of the science in the care of people with cancer, or at risk for cancer, and their families. Specific attention is paid to factors associated with quality of life, such as symptoms, functional status, and affect; and high-risk groups, as defined by family history, ethnicity, and socioeconomic class. Research from nursing, medicine, and the social sciences is discussed. Two hours per week. Offered every other year.

**NURS 929b, Ethical Conduct of Clinical Research. Ann Williams.**

This course covers major concepts in the ethical conduct of clinical research. 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. One hour per week. Offered every other year.

**NURS 941b, Methods for Health Services Research and Policy. Meg Bourbonniere.**

The primary focus in this course is on methods for evaluating the effectiveness, efficiency, and equity of health services delivery. Approaches to measuring the relevant structure, process, and outcome variables that can be used to address effectiveness, efficiency, and equity issues are presented. Throughout the course, linkages are made between specific health care policies

and the related health services research. Required for doctoral students in the health systems and policy research area. Three hours per week.

**NURS 943a, Conceptual Basis for the Study of Self- and Family Illness Management. Gail Melkus.**

This course examines major conceptualizations of illness and self- and family management and the research supporting these conceptualizations. Emphasis is placed on the link between illness self-management and related concepts such as self-efficacy and coping, and the contributions of health care systems and providers to self-management. Self-management is considered from an individual and family perspective. Physiological, psychological, and socio-cultural influences on self-management are explored. Required of all doctoral students in the clinical research area. Three hours per week.

**NURS 943b, Methodological Issues in the Study of Management of Health and Illness. Margaret Grey.**

This seminar focuses on research methods used in the study of self- and family management of patients with chronic illness or at risk for the development of chronic illness. Content includes methodological issues in the study of chronic illness, self-management, and family management. The development and testing of interventions are emphasized. Prerequisite: successful completion of NURS 943a, Conceptual Basis for the Study of Self- and Family Illness Management. Required of all doctoral students in the clinical research area. Three hours per week.

**NURS 961a, Contemporary Issues in Health Policy and Politics. Sally Cohen.**

This course is based on the assumption that clinicians and researchers bring important data to health policy deliberations, but need to be politically savvy in disseminating such data and linking them to contemporary policy deliberations. It examines how health policy at national, state, and local levels of government influences access to, and cost and quality of, health care. Other structural variables, such as delivery systems, populations at risk, and the environment, are also covered. Comparative health policy is included. Required of all doctoral students. Three hours per week.

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## PHARMACOLOGY

B-334 Sterling Hall of Medicine, 785.4545  
M.S., M.Phil., Ph.D.

### *Chair*

Joseph Schlessinger

### *Director of Graduate Studies*

Elias Lolis (SHM B345, 785.6721; [elias.lolis@yale.edu](mailto:elias.lolis@yale.edu))

### *Director of Medical Studies*

Karen Anderson

### *Professors*

George Aghajanian, Karen Anderson, G. Peter Beardsley, Harold Behrman, B. Stephen Bunney, Evangelo Canellakis (*Emeritus*), Yung-chi Cheng, Edward Chu, J. G. Collins, Jack Cooper (*Emeritus*), Priscilla Dannies, Ronald Duman, Barbara Ehrlich, Robert Handschumacher (*Emeritus*), Leonard Kaczmarek, Perry Molinoff (*Adjunct*), William Prusoff (*Emeritus*), J. Murdoch Ritchie (*Emeritus*), Sara Rockwell, Robert Roth, Gary Rudnick, Alan Sartorelli, Joseph Schlessinger, William Sessa, Stephen Waxman

### *Associate Professors*

Anton Bennett, Valentin Gribkoff (*Adjunct*), Robert Heimer, James Howe, Elias Lolis, Marina Picciotto, Giuseppe Pizzorno, Todd Verdoorn (*Adjunct*)

### *Assistant Professors*

Titus Boggon, David Calderwood, Michael DiGiovanna, Ya Ha, Sven-Eric Jordt, Benjamin Turk

### *Lecturers*

Louise-Marie Dembry, Gregory Gardiner, Robert Levine, John Pawelek, Alexander Scriabine

### *Fields of Study*

Major emphases in the department are in the areas of molecular pharmacology, mechanisms of drug action, 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 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. The only common courses required of all students are the basic course in pharmacology, seminars in which students present papers, and laboratory rotations that provide students with exposure to a variety of experimental approaches.

The basic requirements for admission to candidacy for the Ph.D. degree include one and one-half to two years of course work (including the basic course in pharmacology, seminars, and laboratory rotations), during which time the Graduate School Honors requirement and an oral qualifying examination must be completed. There is no foreign language requirement. A thesis prospectus must be submitted 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 examination in defense of the dissertation, is required for the degree. The norm for completion of the Ph.D. program is four to five 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 level. 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.

### *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.

Program materials are available upon request to the Director of Graduate Studies, Department of Pharmacology, Yale University, PO Box 208066, New Haven CT 06520-8066.

### *Courses*

**PHAR 502a and b, Seminar in Pharmacology.** To be announced.

A seminar given by a department faculty member on his or her area of interest to teach students how to critically evaluate papers and to improve the ability of the students to give oral presentations.

**PHAR 504a, Pharmacology I: Maintaining and Restoring Homeostasis.**  
**Priscilla Dannies and staff.**

MW 10.30–12

Lectures covering drug-receptor interactions, control of messenger systems and channels, and regulation of physiological systems.



**PHAR 504b, Pharmacology II: Interfering Selectively. Elias Lolis and staff.**

MW 10.30–12

Lectures covering antibiotics, immunotherapy, and chemotherapy.

**PHAR 506a and b, Methods in Pharmacological Research (Rotations).**

**William Sessa.**

Students work in laboratories of faculty of their choice. The period spent in each laboratory is one term.

**PHAR 508b, Neuropharmacology. James Howe.**

T 2–4

An intensive examination of current understanding of the sites and mechanisms involved in drug action on single nerve cells and on the brain. Emphasis on basic functions and illustrative examples of their disturbance by drugs.

**PHAR 518b, Current Topics in Cancer and Viral Therapy. Yung-chi Cheng,  
Elias Lolis.**

W 5.15–7.15

## PHILOSOPHY

Connecticut Hall, 432.1665

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

### *Chair*

Michael Della Rocca

### *Directors of Graduate Studies*

Karsten Harries [F] (107 Connecticut Hall, 432.1682, karsten.harries@yale.edu)

Sun-Joo Shin (*Acting* [Sp]) (107 Connecticut Hall, 432.1682, sun-joo.shin@yale.edu)

### *Professors*

George Bealer, Seyla Benhabib, Susanne Bobzien, Jules Coleman, Michael Della Rocca, Keith DeRose, Tamar Gendler, John Hare, Karsten Harries, Verity Harte, Shelly Kagan, Sun-Joo Shin, Zoltán Szabó, Kenneth Winkler (*Visiting*)

### *Associate Professors*

Katalin Balog, Michael Weber

### *Assistant Professors*

Troy Cross, Jonathan Gilmore, James Kreines, Jill North, Matthew Smith

### *Fields of Study*

Fields include most of the major areas of philosophy. Please see the Philosophy Web site ([www.yale.edu/philos](http://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 Philosophy Web page for information on the program ([www.yale.edu/philos](http://www.yale.edu/philos)).

## Philosophy and Classics

Superior students, preferably with a background in Classical languages and literature, may be admitted to a joint Ph.D. program in Philosophy and Classics. Interested students who have been admitted to either department should apply to the interdepartmental committee in charge of the program. Philosophy students enrolled in the program are expected to meet the qualifying paper requirement in Philosophy. Students will be expected to take at least seven term courses in the Department of Philosophy. Two of these must be in the history of postclassical philosophy. Students will also have to satisfy the requirements of the Department of Classics as stated under Classics.

## Courses

### PHIL 567a<sup>U</sup>, Mathematical Logic. Sun-Joo Shin.

TRH 11.30–12.45

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.

### PHIL 568b<sup>U</sup>, Mathematical Logic II. Sun-Joo Shin.

M 1.30–3.20

A technical exposition of Gödel's first and second incompleteness theorems and of 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.

### PHIL 600b<sup>U</sup>, Plato's Philosophical Psychology. Verity Harte.

M 3.30–5.20

The seminar explores the rich vein of thought on philosophical psychology running through several major Platonic works. Topics to be discussed include the nature of psyche, soul or mind, and its relation to body; the nature of psychological faculties such as perception, reason, and desire; the unity of consciousness; psychological conflict; and Plato's various models of the mind. Works to be discussed, in translation, include *Phaedo*, *Republic*, *Theaetetus*, and *Philebus*.

### PHIL 603a<sup>U</sup>, Causation in Early Modern Philosophy. Michael Della Rocca, Kenneth Winkler.

W 1.30–3.20

Close examination of the way in which the notion of causation shaped metaphysics in the seventeenth and eighteenth centuries. Topics include causation as necessary connection, occasionalism, laws of nature, miracles, pre-established harmony, mental causation, physical causation, causation and explanation. Focus on these themes in Descartes, Malebranche, Leibniz, Berkeley, and Hume.

**PHIL 604b<sup>U</sup>, Locke and Leibniz. Kenneth Winkler.**

W 1.30–3.20

A close study of Locke's *Essay Concerning Human Understanding* and Leibniz's *New Essays on Human Understanding*, a section-by-section commentary on Locke. Topics include representation and consciousness; substance and essence; the explanatory limits of mechanism; the nature and extent of human freedom; personal identity; theories of signification; and the scope of human knowledge. Some examination of Leibniz's views as presented in the *Discourse on Metaphysics* and the *Monadology*.

**PHIL 605b<sup>U</sup>, Hume and Reid. Keith DeRose.**

Th 1.30–3.20

A study of the philosophies of the eighteenth-century Scottish philosophers David Hume and Thomas Reid, focusing on their work in metaphysics and epistemology, and focusing especially on their responses to skepticism and the different roles each gave to the use of common sense in philosophy.

**PHIL 607b<sup>U</sup>, German Idealism. James Kreines.**

T 3.30–5.20

An in-depth study of idealism in Kant, Jacobi, Fichte, Schelling, and Hegel, with the majority of the term devoted to Kant and Hegel. The emphasis is on the metaphysics and epistemology involved in the very different forms of idealism advocated by Kant and the post-Kantian idealists.

**PHIL 608a, Systems and Their Theory. Henry Sussman.**

T 1.30–3.20

This is a course examining the nature and impact of the conceptual systems that have, since the outset of modernity, furnished a format and platform for rigorous thinking at the same time that they have imposed self-reflexivity, consistency, repetition, purity, and dependability on language. Readings by Kant, Hegel, Freud, N. Weiner, Bateson, Wilden, Luhmann, Kafka, Borges, Calvino, and Pynchon, among others. *Also CPLT 651a<sup>U</sup>, GMAN 645a<sup>U</sup>.*

**PHIL 609b, Dialectic of Enlightenment: Kant/Sade. Rainer Nägele.**

Th 3.30–5.20

In 1944, Adorno and Horkheimer, under the experience of the historical catastrophe, undertook a fundamental rethinking of the concept of Enlightenment, undercutting the all-too-simplistic opposition of rationality and irrationality through a complex analysis of the interweaving of the rational and irrational. One of the essays of the book brings together the odd couple of Kant and Sade, later condensed in one of the essays in the *Ecrits*. The course pursues this curious constellation through a close reading of Kant's *Critique of Practical Reason*, Sade's "Philosophy in the Boudoir," and the two essays by Adorno and Lacan. *Also CPLT 652b<sup>U</sup>, GMAN 664b<sup>U</sup>.*

**PHIL 625b<sup>U</sup>, Consciousness: Philosophical Issues. Katalin Balog.**

T 1.30–3.20

The problem of consciousness is considered by most philosophers of mind as the "hard problem," i.e., the difficult part of the mind-body problem. Arguments against physicalism, i.e., the view that everything is, or is composed of, physical stuff, often take consciousness as their starting point. Discussion of these arguments as well as physicalist proposals for a theory of consciousness.

**PHIL 627b<sup>U</sup>, Direction of Time. Jill North.**

M 3.30–5.20

We focus on the following problem: How can we 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 — if the underlying laws of physics are symmetric in time? Is it possible to have a unified explanation for the different asymmetries we experience? If so, does this suggest that time itself has a direction? We also look at the probabilities required by the explanations: How should we understand these probabilities metaphysically?

**PHIL 628a<sup>U</sup>, Personal Identity and the Self. Katalin Balog.**

T 1.30–3.20

What is it to be a person? Has our conception of what it is to be a human being changed over time? Is it culture-relative in some sense? Is our conception of ourselves related to our knowledge and understanding of other people? A related issue is the problem of personal identity over time, that is, the problem of what it is that makes a person the same individual over time. Implications for ethics, psychology, and the significance of mortality are explored as well.

**PHIL 629a<sup>U</sup>, Imagination. Tamar Gendler.**

M 3.30–5.20

An interdisciplinary exploration of the topic of imagination, drawing on traditional philosophical discussions (e.g., Aristotle, Hume, Kant), contemporary philosophical writing (e.g., Currie, Goldman, Walton), and recent psychological research (e.g., Harris, Kosslyn, Leslie). Students are expected to read several articles or chapters for each class meeting, give a class presentation, and write a term paper in two drafts. Prerequisites: open to undergraduates who have taken at least two previous philosophy courses, graduate students in Philosophy or Psychology, and others by permission of instructor.

**PHIL 630a<sup>U</sup>, Propositions and Events. Zoltán Szabó.**

T 3.30–5.20

Whether we should believe in propositions or events and if we do, what we should think of their nature depends to some extent on how we should think about the interpretation of nominalization, the progressive aspect, that-clauses, and a number of other complex linguistic phenomena. At the same time, one probably cannot make real progress in the semantic analysis of these issues without keeping in mind that we want an ontology that meshes well with our best accounts of mental states and causation. So, in theorizing about propositions and events we need to pay attention to both language and the world. This is our central aim in the course.

**PHIL 651a<sup>U</sup>, Problem of Evil. Keith DeRose.**

Th 1.30–3.20

A study of the major forms of the challenge to traditional theism posed by the evil in the world, together with the main lines of response to these various forms of the problem of evil. The focus is on recent philosophical writings.

**PHIL 652a<sup>U</sup>, Freedom of Expression. Jonathan Gilmore.**

Th 1.30–3.20

The history and theory of freedom of expression examined from the standpoints of philosophy, law, art history, and literary criticism. Topics include censorship of art and literature, self-expression and self-realization, First Amendment interpretation, autonomy, paternalism, and rights.

**PHIL 655a<sup>U</sup>, Normative Ethics. Shelly Kagan.**

T 1.30–3.20

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).

**PHIL 656b<sup>U</sup>, Ethics of Trust. Matthew Smith.**

Th 1.30–3.20

This course is an in-depth philosophical exploration of trust and trusting relationships. We address the following questions: What is trust? What is a trusting relationship? What is the relationship between trust and belief? Trust and knowledge? Trust and faith? Trust and love or loving relationships? Trust and social practices? Trust and political institutions? Is trust cognitive or non-cognitive? We read widely in ethics, epistemology, political philosophy, psychology, economics, political science, and cognitive science.

**PHIL 657b<sup>U</sup>, Biology, Evolution, and Culture. Jonathan Gilmore.**

W 3.30–5.20

A broad investigation into purported evolutionary and biological explanations for such cultural phenomena as language, morals, politics, and art.

**PHIL 658b<sup>U</sup>, Political Philosophy of Social Science. Thomas McCarthy.**

W 3.30–5.20

This course examines some of the philosophical issues central to the ongoing debates concerning the methodology of the human sciences: explanation and understanding; objectivity and value-neutrality; the linguistic, cultural, and hermeneutic turns; the logic of functional and of rational explanation; social science as social criticism. We then look at several current discussions concerning rational choice theory, participant and observer perspectives, and the interplay of normative and empirical considerations. *Also PLSC 634b.*

**PHIL 700a, Legitimacy, Pluralism, and Judgment. Seyla Benhabib.**

W 1.30–3.20

This course focuses on questions of pluralism and judgment in contemporary critical theory. What is the source of pluralism in ethics? In law? What is the range of legitimate variations among different human rights traditions across culture and countries? How is pluralism to be distinguished from relativism? What are the “burdens of judgment” according to Rawls? According to Hannah Arendt? Readings from Habermas, Taylor, Bernard Williams, Rawls, Arendt, O’Neill, Hermann, and Doyle. *Also PLSC 585a, WGSS 713a.*

**PHIL 701b, Rethinking Sovereignty: Cosmopolitanism, Rights, and Popular Constitutionalism. Seyla Benhabib, Robert Post.**

T 3.30–5.20

Recently the crisis of sovereignty and the end of sovereignty have been discussed in law, political science, and philosophy. Post-nationalist, cosmopolitan, as well as neo-liberal critics of sovereignty abound. This 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. *Also PLSC 605b, LAW 2125j.*

**PHIL 702b, Contextualism in Epistemology. Keith DeRose.**

Th 10.30–12.20

An investigation of recent work on contextualism in epistemology and on some rival approaches to contextualism that have become prominent in the last few years.

**PHIL 703a, Kant’s Philosophy of Religion. John Hare.**

Th 3.30–5.20

The purpose of the course is to look at Kant’s writings in the philosophy of religion. The principal readings are from Kant’s *Critique of Pure Reason* (especially the Ideal and the Canon), the *Lectures on Ethics*, *The Critique of Practical Reason* (especially the Dialectic), the *Critique of Judgment* (especially the Methodology), *Religion within the Boundaries of Mere Reason*, and *The Conflict of the Faculties*. *Also RLST 914a.*

**PHIL 704b, Kierkegaard's Philosophy of Religion. John Hare.**

Th 3.30–5.20

This seminar explores a number of texts focusing on the relation between religious faith and the ethical life. We read the following texts (in whole or in part): *Either/Or*, *Fear and Trembling*, *Fragments*, *Concluding Unscientific Postscript*, *Works of Love*. Also RLST 916b.

**PHIL 705a, Nietzsche and Tragedy. Karsten Harries.**

T 10.30–12.20

The seminar focuses on *The Birth of Tragedy* and *Zarathustra*. An examination of the boundary that separates and joins philosophy and tragedy; also of the tasks and limits of philosophy.

**PHIL 706b, Work-in-Progress Seminar. Troy Cross, Shelly Kagan.**

T 1.30–3.20

In consultation with the instructors, each student presents a significant work in progress, such as a revised version of an advanced seminar paper or a dissertation chapter. On completion of the writing, the student presents the work in a mock colloquium format, including a formal question-and-answer period.

**PHIL 707a, Aristotle's *Categories*. Verity Harte.**

W 4–5.50

The seminar reads and discusses the Greek text of Aristotle's *Categories*. The *Categories* is a foundational work in Aristotle's metaphysics, historically viewed as the best introduction to Aristotle's philosophical work and to philosophy in general. Professor Bobzien participates in the seminar.

**PHIL 708b, Aristotle's *De Interpretatione*. Susanne Bobzien.**

W 4–5.50

The seminar reads and discusses the Greek text of Aristotle's *De Interpretatione*. The treatise contains some of Aristotle's most important contributions to philosophy of language, logic, and metaphysics. It also makes a great introduction to Aristotle's views on language and logic. Professor Harte participates in the seminar.

**PHIL 709b, Poetics I: Theory of the Work of Literature. Benjamin Harshav.**

M 1.30–3.20

The course presents a comprehensive theory of works of literature as the highest sign-complexes in human culture. From rhythm and sound patterns through metaphor and fictional world to genre and representation, a work of literature combines elements of structure with a network of necessary and possible or contradictory constructs. The seminar develops a conceptual network for the descriptive analysis of individual works of poetry and fiction. The theory focuses on questions of fictionality and art in language, yet goes beyond linguistics and philosophy of language, on the one hand, and narratology, on the other. It is grounded in close readings of poems and narrative texts by Kafka, Joyce, Eliot, Dostoevsky, and others. Also CPLT 541b.

**PHIL 750, Tutorial.**

By arrangement with faculty.

## PHYSICS

35 Sloane Physics Laboratory, 432.3607

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

### *Chair*

Ramamurti Shankar

### *Director of Graduate Studies*

Simon Mochrie (35 SPL, 432.3607, [graduatephysics@yale.edu](mailto:graduatephysics@yale.edu))

### *Professors*

Robert Adair (*Emeritus*), Yoram Alhassid, Thomas Appelquist, Charles Bailyn (*Astronomy*), O. Keith Baker, Charles Baltay, Sean Barrett, Cornelius Beausang (*Adjunct*), William Bennett, Jr. (*Emeritus*), Richard Casten, Richard Chang (*Applied Physics*), Paolo Coppi (*Astronomy*), David DeMille, Michel Devoret (*Applied Physics*), Frank Firk (*Emeritus*), Paul Fleury (*Applied Physics*), Moshe Gai (*Adjunct*), Steven Girvin, Robert Grober (*Applied Physics*), Martin Gutzwiller (*Adjunct*), John Harris, Victor Henrich (*Applied Physics*), Arvid Herzenberg (*Emeritus*), Jay Hirshfield (*Adjunct*), Francesco Iachello, Martin Klein (*Emeritus*), Henry Kraybill (*Emeritus*), Steve Lamoreaux, William Lichten (*Emeritus*), Samuel MacDowell (*Emeritus*), William Marciano (*Adjunct*), Simon Mochrie, Vincent Moncrief, Peter Parker, Daniel Prober (*Applied Physics*), Nicholas Read, Vladimir Rokhlin (*Computer Science; Mathematics*), Jack Sandweiss, Michael Schmidt, 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, John Wettlaufer (*Geology & Geophysics*), Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*), Michael Zeller

### *Associate Professors*

Charles Ahn (*Applied Physics*), Colin Gay, Karyn LeHur, Priyamvada Natarajan (*Astronomy*), Homer Neal, Corey O'Hern (*Mechanical Engineering*), Witold Skiba

### *Assistant Professors*

Helen Caines, Eric Dufresne (*Mechanical Engineering*), Richard Easter, Bonnie Fleming, Steven Furlanetto, Walter Goldberger, Jack Harris, Andreas Heinz, Sohrab Ismail-Beigi (*Applied Physics*), Daniel McKinsey, Pieter van Dokkum, Volker Werner

### *Fields of Study*

Fields include atomic physics and quantum optics; nuclear physics; particle physics; astrophysics and cosmology; condensed matter; quantum information physics; applied physics; and other areas in collaboration with faculties of Engineering and Applied Science, Mathematics, Chemistry, 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 (Dynamics, 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 required courses in classical and quantum field theory, provides an introduction to modern physics and research. Certain equivalent course work 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 having had sufficiently advanced prior course work or by taking a course offered by the department. All students will also attend a seminar during their first term in order to be introduced to the various research efforts and opportunities at Yale.

Students who have completed their course requirements with satisfactory grades (a High Pass average and the Graduate School requirement of two 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. Approximately eighteen months after passing the qualifying examination, but no later than the end of the fourth year, students take an oral examination in their chosen field of specialization (the Field Oral Examination).

There is no foreign language requirement. Teaching experience is regarded as an integral part of the graduate training program. Students are expected to serve as teaching fellows at some point during their study, 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, 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](mailto:graduatephysics@yale.edu); Web site, [www.yale.edu/physics](http://www.yale.edu/physics).

### *Courses*

#### **PHYS 500a, Dynamics. Francesco Iachello.**

MW 10.45–12

Newtonian dynamics, Lagrangian dynamics, and Hamiltonian dynamics. Rigid bodies and Euler equations. Oscillations and eigenvalue equations. Classical chaos. Introduction to dynamics of continuous systems.

#### **PHYS 502b, Electromagnetic Theory I. Nicholas Read.**

MW 9–10.15

Classical electromagnetic theory including boundary-value problems and applications of Maxwell equations. Macroscopic description of electric and magnetic materials. Wave propagation.

#### **PHYS 504Lb, Modern Physics Measurements. Simon Mochrie and staff.**

HTBA

A laboratory course with experiments and data analysis in soft and hard condensed matter, nuclear and elementary particle physics.

#### **PHYS 506a<sup>U</sup>, Mathematical Methods of Physics. Richard Easther.**

MW 9–10.15

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.

#### **PHYS 508a, Quantum Mechanics I. Jack Harris.**

TTh 9–10.15

The principles of quantum mechanics with application to simple systems. Canonical formalism, solutions of Schrödinger's equation, angular momentum and spin.

#### **PHYS 512a, Statistical Physics I. Yoram Alhassid.**

TTh 10.45–12

Review of thermodynamics, the fundamental principles of classical and quantum statistical mechanics, canonical and grand canonical ensembles, identical particles, Bose and Fermi statistics, phase transitions and critical phenomena, renormalization group, irreversible processes, fluctuations.

#### **PHYS 515a, Topics in Modern Physics Research. John Harris.**

M 4–5

A seminar course intended to provide an introduction to current research in physics and an overview of physics research opportunities at Yale.

[PHYS 522a, Introduction to Atomic Physics.]

[PHYS 523a, Biological Physics.]

#### **PHYS 524a, Introduction to Nuclear Physics. Richard Casten.**

MW 10.45–12

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 nuclear models are discussed. The course also covers topics in nuclear astrophysics and in the use of relativistic heavy ion collisions to study quark-gluon interactions

at high density. The aim is to give a broad perspective on the subject and to develop the key ideas in as simple a way as possible. Physics ideas always have precedence over mathematical formalism. The course assumes no prior knowledge of nuclear physics and only elementary quantum mechanics. It is accessible to advanced undergraduates.

**PHYS 526b, Introduction to Elementary Particle Physics. Michael Schmidt.**

MW 1–2.15

An overview of particle physics, including an introduction to the standard model, experimental techniques, symmetries, conservation laws, the quark-parton model, and open questions in particle physics.

**PHYS 538a, Introduction to Relativistic Astrophysics and General Relativity.**

Vincent Moncrief.

MW 9–10.15

Basic concepts of differential geometry (manifolds, metrics, connections, geodesics, curvature); Einstein's equations and their application to such areas as cosmology, gravitational waves, black holes.

**PHYS 548a<sup>u</sup> and 549b<sup>u</sup>, Solid State Physics I and II. Victor Henrich [F],**

Charles Ahn [Sp].

TTh 1–2.15 [F], TTh 9–10.15 [Sp]

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonons, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. *Also ENAS 850a<sup>u</sup>, 851b<sup>u</sup>.*

[PHYS 570a<sup>u</sup>, High-Energy Astrophysics.]

[PHYS 600b, Cosmology.]

**PHYS 602a, Classical Field Theory. Nicholas Read.**

TTh 9–10.15

Covariant formulation of electrodynamics, radiation phenomena, and introduction to general relativity.

**PHYS 608b, Quantum Mechanics II. Jack Harris.**

TTh 9–10.15

Approximation methods, scattering theory, and the role of symmetries. Relativistic wave equations. Second quantized treatment of identical particles. Elementary introduction to quantized fields.

**PHYS 609a, Relativistic Field Theory I. Walter Goldberger.**

TTh 10.45–12

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.

**PHYS 610b, Quantum Many-Body Theory. Yoram Alhassid.**

TTh 10.45–12

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. *Also ENAS 852b.*

**PHYS 624b<sup>U</sup>, Group Theory. Francesco Iachello.**

MW 9–10.15

Lie algebras, Lie groups, and some of their applications. Representation theory. Explicit construction of finite-dimensional irreducible representations. Invariant operators and their eigenvalues. Tensor operators and enveloping algebras. Boson and fermion realizations. Differential realizations. Quantum dynamical applications.

**PHYS 628b, Statistical Physics II. Corey O'Hern.**

TTh 2.45–4

An advanced course in statistical mechanics. Topics to be covered include a statistical formulation of thermodynamics, review of the canonical and grand canonical ensembles, theories for simple gases, treatment of interacting systems using cluster expansions, review of phase transitions and critical phenomena, introduction to the renormalization group, and discussion of the approach to equilibrium and the fluctuation-dissipation theorem. *Also ENAS 849b.*

**PHYS 630b, Relativistic Field Theory II. Walter Goldberger.**

MW 10.45–12

An introduction to nonabelian 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.

**[PHYS 631a<sup>U</sup>, Computational Physics I.]****PHYS 633b, Introduction to Superconductivity. Daniel Prober.**

MW 10.30–12

The fundamentals of superconductivity, including both theoretical understandings of basic mechanism, and description of major applications. Topics include historical overview, Ginzburg-Landau (mean field) theory, critical currents and fields of type II superconductors, BCS theory, Josephson junctions and microelectronic and quantum-bit devices, and high  $T_c$  oxide superconductors. *Also ENAS 863b.*

**[PHYS 634a, Mesoscopic Physics.]****[PHYS 650a, Theory of Solids I.]****[PHYS 651b, Theory of Solids II.]***Special Topics Courses***[PHYS 661b, The Art of Data Analysis.]****PHYS 662a, Special Topics in Particle Physics: Beyond the Standard Model.****Thomas Appelquist.**

MW 10.45–12

Modern concepts in particle physics, including electroweak symmetry breaking, mass generation, conformal symmetry, strongly coupled quantum field theories, supersymmetry, and extra dimensions. Material covered includes the theoretical basis of these ideas, experimental tests and constraints, and implications for cosmology.

**PHYS 663b, Special Topics in Cosmology and Particle Physics. Steven Furlanetto.**

TTh 9–10.15

Introduction to theoretical cosmology, including the early Universe and structure formation. The course begins with an overview of the standard Big Bang model and current observational constraints on it. Later topics include inflation, the generation and growth of cosmological perturbations, the cosmic microwave background, large-scale structure, and galaxy formation.

**PHYS 664b, Special Topics in Nuclear Physics. Richard Casten.**

TTh 9–10.15

The emphasis in this course is on nuclear structure models and their use in understanding atomic nuclei. A number of models are covered, ranging from the Shell Model to a variety of Collective models. In each case, practical calculations are carried out by the students so that the application of these models to real situations, and their strengths, weaknesses, and ranges of applicability, become clear. Finally, there is discussion of the evolution of nuclear structure as a function of nucleon number, both near and far from the valley of stability, the appearance of behavior resembling phase transitions, and simple guidelines to structural evolution.

[PHYS 667a, Special Topics in Condensed Matter Physics.]

[PHYS 668b, Special Topics in Geometry and Modern Field Theory.]

[PHYS 671b, Special Topics in Experimental Nuclear and Particle Physics.]

[PHYS 672a or b, Special Topics in Experimental Physics.]

[PHYS 673a or b, Special Topics in Atomic Physics.]

[PHYS 674b, Quantum Information, Quantum Cryptography, and Quantum Computation.]

[PHYS 675b, Special Topics in Optics.]

**PHYS 676a, Optical Properties of Semiconductors. Richard Chang.**

TTh 2.30–3.45

Comprehensive treatment of the optical and electronic properties of semiconductor alloys and quantum structures. Physical models of blackbody radiation, spontaneous emission, stimulated emission, absorption, and polarization. Quantitative analysis of the effects of temperature, pressure, stress fields, and electric and magnetic fields. *Also ENAS 917a<sup>II</sup>.*

**PHYS 677a, Noise, Dissipation, Amplification, and Information. Michel Devoret.**

TTh 10.30–12

Graduate-level equilibrium and non-equilibrium statistical physics applied to quantum electronics/optics phenomena. The aim is to explain the fundamental link between the random fluctuations of a physical system in equilibrium and the response of the same system to an external perturbation. Several key examples where 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 in particular the ultimate limits of amplifier sensitivity and speed in physics measurements. *Also ENAS 817a.*

**PHYS 678b, Computing for Scientific Research. Helen Caines, Thomas Ullrich.**

F 1–3.30

An introduction to basic computational tools and techniques utilized in science and engineering research. The course focuses on developing hands-on experience via a mixture of lectures and practical programming. We introduce the fundamentals of PC hardware, the UNIX/Linux operating system, scripting languages (Perl), and the development of programs to solve physical and mathematical problems. Programming languages with emphasis on C/C++ (procedural and object-oriented) as well as the conceptual underlying numerical methods are covered to provide the tools for scientific problem solving. This course is intended for students with little basic programming experience.

[PHYS 679a, Nonlinear Optics.]

**PHYS 680a<sup>u</sup>, The Experimental Tests of General Relativity. Jack Sandweiss.**

MW 1–2.15

The basic physical ideas and mathematical formulation of general relativity are reviewed, although many results which apply to particular experiments are given without proof. The modern experiments which make precision tests of the theory are explained. These include lunar laser ranging, radar timing from planet Venus reflections, and gravitational radiation from a binary pulsar. A discussion of the LIGO experiment (earth-based gravity wave detector) and LISA (space-based gravity wave detector) is conducted. The course is open to upper-level undergraduates as well as graduate students.

**PHYS 990a and b, Special Investigations. Faculty.**

By arrangement with individual faculty members and approved by the DGS.

## POLITICAL SCIENCE

124 Prospect, 432.5241

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

### *Chair*

Peter Swenson

### *Director of Graduate Studies*

Kenneth Scheve

### *Professors*

Bruce Ackerman, Akhil Amar (*Law*), Arjun Appadurai (*Anthropology*), Seyla Benhabib, Paul Bracken (*Management*), David Cameron, Paul Gaddis (*History*), Alan Gerber, Donald Green, Jacob Hacker, Stathis Kalyvas, Theodore Marmor (*Management*), David Mayhew, Barry Nalebuff (*Management*), Douglas Rae, John Roemer, Susan Rose-Ackerman, Frances Rosenbluth, Bruce Russett, 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*), Elisabeth Wood

### *Associate Professors*

Gregory Huber, Ellen Lust-Okar, Nicholas Sambanis, James Vreeland

### *Assistant Professors*

Khalilah Brown-Dean, Seok-ju Cho, Keith Darden, Thad Dunning, Justin Fox, Bryan Garsten, Ange-Marie Hancock, Susan Hyde, Pierre Landry, Karuna Mantena, Nikolay Marinov, Paulina Ochoa Espejo, Vivek Sharma, Ebonya Washington

### *Fields of Study*

Fields include contemporary theory, political philosophy, international relations, comparative politics, American politics, political economy, empirical 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. Two of the courses may be in departments other than Political Science. 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 course is conducted as a seminar including all second-year students and directed by two members of the faculty. Performance in the first-term course (540a) is graded on a Satisfactory/Unsatisfactory basis. The second-term course (541b) carries conventional letter grades that are assigned retroactively to 540a at the end of the second term.

All students must take a one-term course in statistical methods, successful completion of which satisfies the statistics requirement. The statistics requirement, the first-year introductory course, and the second-year Research and Writing sequence will count as four of the sixteen credits needed to advance to candidacy.

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. Alternatively the language requirement can be satisfied by successfully completing two terms of formal theory at the graduate level, in addition to the required course in statistical methods.

Courses are offered in six substantive fields — contemporary theory, political philosophy, international relations, comparative politics, American politics, and political economy — and two methods fields — empirical methods and formal theory. The department also allows students in exceptional cases to petition for the creation of a special field of study which will be certified by successful completion of a comprehensive examination created by the field advisers. Each student must demonstrate competence in four fields by the end of the fifth term, *including at least two of the substantive fields*. 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. For fields to be certified by course work students are required to satisfactorily complete three courses in the field, including one in which a research paper or other independent project is presented.

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 statistics course, 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. All students are expected to present a research paper of their own at one of these workshops before the end of their fourth year.

A joint Ph.D. degree is available with African American Studies and the Law School. Students must apply to and be accepted by both programs independently. Consult that program 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 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 seven term courses) with an average of High Pass or better. The course must include one each in at least three of the department's substantive fields and a basic course in statistical analysis. Language requirements are the same as for the Ph.D. degree.

Program materials are available upon request to the Director of Graduate Studies, Political Science Department, Yale University, PO Box 208301, New Haven CT 06520-8301.

### *Courses*

#### EMPIRICAL ANALYSIS AND RESEARCH METHODOLOGY

##### **PLSC 500a, Statistics. Donald Green.**

T 9.30–11.20, Th 4–5.30

The goal of this 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.

##### **PLSC 503b, Quantitative Methods. Ebonya Washington.**

W 10–12

This 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 time-series-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 students have command of the material covered in PLSC 500 including basic knowledge of probability theory.

##### **PLSC 504a, Advanced Quantitative Methods II. Kenneth Scheve.**

M 1.30–3.20, Th 1.30–3.20

This course provides an extensive treatment of the likelihood theory of statistical inference that underlies many of the statistical methods used in political science. After the foundational material is presented, we introduce a large variety of statistical models. These include dichotomous and polychotomous response models, models for censored and truncated data, sample

selection models, duration models, and models for count data. We also cover methods for time series and pooled time-series-cross-sectional data with an emphasis on approaches for limited dependent variables. Finally, the course introduces some basic ideas and methods from Bayesian data analysis. 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 students have command of the material covered in PLSC 500 and PLSC 503, including basic probability theory, matrix algebra, and the linear regression model.

**PLSC 505a, Qualitative Methods. Elisabeth Wood.**

Th 3.30–5.20

In this graduate seminar we discuss the methods of field research, particularly qualitative methods. The emphasis is on the use of field methods to develop and test theory. Course reading draws on works in economics, sociology, and anthropology as well as political science. In addition to participating in the seminar, students carry out a number of exercises designed to develop qualitative research skills. The principal course requirement is the development of a detailed research proposal on a topic for which field research is appropriate. Other requirements include the writing of weekly reviews of the course reading and participation. Prerequisite: completion of PLSC 777a or 777b.

**PLSC 510a, Introduction to the Study of Politics. Ian Shapiro.**

M 9.30–11.30

This course introduces students to some of the major controversies in political science. We focus on the five substantive themes that make up the Yale Initiative: Order, Conflict, and Violence; Representation and Popular Rule; Crafting and Operating Institutions; Identities, Affiliations, and Allegiances; and Distributive Politics. We divide our time between discussing readings on these subjects and conversations with different members of the faculty who specialize in them. There is also some attention to methodological controversies within the discipline. Requirements: an annotated bibliography of one of the substantive themes and a take-home final exam.

**PLSC 517a, Fundamentals of Modeling. John Roemer.**

Th 10.30–12.20

This course is an introduction to techniques of microeconomic modeling, as applied to problems in political science. The level is that of a fairly sophisticated course in intermediate microeconomics. Topics include preferences, utility functions, Pareto efficiency, economic equilibrium, voting for public goods, Nash equilibrium, the first theorem of welfare economics, Hotelling-Downs political equilibrium, Wittman-Nash political equilibrium, Arrow's theorem and social welfare functions, equilibria in multidimensional issue spaces, and Bayesian equilibria with applications to the politics of redistribution, market and government failures, and turnout. Prerequisites are differential calculus, and/or the Political Science Math Camp. Microeconomics at the intermediate level is helpful but not mandatory.

**PLSC 518b, Fundamentals of Modeling II. Seok-ju Cho, Justin Fox.**

M 3.30–5.20

A game is a situation in which the outcome of a person's choice depends on the choices made by others. Since social sciences study human interaction, game theory is a basic theory in the social sciences. This course is an introduction to game theory with a particular emphasis on its applications to political science. Coverage includes the fundamental concepts of strategic games, extensive games with perfect information, coalitional games, Bayesian games, and extensive games with imperfect information, among others. The goal of the course is to explain the key concepts of game theory as simply as possible while maintaining complete precision.

**PLSC 540a, 541b, Research and Writing. Bryan Garsten, Nikolay Marinov.**

w 3.30–5.20

This is a required course for all second-year students. Although it is considered as a spring-term course, in fact 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. Six weeks in beginning of fall term; six weeks in beginning of spring.

**PLSC 575a, Political Competition. John Roemer.**

w 10.30–12.20

Political competition in democracies is party competition. We develop, from the formal viewpoint, theories of party competition in democracies. The familiar "median voter theorem" of A. Downs is the simplest example of such a theory, but it is inadequate in several ways. We develop a theory in which parties (1) compete over several issues, not just one issue, as in Downs; (2) are uncertain about how citizens will respond to platforms; and (3) represent interest groups in the population. Applications, particularly to the theory of income distribution and taxation, are studied. *Also ECON 788a.*

**CONTEMPORARY THEORY****PLSC 585a, Legitimacy, Pluralism, and Judgment. Seyla Benhabib.**

w 1.30–3.20

This course focuses on questions of pluralism and judgment in contemporary critical theory. What is the source of pluralism in ethics? In law? What is the range of legitimate variations among different human rights traditions across cultures and countries? How is pluralism to be distinguished from relativism? What are the "burdens of judgment" according to Rawls? According to Hannah Arendt? Readings from Habermas, Taylor, Bernard Williams, Rawls, Arendt, O'Neill, Hermann, and Doyle. *Also PHIL 700a, WGSS 713a.*

**POLITICAL PHILOSOPHY****PLSC 600a<sup>U</sup>, Postcolonial Political Thought: Gandhi and Fanon. Karuna Mantena.**

w 1.30–3.20

How do concepts of freedom and domination, equality and liberty, nationalism and identity, look from outside Europe and North America? This course considers these issues by considering two of the twentieth century's most influential non-European thinkers: Mohandas Gandhi and Frantz Fanon. Their transformational critiques were developed out of an important engagement with, and an intimate critique of, central categories of Western political thought. Reconsidering Gandhi and Fanon, thus, can help us grapple in new ways with the central questions of political theory, such as the relationship between universality and freedom, revolution and history, progress and emancipation and help us reflect on the relationship of European politics and European ideas to the aspirations for and experience of freedom in the non-Western world. We also examine the contribution of contemporary theorists working in the field of postcolonial theory to these questions and concerns.

**PLSC 602a<sup>U</sup>, Ancient and Medieval Political Thought. Robert Wokler.**

TTH 2.30–3.45

An intensive study of the foundations of political philosophy. An analysis of the origins of political philosophy in Socratic and Platonic thought, followed by Machiavelli's comprehensive critique of the Socratic tradition.

**PLSC 605b, Rethinking Sovereignty: Cosmopolitanism, Rights, and Popular Constitutionalism. Seyla Benhabib, Robert Post.**

T 3.30–5.20

Recently the crises of sovereignty and the end of sovereignty have been discussed in law, political science, and philosophy. Post-nationalist, cosmopolitan, as well as neo-liberal critics of sovereignty abound. This course discusses alternative models of sovereignty, ranging from democratic iterations to popular constitutionalism, and 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. *Also LAW 21253, PHIL 701b.*

**PLSC 608a<sup>U</sup>, Democratic Rhetoric: Demagoguery, Persuasion, and Deliberation. Bryan Garsten.**

MW 2.30–3.20

A consideration of the political problems surrounding the democratic practice of persuasion. Does democracy tend to devolve into an "aristocracy of orators"? Readings include classic texts of political thought, recent writings on deliberative democracy, and reflections on contemporary rhetoric, including rhetoric of the ongoing presidential campaign.

**PLSC 622b<sup>U</sup>, The Age of Enlightenment and Its Critics. Robert Wokler.**

TH 1.30–3.20

Introduction to central themes and currents of European social and political thought in the eighteenth century, including notions of religious toleration, civilization, and progress, and the emancipation of women, slaves, and Jews. Analysis of twentieth-century claims that modern totalitarianism and even the Holocaust may be traced to Enlightenment principles.

**PLSC 624b<sup>U</sup>, Empire and Political Thought. Karuna Mantena.**

W 1.30–3.20

Examines the relationship between the development of modern political thought and the history of empire, focusing especially on how the imperial experience shaped central concepts of political theory such as reason, liberty, rights, sovereignty, property, and progress. Readings from Montaigne, Locke, Diderot, Kant, Herder, Burke, Marx, Mill, Tocqueville, and others.

**PLSC 634b, Political Philosophy of Social Science. Thomas McCarthy.**

W 3.30–5.20

This course examines some of the philosophical issues central to the ongoing debates concerning the methodology of the human sciences: explanation and understanding; objectivity and value-neutrality; the linguistic, cultural, and hermeneutic turns; the logic of functional and of rational explanation; social science as social criticism. We then look at several current discussions concerning rational choice theory, participant and observer perspectives, and the interplay of normative and empirical considerations. *Also PHIL 658b<sup>U</sup>.*

**PLSC 636a<sup>U</sup>, Representation. Bryan Garsten.**

T 1.30–3.20

A historical survey of political thought about the principles of representative government. The course begins with the prehistory of representation in ancient Athens and Rome, continues through medieval, early modern, and Enlightenment theories (including those debated after the American and French revolutions), and ends with several weeks considering recent debates on representation in the U.S. and the European Union.

**PLSC 641b, Hobbes, Spinoza, and the Enlightenment Critique of Religion.****Steven Smith, Anthony Kronman.**

T 1.30–3.20

This class examines Thomas Hobbes and Baruch Spinoza as the two chief architects of the Enlightenment critique of religion. What were the bases of their critiques of Scripture? What kind of politics did their critiques make possible? How did their writings on religion shape the Enlightenment conception of secularization and religious toleration, and what role, if any, did they imagine religion would play in public and private life given their criticisms of biblical orthodoxy? Based on a close reading of Hobbes's *Leviathan* and Spinoza's *Theologico-Political Treatise*, the course looks briefly at the replies to their views by two figures of twentieth-century political theology, Carl Schmitt and Leo Strauss. Also LAW 21174.

**PLSC 645a, Introduction to Political Philosophy. Steven Smith.**

T 3.30–5.20

This course deals with the first and most fundamental of all political concepts: the regime or constitution. What is a regime? How many kinds are there? What are their criteria for membership and how do they divide power among citizens? What forms of political education do they promote? We examine these questions through a close reading of parts of Aristotle's *Politics and Ethics*, Rousseau's *Social Contract* and his constitutional writings on Geneva, Corsica, and Poland, and Tocqueville's *Democracy in America*.

**PLSC 647b, The Philosophy of Religion and Politics. Paulina Ochoa Espejo.**

HTBA

Religion and politics are interlocked. Religion influences political behavior, the construction of social institutions, and the conduct of international affairs. Politics influences churches and the construction of religious institutions. But what is the nature of the relationship between religion and politics? Are religious ideas merely political ideology or are the two distinct? This course is designed to help students think through philosophical questions about religion and politics. We give special attention to the question: Can there be a secular source of legitimate authority? We approach these questions by working at the intersection of philosophy of religion and political philosophy. We read works by Whitehead, Hartshorne, Badiou, James, Weber, Schmitt, Blumenberg, MacIntyre, and Taylor.

**INTERNATIONAL RELATIONS****PLSC 650b<sup>U</sup>, Theories of War and Peace. Bruce Russett.**

W 3.30–5.20

Comprehensive review and analysis of the theoretical literature on the causes of war and survey of some major ongoing research programs on war and peace. Includes structural systemic, dyadic, domestic political, bureaucratic/organizational, and psychological approaches.

**PLSC 655a<sup>U</sup>, Nationalism and Identity. Keith Darden.**

M 3.30–5.20

Exploration of the formation of national identity and the expression of nationalist sentiments through ethnic parties, autonomy movements, resistance to occupation, and warfare. Particular focus on Europe and post-Soviet Eurasia.

**PLSC 656b<sup>U</sup>, American National Security Policy. William Odom.**

M 3.30–5.20

The course examines the institutions and processes for making U.S. national security strategy and policy; reflects critically on inherent tensions in the way Americans view the nature of war, the use of force, the aims of diplomacy, and America's role in the world; and addresses several contemporary challenges facing the U.S. national security policy making.

**PLSC 661b, Business, Government, and Globalization. Paul Bracken.**

M 2.40–4.40

Transformational forces of globalization and technology are changing the configuration of business and government throughout the world. This course applies to countries the tools and frameworks developed for studying business. A comparative approach (East and South Asia, Europe, the U.S.) is used to analyze the politics and strategy of the multinational corporation. Topics covered include technology strategies, risk and the global corporation, the Global Compact, and organizational formats for multinational enterprise. *Also MGT 580b.*

**PLSC 662a<sup>U</sup>, Strategy, Technology, and War. Paul Bracken.**

MW 11.30–12.45

The interrelationship of strategy, foreign policy, and military technology since 1900. Examination of classic and modern formulations of this relationship, including new post-Cold War theories of the role of force in international affairs. Topics include multipolarity and the emergence of new competitors; developments in military technology and their impact on the balance of power and U.S. international position; proliferation of weapons of mass destruction; information warfare and the revolutionary impact of new technologies. *Also MGT 586a.*

**PLSC 668a<sup>U</sup>, International Dimensions of Democratization. Nikolay Marinov.**

T 9.30–11.20

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.

**PLSC 669b<sup>U</sup>, Peace Keeping and Peace Building. Nicholas Sambanis.**

M 7–8.50

This seminar for graduate students and advanced undergraduates provides a comprehensive analysis of theories and evidence on the uses of international organizations in building peace in countries emerging from civil war. The course is structured to help students engage in original research on topics related to peace building.

**PLSC 670a, Global Constitutionalism. Michael Doyle.**

MW 4.10–5.25

The course compares a variety of proposals that have been advanced to promote global order. We begin with traditional conceptions of the balance of power among independent states and then explore arrangements designed to produce increasing forms of international and world order. These include liberal internationalism, collective security through the League Covenant and the United Nations Charter, Clark and Sohn's *World Peace Through World Law*, John Rawls's *Law of Peoples*, and various other contemporary models of global governance networks and global democratization. In addition to assessing the particular merits and limitations of these visions of global order, we examine the underlying principles of international politics, institutional accountability, and responsibility that characterize these efforts to establish rules for the globe. Prerequisite: a previous course in international law or politics. *Also LAW 20137.*

**PLSC 673b<sup>U</sup>, Social Foundations of War. Vivek Sharma.**

T 3.30–5.20

This course is designed to review the state of theorizing in international relations on security issues. Part of the goal of the course is to sort out where the real as opposed to artificial debates exist and to arrive at a more synthetic vision of international relations.

**PLSC 675b<sup>U</sup>, Researching Ethnic Politics. Thad Dunning.**

T 1.30–3.20

Attention is given to questions of research design, as they pertain to research on ethnic politics. While engaged with fundamental, substantive questions and topics, the course is also especially concerned with how to do research on ethnic politics. Preference is given to undergraduates in international studies or political science, M.A. students in international relations, and graduate students in political science. *Also INRL 535b<sup>U</sup>.*

**PLSC 676b, Use of Force. Michael Doyle.**

W 4.10–6

This research seminar offers an opportunity for students to explore the law, ethics, and politics of the use of force. We concentrate on anticipatory self-defense and humanitarian intervention. When, other than in self-defense once an armed attack has occurred, should states be allowed to forcibly intervene in or invade another state in order to protect themselves? When should states be permitted or required to intervene in order to rescue populations from a humanitarian emergency? Drawing on the literature and examining historical cases, the seminar aims to foster a discussion of what would be better procedural and substantive guidelines for making these difficult decisions. At the beginning of the term, the seminar meets together to consider some of the key issues and methods of analysis. Students orally present an outline of their paper before the end of the term. Papers should focus on contentious historical or contemporary cases. *Also LAW 21257.*

**PLSC 679b, Theories, Methods, and Approaches in the Study of International Relations. Keith Darden.**

W 1.30–3.20

This course examines theories of international relations and the methods used for evaluating them. The course begins with a review of different philosophies of science, surveys the main theoretical traditions in International Relations, and then examines the different empirical methods that can be used to identify causation, using examples from IR. The course is designed to marry comprehensive conceptual training with the tools to do original research. Students gain practical experience in selecting a problem, developing or selecting a theory, coding and analyzing their own data, and demonstrating causation with a case study.

**PLSC 684b<sup>U</sup>, War and Public Health. Bruce Russett.**

T 1.30–3.20

The immediate combat casualties in wars represent only the tip of the iceberg of long-term casualties due to malnutrition, disease, and social disruptions that derive indirectly from war. We examine how these casualties arise and their humanitarian and political implications. This is a research seminar, following some common readings with major papers.

**PLSC 685a, Theories in International Relations. Nikolay Marinov.**

M 3.30–5.20

This course provides an introduction to the major concepts and theories in the field of International Relations. By the end of the course, students should be familiar with some of the major debates in the field, and be comfortable using IR concepts and theories to understand and explain events in international politics. The course is a reading-intensive seminar, and the weekly meetings are structured around student-led presentations and discussions of the assigned readings for the week. The student presentations should provide a brief overview of the main arguments of the readings and raise questions for group discussion. All students should prepare to participate in the group discussion by preparing discussion notes, which are turned in at the end of each session of class. There are approximately 150–200 pages of required reading per week. *Also INRL 555a.*



**PLSC 689a<sup>U</sup>, Secession and Political Boundaries. Nicholas Sambanis.**

M 7–8.50

This 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.

**PLSC 715a, Studies in Grand Strategy, Part II. John Gaddis, Paul Kennedy.**

M 3.30–5.20

Part II of the two-term linked seminar offered during the calendar year 2006. Research seminar. *Also HIST 985a.*

**PLSC 715b, Studies in Grand Strategy, Part I. John Gaddis, Paul Kennedy.**

M 1.30–3.20

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, whether of a historical or contemporary character. Written reports on these projects are presented and critically discussed early in the fall term. The seminar then turns its attention to strategic dilemmas currently facing governments, corporations, and nongovernmental organizations. Students must take both terms, fulfill the summer research/internship requirement, and attend additional lectures on grand strategy to be scheduled throughout the spring and fall terms. For the first term, students from the Graduate School receive a grade of FY (full year), which converts to a final grade for both terms upon completion of the course. Other students receive grades in accordance with the grading systems of their respective schools. In both terms the seminar meets during reading week and holds a total of fourteen weekly sessions. Admission is by competitive application only; forms are available at International Security Studies. *Also HIST 985b.*

**COMPARATIVE POLITICS****PLSC 714a, Corruption, Economic Development, and Democracy.****Susan Rose-Ackerman.**

W 2–4

A seminar on the link between political and bureaucratic institutions on the one hand, and economic development on the other. Consideration is given to the role of international aid and lending organizations such as the World Bank. A particular focus is the impact of corruption on development. *Also LAW 20098.*

**PLSC 718b, Comparative Policy Development. Jacob Hacker.**

HTBA

This course is an introduction to research and theorizing in the field of comparative public policy. It departs from a traditional comparative policy analysis course in its emphasis on politics — the institutions, processes, and actors that characterize contrasting political regimes. It departs from a traditional comparative politics course in its emphasis on policy — the structures, tools, and outcomes that characterize contrasting policy regimes. By tracing contiguities between these two often isolated research traditions, the course maps out some of the most vital links between politics and policy in the comparative context, exploring both the policy consequences of comparative political variation and the political consequences of comparative policy variation. The principal empirical focus is the domestic policies of advanced



industrial democracies in Europe and North America, with special emphasis placed on the United States as a comparative case.

**PLSC 720a<sup>U</sup>, Sexual Violence and War. Elisabeth Wood.**

T 7–8,50

In this seminar we analyze patterns of sexual violence in war. While sexual violence occurs to at least some degree in most wars, it occurs to sharply varying extent and in radically different patterns. We study a number of cases in detail, including Rwanda and Bosnia where sexual violence was extremely widespread, Colombia and Guatemala where it was frequent on the part of one of the factions of the war, Sierra Leone and Liberia where it included sexual slavery, and El Salvador and Sri Lanka where it was relatively limited. We also examine two well-documented cases of sexual violence in inter-state wars, by the Soviet Army in World War II and the Japanese in Nanking. We analyze how well the relevant literatures in sociology, political science, criminology, psychology, biology, and gender studies account for these patterns. *Also AFST 806a<sup>U</sup>.*

**PLSC 722b<sup>U</sup>, Authoritarian Regimes. Pierre Landry.**

W 1.30–3.20

The course introduces students to the key literature on authoritarian regimes and their political evolution.

**PLSC 733a<sup>U</sup>, Power and Authority in China's Localities. Pierre Landry.**

W 1.30–3.20

An examination of the relationship between “reforms” and the political evolution of Chinese localities in contemporary China. Topics include the “village” literature, namely the lowest level of aggregation of China's local institutions, and the issue of political authority in the broader contexts of cities and provinces.

**PLSC 734a, Comparative Research Workshop. Ivan Szelenyi, Karl Ulrich Mayer, Philip Gorski, Julia Adams.**

W 4–6

This workshop is a weekly interdisciplinary seminar at which work-in-progress by distinguished visiting scholars, Yale graduate students, and faculty from various social science disciplines is discussed. Papers are distributed a week ahead of time and also posted at the Web site of the Center for Comparative Research. Students who take the course for a letter grade have to present a paper the term they are enrolled for credit. *Also SOCY 560a.*

**PLSC 734b, Comparative Research Workshop. Ivan Szelenyi, Karl Ulrich Mayer, Philip Gorski, Julia Adams.**

W 4–6

Please see PLSC 734a for course description. This term's workshop has an additional focus on recent developments in comparative methodology. *Also SOCY 560b.*

**PLSC 736b, Formal Models of Comparative Politics. Thad Dunning.**

HTBA

We discuss and dissect recent models of the political regime type, political transitions, the separation of powers in democracies, and other topics. The goal is to become better consumers and critics of models, as well as to learn technique through discussion of leading exemplars. A previous course in game theory is recommended. *Also INRL 595b.*

**PLSC 744b<sup>U</sup>, The Dynamics of Russian Politics. William Odom.**

T 1.30–3.20

Issues of political stability, constitutionalism, and institutions for political participation and governing are examined in light of contemporary events as well as the legacy of the Soviet

period. Concepts from political development literature are used to devise alternative interpretations of the most critical determinants of Russian political change and stability, today and in the future. Huntington's *Political Order in Changing Societies*, Dahl's *Polyarchy*, Barrington Moore's *The Social Origins of Dictatorship and Democracy*, as well as selected journal articles on transitions to democracy, provide the analytic tools for analysis. Students write a short midterm essay on concepts for analysis, and choose a research paper topic in one of the main issue areas, basing their research on the contemporary Russian press and other available sources on Russian affairs since 1985. *Also INLR 545b.*

**PLSC 755a<sup>U</sup>, European Politics. David Cameron.**

T 1.30–3.20

A comprehensive survey of politics in Europe. Attention is given to a variety of issues such as the role of the state in the economy; party systems and electoral change; migration, immigration, and demographic change; political and economic transformations in post-Communist Europe; and social and economic policy in the European states, as well as to the origins, development, and current performance of the European Union. With respect to the latter, the course concentrates on institutional arrangements within the EU, relations between the EU and its member states, and recent developments such as the creation of an Economic and Monetary Union, enlargement, and the negotiation of a constitutional treaty.

**PLSC 764a, Civil Wars. Stathis Kalyvas.**

M 6–8

This is a seminar about cutting-edge research on civil wars, violent ethnic conflict, and the dynamics of violence. We read recent and forthcoming work as well as older pieces, and discuss various approaches and methods. Although the readings include some historical material and a few case studies, the emphasis is analytical and theoretical. This seminar also aims to address questions of research design in comparative politics, with a particular emphasis on conceptually ambiguous phenomena and data-poor environments.

**PLSC 777a, Comparative Politics I: Research Design. Susan Stokes.**

W 1.30–3.20

The first part of a two-part sequence designed to introduce graduate students to the fundamentals of comparative politics, including the major debates, topics, and methods.

**PLSC 778b, Comparative Politics II. Stathis Kalyvas.**

M 6–8

The second part of a two-part sequence designed to introduce graduate students to the fundamentals of comparative politics, including the major debates, topics, and methods.

**PLSC 779a, Agrarian Societies: Culture, Society, History, and Development.**

Michael Dove, James Scott, Steven Stoll.

M 1.30–5.20

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from 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. *Also ANTH 541a, F&ES 80054a, HIST 965a.*

**PLSC 780a, Institutions and Transitions of Democracy. Ellen Lust-Okar.**

T 3.30–5.20

An examination of the institutional choices of regime transitions and their implications. Consideration of why some states create presidential systems and others parliamentary ones; the choices of various electoral rules; and political implications of these institutions for future regime change.

**PLSC 786a,b, Political Economy Colloquium. Kenneth Scheve.**

M 12 – 1.30

This course meets throughout the year in conjunction with the Leitner Political Economy Seminar Series. The audience for this course includes those students who have substantive interests in the interaction between economics and politics, as well as those students interested in the research methods (analytical and empirical) employed by contemporary political economists. The colloquium 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 fellow students.

**PLSC 787a<sup>U</sup>, Japanese Politics. Frances Rosenbluth.**

W 1.30 – 3.20

This course places Japanese politics in historical, theoretical, and comparative perspectives. After comparing conceptual frameworks, we examine the organization and functioning of political parties, factions, and local electoral machines. The latter portion of the course takes a close look at the government's decision-making process in the area of economic regulation and social policies. Finally, we consider recent changes in Japanese politics and their implications for Japan's global role.

**POLITICAL ECONOMY****PLSC 712b, Comparative Political Economy. Frances Rosenbluth.**

W 10 – 12

The course introduces graduate students to the basic theoretical and methodological approaches to political economy (most notably rational choice and game theory), as well as analyzing important empirical questions and providing a forum for students to undertake their own research. Some of the empirical topics include transitions to democracy and the market, political competition and economic outcomes, globalization, deregulation, environment, regional integration, federalism, and corruption.

**PLSC 749b<sup>U</sup>, Political Economy of Gender. Frances Rosenbluth.**

T 9.30 – 11.20

This course examines gender using standard analytical tools of political economy. The course is divided into three parts. The first reviews classical and modern political theories of gender. The second takes up neoclassical and bargaining models of gender. The third lays out a sequence of topics from historical and contemporary cases including gender gaps in wages, career trajectories, and political representation for theoretical evaluation.

**PLSC 792b, Models of Bargaining. Seok-ju Cho.**

T 10 – 12

Collective decision making in politics often takes the form of bargaining; that is, a process through which actors try to reach an agreement on their own. This course offers a survey of the literature of bargaining theories in political science. We focus on non-cooperative bargaining models, which are applicable to many subfields of political science, such as legislative politics, cabinet formation, bargaining between different branches of the government, and conflict resolution between countries.

**AMERICAN POLITICS****PLSC 800a, Introduction to American Politics. David Mayhew.**

T 1.30 – 3.20

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, power and

influence, 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, M. Smith, L. Bartels, D. Mayhew, K. Poole and H. Rosenthal, K. Krehbiel, E. Schickler, D. Carpenter, and A. Alesina. Students are expected to read and discuss each week's assignment and, for each of five weeks, to write a three- to five-page analytic paper that deals with a subject addressed or suggested by the reading.

**PLSC 814b, Reconstruction from the Right. Daniel Kevles, Michael Graetz.**

W 2.10–4

Research seminar. Centering on the 1970s, an examination of changes in policy and society that moved the United States from the liberalism of the Kennedy-Johnson years to the conservatism of the Reagan era. Topics to be considered include the backlash against the women's and the civil rights movements, deregulation, tax and economic policies, the rise of the religious right, the federalization of crime, the new immigration and regional migrations, the emergence of the personal computer, biotechnology, reproductive technologies industries, and energy, environment, and globalization. *Also AMST 778b, HIST 778b, LAW 21178.*

**PLSC 819b<sup>U</sup>, Political Participation and Representation. Alan Gerber.**

T 3.30–5.20

Examination of the causes and consequences of observed patterns of participation in the electoral process, with a focus on voter turnout and campaign contributions. Theoretical models and empirical evidence are both considered. Readings include works by Verba, Scholzman, Brady, Rosenstone and Hansen, Downs, and Olsen.

**PLSC 822a&b, Research Topics in American Politics. Alan Gerber.**

W 12–1.30

This 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. Students taking the course for a grade are required to present their work and submit a research paper.

**PLSC 846b, The Civil Rights Era. Bruce Ackerman.**

HTBA

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.

**PLSC 853a<sup>U</sup>, U.S. National Elections. David Mayhew.**

W 1.30–3.20

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.

**PLSC 855a<sup>U</sup>, Identity, Persuasion, and Leadership. Eric Dickson.**

W 3.30–5.20

The aim of this course is to encourage the development of new theoretical perspectives on identity, persuasion, and leadership, as well as novel experimental and empirical means of testing such theories. The class considers insights from political science, psychology, and economics.

**PLSC 858a, Political Analysis in Legal and Policy Design. S. Teles.**

Public policies or legal strategies have impacts not only on the population they are intended to serve, but on the larger political system through which they are enacted and maintained. This course examines two factors that are typically ignored in policy or legal analysis: the elements of policy or legal design that can enhance viability in the short term, and the long-term impact of policies and legal strategies on public policies, interest group organization, public opinion, and political mobilization. Scheduled examination. *Also LAW 20268.*

## PSYCHOLOGY

2 Hillhouse, 432.4500

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

### *Chair*

Marcia Johnson (432.4545, marcia.johnson@yale.edu)

### *Director of Graduate Studies*

Susan Nolen-Hoeksema (432.0699, susan.nolen-hoeksema@yale.edu)

### *Professors*

Woo-kyoung Ahn, Stephen Anderson (*Linguistics*), John Bargh, Linda Bartoshuk (*Surgery; Otolaryngology*), Sidney Blatt (*Psychiatry*), Paul Bloom, Thomas Brown, Kelly Brownell, Marvin Chun, Margaret Clark, Ravi Dhar (*School of Management*), Carol Fowler (*Haskins Laboratories*), Louis Goldstein (*Linguistics*), Donald Green (*Political Science; ISPS*), Marcia Johnson, Alan Kazdin, Frank Keil, Marianne LaFrance (*Women's, Gender & Sexuality Studies*), James Leckman (*Pediatrics*), 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*

Larry Davidson (*Psychiatry*), Karyn Frick, Elena Grigorenko (*Child Study Center*), Jeannette Ickovics (*Epidemiology & Public Health*), Robert Kerns (*Veterans Administration Medical Center*), Ami Klin (*Child Study Center*), Joseph Mahoney, Linda Mayes (*Child Study Center*), Brian Scholl, Mary Schwab-Stone (*Child Study Center*), Kathleen Sikkema (*Psychiatry*)

### *Assistant Professors*

Maria Babyonyshev (*Linguistics*), William Corbin, Walter Gilliam (*Child Study Center*), Jeremy Gray, Joan Kaufman (*Psychiatry*), Julia Kim-Cohen, Douglas Mennin, Nathan Novemsky (*School of Management*), Maria Piñango (*Linguistics*), Valerie Purdie-Vaughns, Laurie Santos, Mark Schaefer (*Child Study Center*), Glenn Schafe, Teresa Treat

### *Lecturers*

Marc Brackett, Nancy Close, Nelson Donegan, Carla Horwitz, Kent Kiehl, Kristi Lockhart, Ewan McNay, Tina Newman, Burton Saxon

### *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 predissertation research project, to be initiated not later than the second term and completed not later than March 15 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, is necessary for continuation beyond the second year. (4) Submission of a dissertation prospectus, a dissertation area review of the literature, 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. (5) 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. The dissertation area review of the literature must be approved prior to receipt by the readers of a preliminary draft of the dissertation. 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. 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](http://www.yale.edu/psychology).

## *Courses*

[PSYC 502b, Learning Theory.]

[PSYC 503a, Memory.]

**PSYC 507a, Health Psychology: Clinical and Social Foundations.** William Corbin.

T 1.30–3.20

Introduction to theory and empirical approaches in health psychology. Consideration of the role of psychological variables in the etiology and treatment of disease and in the maintenance of health. Emphasis is placed on current basic research in selected areas of health psychology and on the application of this knowledge base to health care delivery.

[PSYC 511b, Cognitive Development.]

[PSYC 514b, Applied Developmental Science.]

**PSYC 518a, Data Analysis: Quantitative Variables.** Teresa Treat.

MWF 10.30–11.20

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.

**PSYC 520b<sup>u</sup>, Multivariate Data Analysis with Latent Variables.** Staff.

HTBA

This course covers multivariate data analysis techniques with latent variables. Particular techniques to be covered include factor analysis (both the component and common factor models); unidimensional scaling; metric and non-metric multidimensional scaling; and hierarchical and additive cluster analysis, as well as an introduction to structural equation modeling.

[PSYC 521b<sup>u</sup>, Multivariate Data Analysis with Observable Variables.]

[PSYC 523b, Cognitive Neuroscience.]

**PSYC 524a<sup>u</sup>, Concepts and Categorization.** Woo-kyoung Ahn.

F 2.30–4.20

This seminar explores how people learn and represent concepts. Topics include prototype, exemplar, and “theory” theories of conceptual representation, computational models of concept acquisition, how concepts are changed and created, expert/novice differences in categorization, levels of concepts, natural kinds and artifacts, and applications of some of the issues. (Previously PSYC 671.)

[PSYC 525a, Minds of Infants.]

[PSYC 528a, Gender and Psychopathology.]

**PSYC 532b<sup>u</sup>, Nature/Nurture and Human Development.** Julia Kim-Cohen.

w 1.30–3.20

This course is intended to provide an introduction to the area of behavior genetics as it relates to field of psychology. This course covers methods for identifying genetic and nongenetic influences on the development of human traits, abilities, and mental disorders. Topics cover research methods for identifying genetic and environmental influences, with a focus on cognitive abilities, personality, and psychological disorders. Ethical considerations as well as future directions for the field are examined. Students explore ways in which the fields of psychology and genetics can be synergistically combined to answer questions regarding the interplay of nature and nurture in human behavioral development.



**PSYC 534b<sup>U</sup>, Adolescent Development. Joseph Mahoney.**

M 1.30–3.20

This course considers current theory and research on adolescent development including physical development and health, peer groups and romantic relationships, parent-adolescent relationships, changing definitions of self, work and leisure activities, problem behaviors, positive youth development, and preparation for adulthood.

[PSYC 539b, Psychopathology and Its Treatment.]

[PSYC 540b, Changing Behavior in Applied Settings.]

[PSYC 541a, Research Methods in Psychology.]

[PSYC 543a, History and Development of Psychological Theory.]

**PSYC 553a, Behavioral Decision Making I. Ravi Dhar.**

T 4.10–7.10

This seminar examines research on the psychology of judgment and choice. Although the normative issue of how decisions should be made is relevant, the course focuses mainly on the description issue of how decisions are made. Topics of discussion include choice, judgment heuristics and biases, decision framing, prospect theory, mental accounting, context effects, task effects, regret, and other topics. The goal of the seminar is threefold: to foster a critical appreciation of existing knowledge in behavioral decision theory, to develop students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that knowledge. *Also MGMT 753a.*

[PSYC 554a, Behavioral Decision Making II.]

[PSYC 556b, Developmental Psychopathology.]

[PSYC 569a, Psychology's Contribution to Gender and Vice Versa.]

[PSYC 570b, Nonverbal Communication.]

[PSYC 605b<sup>U</sup>, The Relation of Speech to Language.]

**PSYC 612a<sup>U</sup>, Neuroimaging Analyses Techniques. Kent Kiehl.**

Th 9.30–11.20

This course covers basic through advanced techniques for the analyses of brain imaging data. Analysis techniques for electroencephalography (EEG), event-related potentials (ERPs), positron emission tomography (PET and SPECT), functional magnetic resonance imaging (fMRI), and magnet resonance spectroscopy (MRS) are examined. Special emphasis is placed on fMRI analyses using statistical parametric mapping (SPM). Students are given example brain imaging data sets and are expected to analyze the data within the SPM framework. The course is designed for social scientists with emphasis on understanding the principles of brain imaging analyses, and successful completion of the course relies heavily on the mathematical implementation of image analyses.

[PSYC 617b<sup>U</sup>, Evolutionary Psychology.]

[PSYC 620, Topics in Cognitive Development.]

[PSYC 625a, Emotion and Cognitive Control.]

**PSYC 627a<sup>U</sup>, Topics in Infant Studies. Karen Wynn.**

M 1.30–3.20

This 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.

[PSYC 637b<sup>U</sup>, Emotion Function and Dysfunction: Applications to Psychopathology.]

[PSYC 639b<sup>U</sup>, Interpersonal Attraction and Relationships.]

**PSYC 640b, Transdisciplinarity: A New Research Approach to Address Complex Scientific Problems.** Suchitra Krishnan-Sarin.

W 9.30–11.20

The traditional method of addressing scientific and health problems has been to study the question within a single discipline in depth. However, the complexity of most disorders requires a more integrated approach. A new approach, transdisciplinarity, has arisen in an effort to address these complex issues from the standpoint of many disciplines at the same time. The course faculty uses a case-based approach, with examples from their own work, to illustrate and define how transdisciplinary approaches might be used to come up with a more meaningful understanding of complex problems.

[PSYC 644b<sup>U</sup>, Neurobiology of Emotion.]

[PSYC 645a, Neuropsychology of Aging.]

[PSYC 648b<sup>U</sup>, Cellular Analysis of Learning and Memory: Vertebrate Model Systems.]

**PSYC 649a<sup>U</sup>, Topics in Syntax: Acquisition of Movement.** Maria Babyonyshev.

T 3.30–5.20

Issues associated with the acquisition of movement. Topics include the order of acquisition of movement operations, difficulties associated with each operation, existing theoretical models of these difficulties, the implications of child data for the syntactic theories of movement, and the distinct properties of movement operations in second language acquisition and in impaired acquisition. *Also LING 662a<sup>U</sup>.*

**PSYC 650a<sup>U</sup>, Topics in Syntax: The Syntax-Semantics Interface.** Maria Piñango.

Th 3.30–5.20

Exploration of the psychological reality of specific proposals regarding how syntactic structure and semantic structure come together (e.g., how meaning is derived from sentence organization). These proposals are examined through an experimental psycholinguistic (real-time parsing) and neurolinguistic (lesion studies and neuroimaging) perspective. Specific phenomena to be evaluated include anaphora resolution, control, and argument and event structure. *Also LING 660a<sup>U</sup>.*

**PSYC 654b<sup>U</sup>, Sensory Information Processing.** Lawrence Marks.

T 9.30–11.20

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.

**PSYC 657a, Social and Behavioral Influences on Health.** Jeannette Ickovics.

T 1–2.50

This 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. This course emphasizes the integration of research from the social and behavioral sciences with epidemiology and biomedical sciences. *Also CDE 505a.*

**PSYC 659a<sup>U</sup>, Addictive Behaviors. William Corbin.**

T 1.30–3.20

An introduction to the field of addictive behaviors. Three areas of focus include defining, assessing, and diagnosing addictive behaviors as well as reviewing epidemiology research on alcohol and drug abuse and negative consequences of normative alcohol and drug use: examining factors that contribute to alcohol- and drug-related problems, including genetic, physiological, neurochemical, cognitive, and social factors; and evaluating current prevention and treatment approaches for addictive behaviors.

**[PSYC 664a, Health and Aging.]****PSYC 684a, Introduction to Psychotherapy: Technique. David Klemanski.**

HTBA

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. Permission of instructor required. Enrollment limited to fifteen.

**PSYC 684b, Introduction to Psychotherapy: Technique. David Klemanski.**

HTBA

The focus of this seminar is on formulating and conceptualizing psychological problems from a cognitive-behavioral perspective. Special consideration is paid to individual and cultural diversity in conceptualizing cases and planning treatment. Also discussed are ways in which cognitive-behavioral perspectives can be integrated with other theoretical orientations (e.g., interpersonal theory, experiential therapy).

**PSYC 689a, Psychopathology and Diagnostic Assessment. David Klemanski.**

HTBA

Didactic practicum for first-year clinical students. Main emphasis is initial assessment. Treatment planning and evaluation of progress also covered. Students first observe and then perform initial interviews. Applicable ethics and local laws reviewed.

**PSYC 690b, Ethics and Clinical Practice: Legislation and Diversity Issues. David Klemanski.**

HTBA

Introduction to ethical and legal guidelines for clinical practice. In addition, supervision on diagnostic interview using the Structured Clinical Interview for DSM-IV is provided.

**PSYC 702, Current Work in Cognition. Woo-kyoung Ahn.**

T 12–1.30

A weekly seminar in which students, staff, and guests report on their research in cognition and information processing.

**PSYC 704, Current Work in Behavioral Neuroscience. Allan Wagner.**

Th 3–4.30

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.

**PSYC 708, Current Work in Developmental Psychology. Joseph Mahoney.**

W 12–1.30

A luncheon meeting of the faculty and graduate students in developmental psychology for reports of current research and discussion on topics of general interest.

**PSYC 710, Current Work in Social Psychology and Personality.****Marianne LaFrance [F], Valerie Purdie-Vaughns [Sp].**

M 12–1.30

Faculty and students in personality/social psychology meet during lunchtime to hear about and discuss the work of a local or visiting speaker.

**PSYC 711, Current Work in Child Development and Social Policy.****Walter Gilliam, Edward Zigler, Sandra Bishop-Josef.**

F 11.30–12.20

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.

**PSYC 720, Current Work in Clinical Psychology. Teresa Treat.**

Th 12–1.30

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.

**PSYC 721, Research Topics in Infant Cognition. Karen Wynn.**

HTBA

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. Permission of instructor required.

**PSYC 722, Research Topics in Eating and Weight Disorders. Kelly Brownell.**

HTBA

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.

**PSYC 723a, Research Topics in Child and Adolescent Therapy. Alan Kazdin.**

HTBA

This 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 724a, Research Topics in Child Development and Social Policy.]****PSYC 726, Research Topics in Mood Regulation and Mental Health.****Susan Nolen-Hoeksema.**

HTBA

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.

**PSYC 728, Research Topics in Prevention Research. Joseph Mahoney.**

HTBA

The course discusses current theory and research on social intervention research and social policy. Format involves student presentation and discussion of original research, student- and faculty-led discussions of current topics in prevention research and social policy, and student development and career training in social intervention research and policy.

**PSYC 729, Research Topics in Language and Cognition. Paul Bloom.**

HTBA

Seminar focusing on ongoing research projects in language, cognition, and development. Permission of instructor required.

**PSYC 730, Research Topics in Addictive Behaviors. William Corbin.**

HTBA

A forum for graduate students conducting research on alcohol and drug abuse.

**PSYC 731, Research Topics in Cognition and Development. Frank Keil.**

HTBA

A weekly seminar discussing research topics concerning cognition and development. Primary focus on high-level cognition, including such issues as the nature of intuitive or folk theories, conceptual change, relations between word meaning and conceptual structure, understandings of divisions of cognitive labor, and reasoning about causal patterns.

**PSYC 732, Research Topics in Visual Cognitive Neuroscience. Marvin Chun.**

HTBA

Examines current research in visual cognitive neuroscience, including discussion of proposed and ongoing research projects. Topics include visual attention, perception, memory, and contextual learning.

**PSYC 734, Research Topics in Anxiety Disorders. Douglas Mennin.**

HTBA

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.

**PSYC 735, Research Topics in Thinking. Woo-kyoung Ahn.**

HTBA

In this lab students explore how people learn and represent concepts. Weekly discussions include proposed and ongoing research projects. Some topics include computational models of concept acquisition, levels of concepts, natural kinds and artifacts, and applications of some of the issues.

**PSYC 738, Research Topics in Cultural Diversity and Social Psychology.**

**Valerie Purdie-Vaughns.**

HTBA

Examines current research related to culture, intergroup relations, group processes, and diversity in social psychology. Discussions include proposed and ongoing research projects. Emphasis placed on building research skills for conducting empirical investigations (hypothesis testing, design, and analysis).

**PSYC 739, Research Topics in Autism and Related Disorders. Fred Volkmar, Ami Klin.**

F 9-10

Focus on research approaches in the study of autism and related conditions including both psychological and neurobiological processes. This seminar emphasizes the importance of understanding mechanisms in the developmental psychopathology of autism and related conditions.

**PSYC 741, Research Topics in Emotion and Relationships. Margaret Clark.**

HTBA

Members of this laboratory read, discuss, and critique current theoretical and empirical articles on relationships and on emotion (especially those relevant to the functions emotions serve within relationships). In addition, ongoing research on these topics is discussed along with designs for future research.

**PSYC 746b, Research Topics in Developmental Psychopathology. Julia Kim-Cohen.**

HTBA

This course focuses on exploring mechanisms of risk and resilience in psychosocial development, including but not limited to early life experiences, parenting, gene-environment interplay, and emotion processing. Permission of instructor required.

**[PSYC 747, Research Topics in Affective Neuroscience.]**

**PSYC 748, Research Topics in Emotion and Cognitive Control. Jeremy Gray.**

HTBA

This 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.

**PSYC 749, Research Topics in Memory. Marcia Johnson.**

Th 2.30–4.20

Examines current research on cognition and memory, including discussion of proposed and ongoing research projects. Topics include issues in design, analysis, and interpretation of empirical studies exploring human memory.

**PSYC 750, Research Topics in the Neurobiology of Learning and Memory.**

Thomas Brown.

HTBA

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 neuroanatomy, and contemporary behavioral neuroscience.

**[PSYC 751, Research Topics in Memory, Aging, and Neurobiology.]**

**PSYC 766, Research Topics in Perception and Cognition. Brian Scholl.**

Th 1–3

A seminar-style discussion of recent research in perception and cognition, covering both recent studies from the literature and the ongoing research in the Yale Perception and Cognition Laboratory.

**PSYC 767, Research Topics in Emotion, Health, and Social Behavior. Peter Salovey.**

F 10.30–12.20

A forum for graduate students conducting research in the Health, Emotion, and Behavior Laboratory.

**PSYC 768, Research Topics in Psychopathology and Cognitive Processing.**

Teresa Treat.

HTBA

Weekly discussion and analysis of theoretical and measurement models relevant to examination of the role of cognitive processing in psychopathology. Permission of instructor required.

**PSYC 770, Research Topics in Animal Learning. Allan Wagner.**

HTBA

Students discuss the current literature, issues of experimental design, and theoretical interpretations pertinent to their own research projects in the area of animal learning.

**PSYC 771, Research Topics in Nonconscious Processes. John Bargh.**

HTBA

The lab group focuses on nonconscious influences of motivation, attitudes, social power, and social representations (e.g., stereotypes) as they impact on interpersonal behavior, as well as the development and maintenance of close relationships.

**PSYC 775, Research Topics in Animal Cognition. Laurie Santos.**

HTBA

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. Permission of instructor required.

**PSYC 777, Research Topics in Gender and Psychology. Marianne LaFrance.**

HTBA

The "Gender Lab" meets weekly to consider research being done in the department that bears on some gender-related issue.

**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.**

An optional extension of PSYC 661. 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. Faculty.**

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. Permission of the instructor required.

**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. Faculty.**

HTBA

Supervised practicum in the assessment and treatment of mood disorders, with an emphasis on cognitive-behavioral perspectives.

**PSYC 816b, Practicum in Developmental Disabilities and Developmental Assessment.  
Fred Volkmar, Ami Klin.**

HTBA

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. Permission of instructor required.

**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 821, Practicum in Clinical Child and Adolescent Treatment.]**

**PSYC 883, Practicum in Clinical Assessment. Donald Quinlan.**

Supervised psychological assessment using measures of intellectual functioning, projective testing, and neuropsychological testing with patients.

**PSYC 920, Individual Study: Dissertation Area Paper.**

By arrangement with faculty.

**PSYC 923, Individual Study: Theme Essay.**

By arrangement with faculty.

**PSYC 925, Individual Tutorial.**

By arrangement with faculty and approval of director of graduate studies.

**PSYC 930, Predissertation Research.**

By arrangement with faculty.



## RELIGIOUS STUDIES

451 College, 432.0828

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

### *Chair*

Harry Stout

### *Director of Graduate Studies*

Denys Turner

### *Professors*

Harold Attridge (*Divinity*), Gerhard Böwering, Jon Butler, Esther Glickler Chazon (*Visiting*), Adela Collins (*Divinity*), John Collins (*Divinity*), Carlos Eire, Margaret Farley (*Divinity*), Steven Fraade, Philip Gorski, Phyllis Granoff, John Hare (*Divinity*), Christine Hayes, Paula Hyman, L. Serene Jones (*Divinity*), Bentley Layton, Ivan Marcus, Dale Martin, Thomas Ogletree (*Divinity*), Gene Outka, David Smith (*Visiting*), Harry Stout, Emilie Townes (*Divinity*), Mary Evelyn Tucker (*Visiting*), Denys Turner, Miroslav Volf (*Divinity*), Robert Wilson, Warren Zev Harvey (*Visiting*)

### *Associate Professors*

Stephen Davis, Frank Griffel

### *Assistant Professors*

Shannon Craigo-Snell, Jacob Dalton, Ludger Viefhues

### *Senior Lecturer*

Koichi Shinohara

### *Lecturers*

Adel Allouche, Mara Benjamin, Hugh Flick, Jr., Kenneth Garden, David Lambert

### *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 Director of Graduate Studies, Department of Religious Studies, Yale University, PO Box 208287, New Haven CT 06520-8287.

### *Courses*

#### **RLST 502a<sup>U</sup>, Religions, Pluralism, and Philosophy. Ludger Viehues.**

TRH 11.30–12.45

A critical survey of different philosophical models addressing religious diversity in the twentieth century. Based on the epistemological motives in this literature, the course discusses the methodological assumptions underlying the philosophers' constructions of religious diversity. We study how theories from religious studies, feminist philosophy, anthropology, and non-Western writings on religious life and practice change the understanding of what religious diversity is, and how philosophy could learn from it. *Also WGSS 700a.*

#### **RLST 510b, Theories in the Study of Religion: Major Thinkers. Ludger Viehues.**

T 3.30–5.20

A seminar on how 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. Besides 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).

**RLST 522a, Early Modern Spain. Carlos Eire.**

W 3.30–5.20

Reading and discussion of sixteenth- and seventeenth-century texts and recent scholarship in English translation. *Also HIST 565a.*

**RLST 554b, Religious Histories of Tibet. Jacob Dalton.**

T 3.30–5.20

This course is designed for students wishing to learn about the traditional historical accounts of Tibet. Class time focuses on close readings of original sources in the classical Tibetan language. Further historical background for the readings is also provided in class.

**RLST 556a<sup>U</sup>, Medieval Indian Religions. Phyllis Granoff.**

W 1.30–3.20

This course focuses on a close reading of selected texts from India's classical religions: Buddhism, Jainism, and Hinduism. Some of the possible themes include the nature of the soul, the divine body, and lineage and transmission.

**RLST 558a, *Lotus Sutra*: The Scripture, Commentaries, and Miracle Stories.**

**Koichi Shinohara.**

W 10.30–12.20

A close reading of the *Lotus Sutra* in the light of a variety of Chinese commentaries and stories that developed around this scripture in East Asia. The course is open both to students who can read the original Chinese sources with ease and to those who do not read Chinese. Students who do not read Chinese are asked to read more broadly in Mahāyāna literature translated into English.

**RLST 561a<sup>U</sup>, Introduction to Classical Tibetan Texts. Jacob Dalton.**

W 2.30–4.20

For over a millennium now, the classical Tibetan language has served as the liturgical language of Tibet, the Chinese court, and much of Central Asia, playing a role in the Buddhist traditions of these regions much like that of Latin in the Catholic church. This course begins with a brief introduction to the alphabet and the grammar of classical Tibetan. Then we move quickly to selected readings from Buddhist texts in Tibetan. Thus the purpose of the course is to learn how to read classical Tibetan while also improving one's knowledge of the religion and culture of Tibet.

**RLST 563a<sup>U</sup>, Jainism and Buddhism. Phyllis Granoff.**

TTh 11.30–12.45

This course introduces students to basic ideas and practices of Jainism and Buddhism. Each year the course focuses on one central theme. The theme for 2006 is crime and karma.

**RLST 570a<sup>U</sup>, Japanese Religions. Koichi Shinohara.**

TTh 1–2.15, I HTBA

This course offers a thematic introduction to the study of Japanese religions. The study of religion sheds light on many of the fundamental assumptions, some more explicit than others, about the way we organize and live our lives. In this course we study selected aspects of Japanese religious life and explore how they shaped Japanese society and culture and why Japanese people found these practices attractive enough to continue going back to them over long periods of time.

**RLST 601a, Required Seminar for New Testament and Ancient Christianity: Philosophy at the Root of Christianity? Dale Martin.**

W 4.30–6.20

The required seminar for doctoral students in New Testament studies and Ancient Christianity for the fall of 2006 focuses on the current debate over the extent to which Greek and Roman philosophy influenced the writings of the New Testament and other early Christian literature. Advanced knowledge of early Christian literature and Graeco-Roman literature and culture is presupposed. Students not in the doctoral programs of New Testament studies or Ancient Christianity must obtain permission of the instructor in order to enroll.

**RLST 605a, Graeco-Roman Environment of the New Testament. Dale Martin.**

HTBA

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. Students not in the Ph.D. program may be admitted with permission of instructor.

**RLST 653b<sup>u</sup>, Introduction to Gnostic Texts in Coptic. Bentley Layton.**

MW 2.30–3.15

Readings in Gnostic and Valentinian literature from Nag Hammadi, in several dialects of Coptic. Prerequisite: CPTC 501 or equivalent. *Also CPTC 502b<sup>u</sup>.*

**RLST 655b, Christianity in the Second Century (Proseminar). Bentley Layton.**

T 1.30–3.20

Principal research areas in ancient Christian literature, controversy, and thought from Ignatius to Clement of Alexandria. A proseminar, required of all graduate students in New Testament Studies and Ancient Christianity.

**RLST 658a<sup>u</sup>, Egyptian Monastic Literature in Coptic. Bentley Layton.**

MW 2.30–3.15

Readings in the early Egyptian classics of Christian asceticism in Sahidic Coptic, including the desert Fathers and Shenoute. Prerequisite: CPTC 501 or equivalent. *Also CPTC 503a<sup>u</sup>.*

**RLST 659a<sup>u</sup>, Seminar: The Making of Monasticism. Bentley Layton.**

T 1.30–3.20

The history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity, with special attention to the eastern Mediterranean world. *Also HIST 531a<sup>u</sup>, NELC 534a<sup>u</sup>.*

**RLST 675b, Ancient Judaism. Christine Hayes.**

T 10–12

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. This 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. *Also JDST 722b.*

**RLST 705b, Readings in Religion and American History, 1600–2000. Jon Butler.**

M 9–11

This introductory graduate readings course assesses the interrelationship between religion and American society from 1600 to 2000. Concentrates on religion's successes and failures in shaping American society from the Puritans to modern neoconservative fundamentalism. Readings in primary and secondary sources; development of bibliographical skills. *Also AMST 705b, HIST 720b.*

**RLST 708a<sup>U</sup>, Revival and Reform in Islam. Kenneth Garden.**

MW 2.30–3.45

Exploration of the doctrine and rhetoric of Muslim reformers, medieval and modern, comparing treatment of common themes and sources of authority and legitimacy.

**RLST 720b, Seminar on the Qur'an. Gerhard Böwering.**

Th 4–6

Intensive study of the Qur'an. Readings in commentaries on the Qur'an. Special emphasis on textual and hermeneutical problems. Prerequisite: reading knowledge of Arabic; permission of instructor.

**RLST 721a, Seminar on Islamic Religious Thought. Gerhard Böwering.**

Th 4–6

Intensive study of Islamic theological and mystical texts. Select readings in classical Arabic sources. Prerequisite: reading knowledge of Arabic; permission of instructor.

**RLST 752a<sup>U</sup>, Mishnah Seminar: Tractate Ta'anit on Fasting. Steven Fraade.**

Th 9.30–11.20

Close study of a section of the Mishnah, the earliest digest of Jewish law, treating procedures for public fasts in response to drought and other forms of collective adversity. Particular attention to the textual practices of rabbinic legal discourse in relation to its social function, and to the interplay of law and narrative. Prerequisite: reading fluency in ancient Hebrew, or two years of college Hebrew. *Also JDST 727a<sup>U</sup>.*

**RLST 753a<sup>U</sup>, The Dead Sea Scrolls and the History of Ancient Judaism.**

Steven Fraade.

TTh 1–2.15

An examination of the place of the Dead Sea Scrolls and the Qumran community within the history of ancient Judaism. We focus on the major genres of the sectarian scrolls, with an eye to understanding the community's history, religious ideology, social structures, and place within the broader varieties of Graeco-Roman Judaism. Texts are available in English translation. No prerequisites. *Also JDST 725a<sup>U</sup>.*

**RLST 756b, The Required Ancient Judaism Seminar: Biblical Interpretation in Ancient Judaism. Steven Fraade, John Collins.**

W 1.30–3.20

An examination of the variety of forms and methods of biblical interpretation from the Hellenistic period into late antiquity. Topics may be drawn from inner-biblical interpretation, Dead Sea Scrolls, Alexandrian Judaism, pseudepigrapha, midrash, targum, and early Christianity. *Also JDST 756b.*

**RLST 759b<sup>U</sup>, The Dead Sea Scrolls and Jewish Prayer in Late Antiquity.**

Esther Chazon.

Th 9.30–11.30

A wide selection of the hundreds of prayers uncovered in the Dead Sea Scrolls are studied in depth with a view to the scrolls' impact on major issues in Second Temple Judaism and the institution of the synagogue liturgy by the rabbis and authors of the first prayer books. *Also JDST 733b<sup>U</sup>.*

**RLST 762a<sup>U</sup>, Memory, Memoirs, and Modern Jewish History. Paula Hyman.**

W 1.30–3.20

Exploration of how memoir writers from the seventeenth to the twentieth century 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. *Also HIST 952a<sup>U</sup>, JDST 784a<sup>U</sup>.*

**RLST 768a<sup>U</sup>, The Holocaust in Historical Perspective. Paula Hyman.**

MW 10.30–11.20, 1 HTBA

A survey of the major issues raised by the Holocaust, including the roots of Nazism; different theoretic perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. *Also HIST 979a<sup>U</sup>, JDST 788a<sup>U</sup>.*

**RLST 773a<sup>U</sup>, History of Jewish Culture to the Reformation. Ivan Marcus.**

TTH 11.30–12.45

A broad introduction to the history of Jewish culture from its beginnings until the late Middle Ages, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Judaism, Christianity, and Islam. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. *Also HIST 535a<sup>U</sup>, JDST 761a<sup>U</sup>.*

**[RLST 776b, Jews in Christian and Muslim Lands from the Fourth to Sixteenth Century.]****[RLST 777b<sup>U</sup>, Jews in Muslim Lands from the Seventh to Sixteenth Century.]****RLST 779a<sup>U</sup>, Weimar German-Jewish Thought. Mara Benjamin.**

TH 1.30–3.20

Seminar focusing on early twentieth-century German-Jewish theology; emphasis on strategies for reading religious texts in light of nineteenth-century critiques of religion. In-depth treatment of Martin Buber, Franz Rosenzweig; attention to other contemporaneous Jewish and Christian thinkers; contemporary literature on religious hermeneutics. *Also JDST 785a<sup>U</sup>.*

**RLST 785a<sup>U</sup>, Talmud Seminar: Sources of Jewish Law and Rabbinic Authority. Christine Hayes.**

MW 1–2.15

How can a legal system based on an eternal and immutable revelation grow and develop, and what are the special anxieties that attend human administration of a divine legal system? Exploration of the sources of Jewish law and authority in the Talmudic period; the interaction of divine revelation and human interpretation; and the theoretical basis and practical application of the rabbis' authority to both administer and interpret—at times radically—biblical law. Secondary readings in comparative law, contemporary legal theory, and legal interpretation inform our analysis of the Hebrew sources. Prerequisite: reading knowledge of Hebrew. *Also JDST 729a<sup>U</sup>.*

**RLST 786a<sup>U</sup>, Exodus and Exile in the Hebrew Bible. David Lambert.**

TTH 2.30–3.45

This course examines the theme of exodus in the Hebrew Bible. We examine the political, historical, literary, and theological dimensions of several biblical narratives in their ancient Near Eastern contexts and in formative Judaism and Christianity. *Also JDST 702a<sup>U</sup>.*

**RLST 787b<sup>U</sup>, Good Deeds in Judaism and Christianity. David Lambert.**

MW 2.30–3.45

This course examines the language used in the Hebrew Bible to depict ideal behavior and also considers this subject in works of early Judaism and Christianity. Readings concentrate on wisdom literature. *Also JDST 703b<sup>U</sup>.*

**RLST 789a<sup>U</sup>, Jewish Philosophy from Maimonides to Spinoza. Warren Zev Harvey.**

MW 2.30–3.45

A discussion of the role of the intellect and the passions in the writings of major Jewish philosophers from Maimonides through Spinoza. *Also JDST 762a<sup>U</sup>.*

**RLST 801a, Hebrew Bible Seminar: Problems in the Book of Deuteronomy.****Robert Wilson.**

Th 1.30–3.20

A close reading of the Hebrew text of Deuteronomy, with a focus on the book's literary history and religious thought. Prerequisite: two years of Biblical Hebrew or the equivalent; reading knowledge of German helpful but not required.

**RLST 802b<sup>u</sup>, Apocalyptic Religion in Cross-Cultural Perspective. Robert Wilson.**

Th 1.30–3.20

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 Pacific Islander movements, and modern manifestations such as Jonestown, the Branch Davidians, and Heaven's Gate.

**RLST 806a, Apocalyptic Imagination in Judaism, Christianity, and Islam.****Abbas Amanat, John Collins.**

Th 1.30–3.20

This course deals with the origins of apocalyptic beliefs in ancient Judaism and early Christianity, their continuing influence down to modern times, and the distinctive apocalyptic tradition in Islam. *Also HIST 543a.*

**RLST 865a, Moral, Religious, and Social Issues in Bioethics. David Smith.**

TTh 9–10.15

A selective survey of important issues in biomedical ethics. Comparison of different points of view from which the issues are approached, including religious vs. secular and liberal vs. conservative. Special attention to issues in research and at the beginning of life. *Also REL 872a.*

**RLST 867b, Bioethics, Religion, and Limits of Freedom. David Smith.**

W 3.30–5.20

Readings of selected contemporary writers in biomedical ethics giving special attention to their philosophical and theological methods of work. Focus on issues at the end of life and questions of justice in health care. Death and taxes. Discussion of the relationship among religion, ethics, and public property.

**RLST 872a, Seminar on World Religions and Ecology. Mary Evelyn Tucker, John Grim.**

This seminar explores the understanding of the emerging relationships of world religions to our global environmental crisis. Both the problems and the promise of these relationships are acknowledged. Religions are containers of symbolic language that often evoke nature's processes and reflect nature's rhythms. For many years science, engineering, policy, and law alone were considered indispensable for understanding and resolving environmental problems. We now have abundant knowledge from these disciplines about environmental issues, but still not sufficient will to change human behavior. Religion, spirituality, ethics, and values can make important contributions to address complex environmental issues. This course explores those contributions. *Also F&ES 80070a, REL 870a.*

**RLST 872b, World Religions and Ecology: Asian Religions. Mary Evelyn Tucker, John Grim.**

This course explores the various ways in which religious ideas and practices have contributed to cultural attitudes and human interactions with nature. Examples are selected from Hinduism, Buddhism, Confucianism, and Daoism. The course examines such topics as symbols, images and metaphors of nature in canonical texts, views of the divine as transcendent to the world, the indwelling of the sacred in the earth, the ethics of using and valuing nature, ritual

practices that link humans to the natural world, and cosmology as orienting humans to the world and embedding them in place. Mary Evelyn Tucker and John Grim. *Also F&ES 80071b, REL 817b.*

**RLST 903b, The Doctrine of God in Some High and Late Medieval Christian Theologians in the Latin West. Denys Turner.**

Th 4–6

This course consists of seminars on texts relating to the doctrine of God. The texts are Bonaventure, *The Soul's Journey into God*; Thomas Aquinas, selected texts from *Summa Theologiae*; Marguerite Porete, *A Mirror of Simple Souls*; Meister Eckhart, selected sermons; Julian of Norwich, *Revelation of Divine Love*; Anon., *The Cloud of Unknowing*. All the texts may be studied in English translation. A reading knowledge of the relevant languages would be a help, but is not required.

**RLST 905a, Required Theology Seminar. Denys Turner.**

Th 7.30–9.30

This course raises some questions about the history of OT exegesis in the period from Augustine to John of the Cross, both as to the underlying hermeneutical principles and as their application to the Song of Songs. The focus is on primary sources in English translation, most of which can be found in Turner, *Eros and Allegory: Medieval Exegesis of the Song of Songs* (Kalamazoo: Cistercian Publications, 1995).

**RLST 908b, Historical Theology: The Medieval Period. Denys Turner.**

MWF 8.30–9.20

A survey of major themes and issues in medieval theology, conducted principally through the study of primary texts, from Augustine in the fifth century to Denys the Carthusian in the fifteenth. Apart from central theological doctrines — including those of God and the Trinity, Christology, creation, the study of the Bible, grace and free will — this survey embraces major theological trends within monastic, scholastic, and “mystical” theologies, and developments in late medieval thought which threaten the unities between theology and practice, between learning and living, between theology and “spirituality.”

**RLST 914a, Kant's Philosophy of Religion. John Hare.**

Th 3.30–5.20

The purpose of the course is to look at Kant's writings in the philosophy of religion. The principal readings are from Kant's *Critique of Pure Reason* (especially the Ideal and the Canon), the *Lectures on Ethics*, the *Critique of Practical Reason* (especially the Dialectic), the *Critique of Judgment* (especially the Methodology), *Religion within the Boundaries of Mere Reason*, and *The Conflict of the Faculties*. This is a seminar course. *Also PHIL 703a, REL 827a.*

**RLST 916b, Kierkegaard's Philosophy of Religion. John Hare.**

Th 3.30–5.20

This seminar explores a number of texts focusing on the relation between religious faith and the ethical life. We read the following texts (in whole or in part): *Either/Or*, *Fear and Trembling*, *Philosophical Fragments*, *Concluding Unscientific Postscript*, *Works of Love*. Restricted enrollment. *Also PHIL 704b, REL 824b.*

**RLST 920a<sup>U</sup>, Reason, Faith, and Feeling: Early Modern Christian Thought. Shannon Craigo-Snell.**

TTh 10.30–11.20

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. Explores connections among theology, philosophy, and social history. No background in religious studies is assumed.



**RLST 921b<sup>u</sup>, History, Hope, and the Self: Modern Christian Thought.****Shannon Craigo-Snell.**

TTH 10.30–11.20

An overview of important developments in Western religious thought during the nineteenth and twentieth centuries. Topics include changing understandings of the significance and movements of history, challenges posed to religious traditions by growing historical knowledge, shifting conceptions of the human person, and contrasting estimations of the role of religious persons in secular and political life. Connections among philosophy, theology, and social history are addressed. Authors include Hegel, Tillich, Barth, Rahner, and Gutierrez. No background in religious studies is assumed.

**RLST 922a<sup>u</sup>, Theology, Theater, and Performance. Shannon Craigo-Snell.**

M 1.30–3.20

Exploration of the historical connections, theoretical intersections, and thematic interplays between Christian theology and theater in the West. This includes study of performance theory, theoretical approaches to theater, liturgical theology, and dramatic texts. Topics addressed include the construction of the self through communal performance, embodied interpretation of texts, conventions of normativity and liminality, negotiations of communal identity in relation to external and internal norms, and creation of communal hermeneutics. No prior background is required.

## RENAISSANCE STUDIES

53 Wall, Rm 310, 432.0672

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

### *Chair and Director of Graduate Studies*

Carlos Eire

### *Executive Committee*

Edwin Duval, Carlos Eire, Roberto González Echevarría, Lawrence Manley, John Matthews, Giuseppe Mazzotta, David Quint, John Rogers, Ellen Rosand, Paolo Valesio, Christopher Wood

### *Faculty Associated with the Program*

Rolena Adorno, Leslie Brisman, Judith Colton, Anne Dunlop, Paul Freedman, Karsten Harries, K. David Jackson, Maija Jansson, James Kearney, Lee Patterson, Francesca Trivellato, 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.

## SLAVIC LANGUAGES AND LITERATURES

2704 Hall of Graduate Studies, 432.1300, [slavic.department@yale.edu](mailto:slavic.department@yale.edu)  
M.A., M.Phil., Ph.D.

### *Chair*

Vladimir Alexandrov

### *Director of Graduate Studies*

Kate Holland (HGS 2709, 432.8515, [kate.holland@yale.edu](mailto:kate.holland@yale.edu))

### *Professors*

Vladimir Alexandrov, Katerina Clark, Laura Engelstein (*History*), Harvey Goldblatt, Robert Greenberg (*Adjunct*), Benjamin Harshav (*Comparative Literature*), Tomas Venclova

### *Associate Professors*

Hilary Fink, John MacKay

### *Assistant Professors*

Kate Holland, Ilya Kliger

### *Senior Lector*

Irina Dolgova

### *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, 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 director of graduate studies and the departmental Web site: [www.yale.edu/slavic](http://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 Program in Film Studies, 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.

*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 605b, Topics in Russian Literature: From the Origins of East Slavic Writing to 1750.** Harvey Goldblatt.

W 10.30–12.20

Representative works, selected from both “old” Russian “bookish writing” and the “new” Russian literature of the seventeenth and first half of the eighteenth century, are examined against a broad comparative background to illustrate the development of various literary types

and writing techniques. Special attention is devoted to (1) diverse historiographic and methodological approaches, (2) traditional and innovative theories of literary expression, and (3) the connections between writing activity and ideological trends.

**RUSS 623b, The Rise of the Russian Novel. Ilya Kliger.**

T 10.30–12.20

An investigation of the rise of the novel in Russia from the 1820s to the 1840s with special attention to key texts by Pushkin, Lermontov, Gogol, Dostoevsky, and Goncharov. The course addresses questions of genre, international literary exchange, cultural institutions, literary field.

**RUSS 644a, Dostoevsky and the Theory of the Novel. Kate Holland.**

T 10.30–12.20

The course examines the place of Dostoevsky's novels in Russian and European theoretical debates about the nature of the novel as a genre. We explore ways in which Dostoevsky engages with Romantic and Realist theories of the novel, look at how he responds to some central problems of novelistic representation, and consider how and why Dostoevsky's novels have been so influential for the development of novel theory in the twentieth century. Readings include a selection of the novels; critical works by Dostoevsky scholars such as Solinin, Ivanov, and Komarovich; and the novel theory of F. Schlegel, Bakhtin, Lukacs, Girard, Moretti, and others. *Also CPLT 918a.*

**RUSS 676a, Tsvetaeva. Tomas Venclova.**

W 9.30–11.20

Discussion of Tsvetaeva's life and art in context of her times. Close readings of her poems.

**RUSS 678b, Brodsky. Tomas Venclova.**

Th 3.30–5.20

An investigation of Joseph Brodsky's poetic work against the background of contemporary Russian poetry. Close readings of approximately twenty selected poems.

**RUSS 693a, Aspects of Turn-of-the-Century Russian Culture. Vladimir Alexandrov.**

Th 1.30–3.20

A seminar on selected works by Bunin, Sologub, and Bely, plays by Chekhov and Blok, films by Bauer, paintings by representatives of *Mir iskusstva*, and music by Scriabin.

**RUSS 696b, Post-Stalin Literature and Film. Katerina Clark.**

Th 1.30–3.20, screenings w 7

The main developments in Russian and Soviet literature and film from Stalin's death in 1953 to the present. *Also FILM 775b.*

**RUSS 699b, The Performing Arts in Twentieth-Century Russia. Katerina Clark.**

W 1.30–3.30

Covers most of the performing arts: ballet, opera, theater, mass spectacle, and film. Theory of the performing arts, including selections from the writings of some of the most famous Russian directors such as Stanislavsky, Meyerhold, Eisenstein, and Balanchine. Their major productions and some of the major Russian plays of the twentieth century (e.g., by Chekhov, Mayakovsky, Bulgakov, and contemporary dramatists). No knowledge of Russian required. Students taking the course for credit in Comparative Literature can write their papers on texts in other languages. *Also CPLT 677b.*

**RUSS 833ab, Advanced Russian Conversation and Composition: Topics in Contemporary Russian Press and Media. Rita Lipson.**

MW 1.30–2.45

A course designed to equip students with language skills necessary to comprehend complexities of contemporary Russia. Accompanied by a grammar review.

**RUSS 834b, Aspects of Russian Grammar and Teaching Methodologies.****Irina Dolgova.**

T 12.30–2.20

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.

**RUSS 851a, Proseminar in Russian Literature. Ilya Kliger.**

Th 10.30–12.20

Introduction to the graduate study of Russian literature. Topics include literary theory, methodology, introduction to the profession.

**SLAV 754a<sup>U</sup>, Old Church Slavic. Harvey Goldblatt.**

T 1.30–3.20

The study of OCS and its place in the history of Church Slavic. The main features and the grammar of OCS. The Glagolitic and Cyrillic writing systems. Close readings from the “canon” of OCS literary monuments. OCS in relation to modern Slavic languages (especially Russian).

**SLAV 771b<sup>U</sup>, Introduction to the Slavic Languages. Robert Greenberg.**

T 3.30–5.20

This course explores the historical development of the Slavic languages from the time of an assumed Slavic unity through the modern period. Linguistic, cultural, historical, and social factors are considered to explain how more than a dozen Slavic languages emerged as standard languages in the past two centuries. Topics include the role of elites in shaping new Slavic languages, the influence of neighboring languages on the development of Slavic, and the natural linguistic differentiation that occurred in the Slavic lands. No previous knowledge of Slavic languages is required. *Also LING 649b<sup>U</sup>.*

**SLAV 784a<sup>U</sup>, Language and Politics. Robert Greenberg.**

TTh 4–5.15

This 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 U.S., the policy of official bilingualism in Canada, and language policies in Europe with emphasis on the Slavs.

**SLAV 900, Directed Reading.**

By arrangement with faculty.



## SOCIOLOGY

140 Prospect, 432-3323

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

### *Chair*

Karl Ulrich Mayer

### *Director of Graduate Studies*

Philip Gorski [F]

Ron Eyerman [Sp]

### *Professors*

Julia Adams, Jeffrey Alexander, Scott Boorman, Deborah Davis, Ron Eyerman, Philip Gorski, Karl Ulrich Mayer, Joel Podolny, Ivan Szelenyi

### *Associate Professors*

Hannah Bruckner, Christopher Rhomberg

### *Assistant Professors*

Jennifer Bair, Averil Clarke, Alondra Nelson (*African American Studies*), Rachel Sherman, Philip Smith

### *Lecturers*

Ulrich Schreiterer, Peter Stamatov

### *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 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 1 and 2, four required courses, 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 program in 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 to demonstrate competence in sociological theory, statistics, research methods, and comprehensive examination in two substantive fields, combined-degree students may substitute African American Studies courses for six of the fourteen 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/socdept](http://www.yale.edu/socdept).

### *Courses*

#### **SOCY 502b, Contemporary Sociological Theory: Durkheimian Sociology.**

**Philip Smith.**

TH 10–12

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 one 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.

[SOCY 504a, Research Methods: Design and Data Collection.]

[SOCY 506b, Research Methods: Applied Data Analysis.]

#### **SOCY 507a/b, Social Science Workshop on Contemporary China. Deborah Davis.**

M 12–1

This is a yearlong course for one credit. Students must register for and complete both terms. This workshop examines contemporary Chinese development from a variety of 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. This format is designed to educate participants about particular topics, provide constructive feedback on developing works of scholarship, and generally foster interdisciplinary dialogue and perspectives among the broad community of social scientists focusing on China at Yale. One unit of course credit is available to students who attend the colloquium in both the fall and spring terms and submit a thirty-page paper. Permission of instructors required. *Also EAST 501.*

[SOCY 509b, Advanced Methods of Ethnographic Field Research.]

**SOCY 510b<sup>U</sup>, Religious Nationalism. Philip Gorski.**

T 1.30–3.20

Until recently, historians and social scientists have generally assumed that “religious nationalism” was an oxymoron or a transitional phase. In this course, we read recent scholarship on religious nationalism in past and present in both the East and the West, and reflect on the normative issues that it raises. We explore the religious roots of Western nationalism, compare the nationalistic propensities of different religious traditions, identify the conditions under which religious nationalism turns violent, and consider whether religion, nationalism, pluralism, and democracy are compatible.

**SOCY 519b, The Sociology of Pierre Bourdieu. Philip Gorski.**

M 2–4

Pierre Bourdieu (1930–2002) was arguably the greatest sociologist since the classical generation of Max Weber and Emile Durkheim. This seminar surveys his life’s work. Through an intensive and extensive reading of Bourdieu’s works, students learn what distinguishes Bourdieu’s approach from other classical and contemporary versions of sociology and social science; develop a firm and nuanced grasp of his trademark concepts (“habitus,” “capital,” and “field”); and observe how Bourdieu applied them to the analysis of various social fields (class, gender, the state, politics, art and culture). In short, students learn how to analyze the world in a Bourdieuan fashion.

**SOCY 525a, Cultural Sociology. Jeffrey Alexander.**

Th 1.30–3.20

After a review of a broad range of contemporary perspectives, the seminar proceeds to examine in depth, and in its variations, the strong program in cultural sociology. This includes looking at theoretical ideas about hermeneutics and interpretation, critical theory, semiotics, structuralism and post-structuralism, social drama and ritual, performance studies, and social approaches to symbolic process. It also includes looking at empirical studies that apply cultural methods to such issues as politics, violence, civil society, and collective trauma.

**SOCY 527a<sup>U</sup>, Knowledge in Society. Ulrich Schreiterer.**

T 1.30–3.20

Post-industrial societies are said to rely deeply on knowledge-based economies, the production and distribution of new knowledge, research, and information. The course examines the social foundations of knowledge regimes, epistemic cultures, and the “value” of knowledge: discursive orders and disciplines; expertise and scientific capital; academic research and economic development; property rights and the governance of knowledge.

**[SOCY 529b, Legislation.]****SOCY 542a, Sociological Theory. Julia Adams.**

W 2–4

Sociology 542a seeks to convey a sense of what doing sociological theory is all about. We trace the lineaments and genealogies of major theoretical approaches in contemporary sociology, including Marxism, cultural structuralism, utilitarianism, Weberian perspectives, and so on. We also explore various ways that sociologists and social theorists have contended with these approaches as they have confronted the central questions of the discipline. Many of these questions developed as an effort to understand the processes by which social structures and social actors were created and transformed during the transition from so-called traditional societies to some distinctively modern form of social life. This course remains deliberately open-ended – not only because, at one term long, it must be so, but because sociologists are still engaged in the intellectual project of deciphering modernity. The course seeks to give graduate students the basic tools to build their own reconstructive encounters with sociological theory and practice.

**SOCY 544b, Social Movements. Ron Eyerman.**

W 10–12

The course covers the dynamic field of social movement research from its origins to the present day. We discuss developments in theory and methodology primarily from European and American (North and South) perspectives, but touch on others as well. The course is open to graduate students and advanced undergraduates; some knowledge of sociological theory is helpful, but not required. Run as a seminar, the course requires active participation. Instruction includes the use of film and music.

[SOCY 548a, *The Sociology of the Arts: Classical and Contemporary Perspectives.*]

[SOCY 551b, *Comparative and Historical Methods.*]

**SOCY 553a<sup>U</sup>, Empires and Imperialism. Peter Stamatov.**

M 1.30–3.20

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.

[SOCY 557a, *Current Debates in Political Sociology.*]

**SOCY 560a, Comparative Research Workshop. Karl Ulrich Mayer, Ivan Szelenyi, Philip Gorski, Julia Adams.**

W 4–6

This workshop is a weekly interdisciplinary seminar at which work-in-progress by distinguished visiting scholars, Yale graduate students, and faculty from various social science disciplines is discussed. Papers are distributed a week ahead of time and also posted at the Web site of the Center for Comparative Research. Students who take the course for a letter grade have to present a paper the term they are enrolled for credit. *Also PLSC 734a.*

**SOCY 560b, Comparative Research Workshop. Karl Ulrich Mayer, Ivan Szelenyi, Philip Gorski, Julia Adams.**

W 4–6

Please see SOCY 560a for course description. This term's workshop has an additional focus on recent developments in comparative methodology. *Also PLSC 734b.*

[SOCY 561b<sup>U</sup>, *Topics in Contemporary Chinese Society.*]

[SOCY 567b<sup>U</sup>, *Cultural Performances. The Whitney Seminar on New Perspectives in the Social Sciences and Humanities.*]

[SOCY 577a, *Topics in Multivariate Data Analysis.*]

**SOCY 578a, Logic of Inquiry. Karl Ulrich Mayer.**

M 4–6

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: experiments and quasi-experiments, description and causal modeling, verification and falsification, testing and inference, longitudinal analysis. The seminar also addresses methodological issues raised by qualitative and hermeneutic approaches. Besides the discussion of selected texts, we re-analyze classical studies as well as recent research papers.

[SOCY 585b, *Life Course Research: Theoretical Foundations and Empirical Approaches.*]

**SOCY 590b, Early Modern Empires: Theory and History. Steven Pincus, Julia Adams.**

TH 1.30–3.20

This co-taught graduate seminar explores the dynamics of early modern empires, as well as the relevant theoretical literature that addresses problems of colonialism and empire more generally. Why and where were the successive early modern empires built; how and why did they cohere and come apart? What differentiates them from contemporary or ancient colonialism and empire? Our readings range over varied intersecting historical colonial contexts including the first wave of overseas empire of the western European states; the Ottoman Empire; and imperial orders in Asia and the Americas. The reflections and experiences of both those who operated the levers of empires and those who lived within their borders are featured throughout the course. Students write a primary-source-based research paper at the close of the course. *Also HIST 610b.*

**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. Directed Reading Course Selection Form should be completed.

**SOCY 601a, Work and Gender. Vicki Schultz.**

MT 4.10–6

This course examines how workplaces, jobs, and workers come to be structured along gendered lines. The class reads theoretical accounts, empirical studies, ethnographies, and legal cases to obtain an understanding of the mechanisms through which work becomes gendered. Among the questions the course addresses are: Does the workplace reflect or rather actively reproduce gendered social relations and identities? What is the relationship among wage work, citizenship, and gender? How do structural features of organizations tend to reproduce sex segregation and gender harassment? How should we understand the relationship between gender and sexuality at work? Which theories ground past and present interpretations of the law's ban on sex discrimination? Which theories should do so? The representation of gender and work in the popular media is also explored, through an accompanying, required, in-class film series. Self-scheduled examination. *Also LAW 20398, WGS 704a.*

**[SOCY 610b<sup>U</sup>, Race, Gender, and the African American Experience.]**

**SOCY 625a, Analysis of Social Structure. Scott Boorman.**

M 10–12

This course develops and integrates a variety of the most promising 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 Janos Kornai in an address at the Hungarian Academy of Sciences published in 1984, and by Harrison C. White in *Identity and Control* (1992), four major types of social organization are identified as focal: (1) social networks, (2) competitive markets, (3) hierarchies/bureaucracy, (4) collective choice. Study of each of the four types has its own scholarly traditions and lineage of key contributors; its own species of, and approaches to, data; its own concepts and theoretical viewpoints; and its own major scientific findings. Contemporary complex social structure contains densely packed multiple levels and expressions of all four types. This lecture course uses mathematical and related models — and comparisons of their scientific styles and contributions — as analytical vehicles of choice in synchronized development of the four areas.

**[SOCY 627a, Sociology of the Welfare State.]**

**[SOCY 627b, Gender and Society.]****SOCY 628a, Workshop in Cultural Sociology. Jeffrey Alexander, Ron Eyerman, Philip Smith.**

F 12–2

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.

**SOCY 628b, Workshop in Cultural Sociology and Civil Society. Jeffrey Alexander, Ron Eyerman, Philip Smith.**

F 12–2

Continuation of SOCY 628a; see 628a for course description.

**SOCY 633b, Economic Sociology. Jennifer Bair.**

T 1.30–3.20

This course provides an overview to the field of economic sociology. Focus is on continuity and change in theory and method over time, from the field's foundations to the so-called new economic sociology of the last fifteen years. Texts include works by Marx, Weber, Bourdieu, Granovetter, Hamilton, North, and Fligstein.

**[SOCY 643b<sup>u</sup>, Transitions and Transformation in Eastern Europe and China.]****SOCY 647b, Social Processes. Scott Boorman.**

M 10–12

Focus is on identifying and exploring robust alternatives/complements to the rational choice models that have come to dominate so much of the analysis of social (including organizational) processes in recent years. Specifically, emphasis is placed on a range of mathematical models and related analytic approaches originating outside of the rational choice literature — in fields such as social network analysis, evolutionary biology, organization theory, and the law. Possible starting points include the Boorman-Levitt network matching model (see, e.g., Scott A. Boorman and Paul R. Levitt, “The network matching principle: A model of efficient resource allocation by informal social networks in non-profit and other non-market social structures,” *Economics Letters*, 1982, 10, 1–7) and its applications to non-profits and complex structures; weak ties models of job information transmission and other information transfer in elite social networks; “garbage can” models of the internal problem-solving dynamics of complex organizations.

**SOCY 656a, Professional Seminar. Philip Gorski and faculty.**

F 10–12

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. The Sociology DGS is responsible for the seminar. Held biweekly.

## SPANISH AND PORTUGUESE

82–90 Wall Street, 432.1150, 432.5439

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

### *Chair*

Rolena Adorno

### *Director of Graduate Studies*

Aníbal González

### *Professors*

Rolena Adorno, Aníbal González, Roberto González Echevarría, K. David Jackson, María Rosa Menocal, Noël Valis (*on leave*)

### *Assistant Professors*

Jason Cortés, Paulo da-Luz-Moreira, Iván Fernández Peláez, Óscar Martín

### *Senior Lecturer*

Priscilla Meléndez

### *Senior Lector*

Sonia Valle

### *Fields of Study*

Fields include Spanish Peninsular literature, Latin American literature, Portuguese and Brazilian literatures.

The doctoral program offers: (1) a Spanish major concentrating in a single field of study (medieval, Renaissance/Golden Age, modern Spanish Peninsular, colonial Spanish American, contemporary Spanish American); (2) a combined major 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 African American Studies program 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 with a grade of Honors in at least two courses, 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 (oral and written components) and submit and receive approval of the dissertation prospectus. Upon completion of all predissertation requirements, including the 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 African American Studies program, 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 960b<sup>U</sup>, Cultural Encounters: Crossing Cultures in the Literature of the Portuguese World. K. David Jackson.**

TH 9.30–11.20

A study of literary works that addresses cultural encounters in the Portuguese world, from colonial to modern and from Asia to Brazil. Topics include acculturation, crossing cultures,



creolistics, miscegenation and hybrid cultures, indigenous peoples and languages, and the theory of space between cultures. Readings include the epic, histories, memoirs and travel literature, the “Cannibal Manifesto,” and other works. In English. Texts available in Portuguese.

**PORT 962a<sup>u</sup>, The Brazilian Short Story. K. David Jackson.**

MW 2.30–3.45

Brazilian literature has produced several of the world’s masters of the short story, including Machado de Assis, Mário de Andrade, Clarice Lispector, João Guimarães Rosa, as well as other internationally known figures such as Osman Lins, Dalton Trevisan, Moacyr Scliar, Nélida Piñón, and Lygia Fagundes Telles. The Brazilian short story occupies a place between European literary background and Brazilian indigenous linguistic and cultural reality. The purpose of this course is to unveil the rich history of the Brazilian short story and introduce its major figures as well as the dominant critical and thematic currents. Major directions include magical realism, satire, feminism, regionalism, linguistic experiments, popular culture, and psychological analysis. In English. Texts available in Portuguese.

**PORT 991a, Tutorial.**

By arrangement with faculty.

**PORT 991b, Tutorial.**

By arrangement with faculty.

**SPAN 520a, The World of Alfonso, el Sabio. María Rosa Menocal.**

T 1.30–3.20

An integrated study of the cultural and historical universe of the medieval monarch (Alfonso el Sabio) whose vision and politics transformed Castilian from one of many regional dialects into the powerful written vernacular that would go on to become the national language. Readings from the numerous foundational texts authored or supervised by the “Learned King” from the still-used *Siete Partidas* to the lavishly illustrated songbooks in Galician-Portuguese. In Spanish.

**SPAN 533b, Garcilaso and Poetry. Roberto González Echevarría.**

W 1.30–3.20

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. Also *CPLT 939b*.

**SPAN 536b, Medieval Literature, Old and New. Óscar Martín.**

T 1.30–3.20

This class tackles the study of a group of canonical medieval works encompassing the most distinctive literary genres: epics, saints’ lives, love pseudoautobiography, short stories, ballads, and short fiction. While paying attention to traditional critical problems, this class also evaluates recent theoretical approaches to medievalism like nationalism, feminism, new historicism, cultural studies, multiculturalism, and gender studies, among others. Works include *Jarchas*, *El cantar de Mio Cid*, *El libro de Apolonio*, *Vida de Santa María Egipcíaca*, *Libro de Buen Amor*, *Cárcel de amor*, romances. In Spanish.

**SPAN 790b, Methodologies of Modern Language Teaching. Sonia Valle.**

M 3.30–5.20

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. An additional ninety-minute practicum meets immediately afterward. In Spanish.

**SPAN 812a, The Polemics of Possession in Early Spanish American Narrative.****Rolena Adorno.**

Th 1.30–3.20

This seminar focuses on canonical works of early colonial Spanish America by Bartolomé de las Casas, Hernán Pérez de Oliva, Alvar Núñez Cabeza de Vaca, Bernal Díaz del Castillo, Alonso de Ercilla, El Inca Garcilaso de la Vega, and Felipe Guaman Poma de Ayala. Through careful readings of the primary texts and selected criticism, we examine the compositional protocols and thematic priorities of these early writings and consider their foundational role in the literary traditions of Latin America. In Spanish.

**SPAN 937a, Postmodern Currents in Contemporary Latin American Theater.****Priscilla Meléndez.**

M 1.30–3.20

Through the study of a group of contemporary Spanish American theater works from the 1960s to the present, we attempt to define the concept of postmodern theater in a socio-cultural and artistic context. Elements such as simulation, transvestism, sexuality and the body, parody, paradox, performance, hybridity, and the critical representation of history are considered as part of a reflection on how Spanish American theater interacts and debates with postmodernity. The course considers some of the following questions: How are concepts of modernity and postmodernity applicable to theater? What distinguishes modernity from postmodernity in theater? How does politics figure in postmodern Spanish American theater? In Spanish.

**SPAN 942a, Fiestas cubanas. Roberto González Echevarría.**

W 1.30–3.20

A study of the fiestas marking the Cuban calendar from the nineteenth century to the present, how they respond to cultural and political transformations, and how they are inscribed in literature, particularly the narrative as well as film. The feast as the representation of time and social and political change. The feast and sports, particularly baseball. The work of anthropologists and theorists of literature such as Claude Lévi-Strauss, Marcel Mauss, Arnold van Gennep, and Mikhail Bakhtin, along with that of Latin American and Cuban anthropologists and writers such as Fernando Ortiz, Lidia Cabrera, José Arrom, Manuel Moreno Fraginals, Miguel Barnet, and Octavio Paz. Fiction by Cirilo Villaverde, Alejo Carpentier, José Lezama Lima, Severo Sarduy, Reinaldo Arenas, Daína Chaviano, and others. In Spanish. Also *CPLT 941a*.

**SPAN 961b, Caribbean Masculinities. Jason Cortés.**

W 4–6

Interdisciplinary examination of the construction of masculinity in Caribbean cultural production. Topics include machismo, queer writing, transvestite culture, popular music, and detective fiction. Some of the authors examined include Ana Lydia Vega, Mayra Santos, Severo Sarduy, Leonardo Padura Fuentes, Virgilio Piñera, Luis Rafael Sánchez, and José Alcántara Almánzar. In Spanish.

**SPAN 978b, Religion and the Novel in Contemporary Spanish American Narrative.**  
**Aníbal González.**

th 4–6

This seminar examines the many ways in which religious discourse has been appropriated in the twentieth-century Spanish American novel, often with the aim of turning novels into “sacred texts.” We also consider the meaning of the “literary theology” that Spanish American literature has generated by creatively adapting into its makeup a variety of religious concepts, such as “the holy,” the notion of an afterlife, reincarnation, salvation, canonization, and the various theories about the nature of God. Primary readings include works ranging from Federico Gamboa’s *Santa* (1903), María Luisa Bombal’s *La amortajada* (1938), and selected essays and stories by Jorge Luis Borges in *Discusión* (1932) and *El Aleph* (1949), to Gabriel García Márquez’s *Cien años de soledad* (1967), Severo Sarduy’s *Maitreya* (1978), Mario Vargas Llosa’s *La guerra del fin del mundo* (1981), and Tomás Eloy Martínez’s *Santa Evita* (1995). Secondary texts include Longinus, Rudolf Otto, and James Thrower. In Spanish.

**SPAN 991a, Tutorial.**

By arrangement with faculty.

**SPAN 991b, Tutorial.**

By arrangement with faculty.

## STATISTICS

24 Hillhouse, 432.0666

M.A., Ph.D.

### *Chair*

Joseph Chang

### *Director of Graduate Studies*

John Emerson (24 Hillhouse, john.emerson@yale.edu)

### *Professors*

Donald Andrews (*Economics*), Andrew Barron, Joseph Chang, John Hartigan, Theodore Holford (*Epidemiology & Public Health; Biostatistics*), Peter Phillips (*Economics*), David Pollard, Edward Tufte (*Political Science; Computer Science*), Heping Zhang (*Epidemiology & Public Health; Biostatistics*)

### *Associate Professors*

Hannes Leeb, Edmund Yeh (*Electrical Engineering*)

### *Assistant Professors*

Lisha Chen, John Emerson, Mokshay Madiman, Sekhar Tatikonda (*Electrical Engineering*), Harrison Zhou

### *Lecturer*

Jonathan Reuning-Scherer

## *Fields of Study*

Fields comprise the main areas of statistical theory (with emphasis on foundations, Bayes theory, decision theory, nonparametric statistics), probability theory (stochastic processes, asymptotics, weak convergence), information theory, econometrics, classification, statistical computing, and graphical methods.

## *Special Admissions Requirements*

GRE scores for the General Test and for the Subject Test in the area of the undergraduate major should accompany an application. 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 examination 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.

### *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.

*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. Full-time students must take a minimum of three courses per term. Part-time students are also accepted into the master's degree program. See page 469.

Program materials are available upon request to the Director of Graduate Studies, Department of Statistics, Yale University, PO Box 208290, New Haven CT 06520-8290; e-mail, amy.mulholland@yale.edu.

### *Courses*

#### **STAT 501–506, Introduction to Statistics.**

A basic introduction to statistics, including numerical and graphical summaries of data, probability, hypothesis testing, confidence intervals, and regression. Each course focuses on applications to a particular field of study and is taught jointly by two instructors, one specializing in statistics and the other in the relevant area of application. The first seven weeks are attended by all students in STAT 501–506 together as general concepts and methods of statistics are developed. The course separates for the last six and a half weeks, which develop the concepts with examples and applications. Computers are used for data analysis. These courses are alternatives; they do not form a sequence and only one may be taken for credit.

#### **STAT 501a<sup>U</sup>, Introduction to Statistics: Life Sciences. Günter Wagner, Jonathan Reuning-Scherer.**

TTH 1–2.15

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. *Also E&EB 510a<sup>U</sup>.*

**STAT 502a<sup>U</sup>, Introduction to Statistics: Political Science.****Jonathan Reuning-Scherer, Alan Gerber.**

TTh 1–2.15

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.

**STAT 503a<sup>U</sup>, Introduction to Statistics: Social Sciences. Jonathan Reuning-Scherer.**

TTh 1–2.15

Descriptive and inferential statistics applied to analysis of data from the social sciences. Introduction of concepts and skills for understanding and conducting quantitative research.

**[STAT 504a<sup>U</sup>, Introduction to Statistics in Psychology.]****STAT 505a<sup>U</sup>, Introduction to Statistics: Medicine. Jonathan Reuning-Scherer, David Salsburg.**

TTh 1–2.15

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.

**STAT 506a<sup>U</sup>, Introduction to Statistics: Data Analysis. Jonathan Reuning-Scherer, Andrew Barron.**

TTh 1–2.15

An introduction to probability and statistics with emphasis on data analysis.

**STAT 530b<sup>U</sup>, Introductory Data Analysis. Joseph Chang.**

MW 2.30–3.45

Survey of statistical methods: plots, transformations, regression, analysis of variance, clustering, principal components, contingency tables, and time series analysis. R and Web data sources are used. After STAT 501a.

**STAT 538a<sup>U</sup>, Probability and Statistics. Joseph Chang.**

MWF 2.30–3.20

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. After MATH 118a or b or 120a or b. Some acquaintance with matrix algebra and computing assumed.

**STAT 541a<sup>U</sup>, Probability Theory. Harrison Zhou.**

MWF 9.30–10.20

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. After or concurrent with MATH 120a or b or the equivalent.

**STAT 542b<sup>U</sup>, Theory of Statistics. Harrison Zhou.**

MWF 9.30–10.20

Principles of statistical analysis: maximum likelihood, sampling distributions, estimation; confidence intervals; tests of significance; regression; analysis of variance; and the method of least squares. Some statistical computing. After STAT 541a and concurrently with or after MATH 222a or b or 225a or b or the equivalent.

**STAT 551b<sup>U</sup>, Stochastic Processes. Andrew Barron.**

MW 1–2.15

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. After STAT 541a or the equivalent.

**STAT 600b<sup>U</sup>, Advanced Probability. David Pollard.**

TTh 2.30–3.45

Measure theoretic probability, conditioning, laws of large numbers, convergence in distribution, characteristic functions, central limit theorems, martingales. Some knowledge of real analysis is assumed.

**STAT 602b, Probability Coupling. David Pollard.**

HTBA

Some of the most striking advances in probability theory have involved coupling: the representation of distributional relationships by means of deterministic properties of specially created joint distributions. The course explores the method through applications such as quantile coupling; almost sure representations for convergence in distribution; problems of mass transportation; Strassen's theorem and stochastic ordering; Wasserstein distances; rapidly mixing Markov chains; interacting systems of particles; the Hungarian (KMT) strong approximations; Poisson approximation; distances between statistical models (Blackwell/Le Cam theory). Acquaintance with measure theoretic probability would be an advantage, but all topics are made accessible to students with a knowledge of probability at the level of STAT 541a.

[STAT 603a, Stochastic Calculus.]

[STAT 606b, Markov Processes and Random Fields.]

[STAT 607b, Inequalities for Probability and Statistics.]

**STAT 610a, Statistical Inference. Hannes Leeb.**

TTh 10.30–11.45

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.

**STAT 612a<sup>U</sup>, Linear Models. Hannes Leeb.**

TTh 9–10.15

The geometry of least squares; distribution theory for normal errors; regression, analysis of variance, and designed experiments; numerical algorithms (with particular reference to S-plus); alternatives to least squares. Generalized linear models. Linear algebra and some acquaintance with statistics assumed.

**STAT 619b, Statistical Decision Theory in Modern Statistical Methodology.****Harrison Zhou, Andrew Barron.**

HTBA

Shrinkage estimation and its connection to minimaxity, admissibility, Bayes, empirical Bayes, and hierarchical Bayes. Shrinkage captures essential nonlinearity necessary to outperform standard linear estimators in Gaussian regression models and random effects models. Relationship to model selection and to sparsity in the estimation of functions by selection from large dictionaries of candidate terms. Nonparametric estimation. Tests of statistical hypotheses. Multiple comparisons. Some knowledge of statistical theory at the level of STAT 610a is assumed.

**STAT 625a, Case Studies. Lisha Chen, John Emerson.**

Statistical analysis of a variety of problems including the value of a baseball player, the fairness of real estate taxes, how to win the Tour de France, energy consumption in Yale buildings, and interactive questionnaires for course evaluations. We emphasize methods of choosing data, acquiring data, and assessing data quality. Computations use R.

**STAT 626b, Practical Work. John Emerson.**

Individual one-term projects, with students working on studies outside the department, under the guidance of a statistician.

**STAT 627b, Statistical Consulting. John Emerson.**

Statistical consulting and collaborative research projects often require statisticians to explore new topics outside their area of expertise. This course exposes students to real problems, requiring them to draw on their expertise in probability, statistics, and data analysis. Students complete the course with individual projects supervised jointly by faculty outside the department and by one of the instructors.

**[STAT 636b, Monte Carlo Methods.]****STAT 645b, Statistical Methods in Genetics and Bioinformatics. Hongyu Zhao.**

TTTh 10.30–11.45

Stochastic modeling and statistical methods applied to problems such as mapping quantitative trait loci, analyzing gene expression data, sequence alignment, and reconstructing evolutionary trees. Statistical methods include maximum likelihood, Bayesian inference, Markov chain Monte Carlo, and some methods of classification and clustering. Models introduced include variance components, hidden Markov models, Bayesian networks, and coalescent. Recommended background: STAT 541a, STAT 542b. Prior knowledge of biology is not required. *Also BIS 692b, CB&B 645b.*

**STAT 654a, Topics in Bayesian Inference and Data Analysis. Joseph Chang.**

HTBA

Topics in the theory and practice of Bayesian statistical inference, ranging from a review of fundamentals to questions of current research interest. Motivation for the Bayesian approach. Bayesian computation, Monte Carlo methods, asymptotics. Model checking and comparison. A selection of examples and issues in modeling and data analysis. Discussion of advantages and difficulties of the Bayesian approach. After STAT 551 and STAT 610.

**STAT 660b, Multivariate Statistical Methods for the Social Sciences.**

Jonathan Reuning-Scherer.

HTBA

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.

**STAT 661a<sup>U</sup>, Data Analysis. Lisha Chen, John Emerson.**

MW 2.30–3.45

By analyzing data sets using the S-plus 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. After STAT 542a and MATH 222a or b or 225a or b or the equivalents.

**STAT 664b<sup>U</sup>, Information Theory. Sekhar Tatikonda.**

TTh 9–10.15

Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithm complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, mutual information, channel capacity. Basic theorems of data compression and coding for noisy channels. Applications in statistics, communication networks, and finance. After STAT 541a. *Also ENAS 954b<sup>U</sup>.*

**STAT 665b<sup>U</sup>, Data Mining and Machine Learning. Lisha Chen.**

MW 11.30–12.45

Techniques for data mining and machine learning from both statistical and computational perspectives, including support vector machines, bagging, boosting, neural networks, and other nonlinear and nonparametric regression methods. Discussion includes the basic ideas and intuition behind these methods, a more formal understanding of how and why they work, and opportunities to experiment with machine learning algorithms and to apply them to data. After STAT 542b.

**STAT 667a, Probabilistic Networks, Algorithms, and Applications.**

**Sekhar Tatikonda.**

TTh 1–2.15

This course examines probabilistic and computational methods for the statistical modeling of complex data. The emphasis is on the unifying framework provided by graphical models, a formalism that merges aspects of graph theory and probability theory. Graphical models: Markov random fields, Bayesian networks, and factor graphs. Algorithms: filtering, smoothing, belief-propagation, sum-product, and junction tree. Variational techniques: mean-field and convex relaxations. Markov processes on graphs: MCMC, factored HMMs, and Glauber dynamics. Some statistical physics techniques: cavity and replica methods. Applications to error-correcting codes, computer vision, bio-informatics, and combinatorial optimization. *Also ENAS 503a.*

[STAT 668a, Information and Probability.]

**STAT 669a, Information and Statistics. Andrew Barron.**

HTBA

Study of the pivotal role that information theory plays in illuminating modern statistics. Topics include the equivalence of data compression and statistical modeling (from the Shannon, universal coding, and Kolmogorov viewpoints), and its relationship to the minimum description length principle; aspects of hypothesis testing (fixed and sequential tests, error exponents, multiple testing); clean risk bounds for complex estimation scenarios based on an index of resolvability; and the arbitrary sequence approach to online learning with applications to prediction, data compression, and portfolio selection. Additional topics if time permits.

[STAT 674a<sup>U</sup>, Analysis of Spatial and Time Series Data.]

[STAT 680b, Nonparametric Statistics.]

**STAT 690a or b, Independent Study.**

By arrangement with faculty. Approval of director of graduate studies required.

**STAT 695a, Internship in Statistical Research. John Emerson.**

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, telecommunications, public policy, and others. The internship experience often serves as a basis for the Ph.D. dissertation. Students work with the director of graduate studies 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. Prerequisites: completion of one semester of the Ph.D. program.

**STAT 700, Departmental Seminar.**

Important activity for all members of the department. See weekly seminar announcements.

## URBAN EDUCATION STUDIES PROGRAM

55 Whitney, 764.8308

M.A.

*Director and Director of Graduate Studies*

Jonathon Gillette

*Committee of the Yale Teacher Preparation Program*

Brian Bailey (*Associate Director, Teacher Preparation Program*), David Berg (*Teacher Preparation Program*), Jill Campbell (*Professor, English*), Karen Campe (*Teacher Preparation Program*), Linda Cole-Taylor (*Teacher Preparation Program*), Nina Garrett (*Center for Language Study*), Gordon Geballe (*Associate Dean, Forestry & Environmental Studies*), Jonathon Gillette (*Director, Teacher Preparation Program; Lecturer, Sociology & Child Study Center*), Judith Hackman (*Associate Dean, Yale College*), Roger Howe (*William B. Kenan Jr. Professor & DGS, Mathematics*), Matthew Jacobson (*Professor & DGS, American Studies; Professor, History and African American Studies*), Frank Keil (*Professor, Psychology and Linguistics; Master, Morse College*), Michael Morand (*Associate Vice President, New Haven and State Affairs*), Barbara Schiller (*Teacher Preparation Program*), Marilyn Szwed (*Lecturer & Field Supervisor, Teacher Preparation Program*), Robert Wyman (*Professor, Molecular, Cellular & Development 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 of 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. Candidates who successfully complete the program are expected to teach in New Haven Public Schools for three years.

### *Courses*

**TPRP 590a<sup>U</sup>, Schools, Community, and the Teacher.** Jonathon Gillette.

TTH 1–2.15

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.

**TPRP 594c, Education Psychology. Learning Theory and Urban Classrooms.**

David Berg.

HTBA

An introduction to cognitive and social psychology as well as the intersection of adolescence with race and class.

**TPRP 595c, Special Education: Legal and Psychological Issues.** Barbara Schiller.

HTBA

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.

**TPRP 598c, An Introduction to Urban Education. Linda Cole-Taylor.**

HTBA

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.

**TPRP 599a, Collaborative Teaching Seminar. Brian Bailey.**

HTBA

Daily co-teaching in a local middle or high school classroom. The emphasis is on the ability to enact strategies that generate student learning.

**TPRP 600–604a<sup>U</sup>, 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<sup>U</sup>, The Teaching of English. Marilyn Szwed.**

M 2.30–4.20

**TPRP 601a<sup>U</sup>, The Teaching of History. Linda Cole-Taylor.**

M 2.30–4.20

**TPRP 602a<sup>U</sup>, The Teaching of Languages. Nina Garrett.**

M 2.30–4.20

**TPRP 603a<sup>U</sup>, The Teaching of Mathematics. Karen Campe.**

M 2.30–4.20

**TPRP 604a<sup>U</sup>, The Teaching of Science. Brian Bailey.**

M 2.30–4.20

**TPRP 620b<sup>U</sup>, Student Teaching. Faculty.**

HTBA

The required practicum in teaching, up to four classes a day, supported by a once-a-week seminar that addresses common issues across sites. (3 course credits)

**TPRP 650a, Advanced Issues in Urban Settings. Jonathon Gillette.**

F 2.30–4.20

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.

**TPRP 650b, Advanced Issues in Urban Settings. Jonathon Gillette.**

F 2.30–4.20

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.

**TPRP 660c, Inquiry into Policy and Practice. Jonathon Gillette.**

HTBA

A capstone seminar in which candidates examine the policy environment of urban education and refine their strategies for enactment. Elements include articulating understanding of their discipline, their theories of social analysis, their philosophical stance as teachers, and their strengths and weaknesses as enactors.

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# Non-Degree-Granting Programs, Councils, and Research Institutes

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## ATMOSPHERIC SCIENCE

### *Advisory Committee*

Donald Aylor (*Forestry & Environmental Studies*)

Sarbani Basu (*Astronomy*)

Michelle Bell (*Forestry & Environmental Studies*)

Alexey Fedorov (*Geology & Geophysics*)

Gary Haller (*Chemical Engineering; Chemistry*)

Xuhui Lee (*Forestry & Environmental Studies*)

Mark Pagani (*Geology & Geophysics*)

Daniel Rosner (*Chemical Engineering; Mechanical Engineering*)

Steven Sherwood (*Geology & Geophysics*)

Ronald Smith (*Geology & Geophysics*)

Sabatino Sofia (*Astronomy*)

Karl Turekian (*Geology & Geophysics*)

John Wettlaufer (*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. 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, 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, and the departments of Epidemiology & 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-200 Sterling Hall of Medicine, 785.3735

*Director*

Lynn Cooley (lynn.cooley@yale.edu)

*Fields of Study*

As the broad field of biological and biomedical sciences has become more exciting, it has also become more complex and demanding. The successful scientist today can no longer be an expert in only one area or one technique, but must be able to make use of information, technologies, and experimental strategies that ignore the boundaries defined by traditional university departments. In the coming decades, opportunities for research and scientific discovery will be greater, but also more challenging, than ever before. A student interested in pursuing a career in science should receive a breadth and depth of training in graduate school that will define his or her ultimate goal, whether he/she chooses to enter academia, industry, education, or any of the many other career opportunities that will be available to young scientists.

To help meet this challenge, Yale faculty have reorganized their approach to graduate education and formed the interdepartmental Combined Program in the Biological and Biomedical Sciences (BBS). Unique among graduate programs, BBS gives entering students access to more than 280 Yale biological science faculty in all departments, both at the School of Medicine and on the main university campus.

The primary purpose of BBS is to provide an environment for graduate education in modern biological and biomedical sciences that is both broad in scope and rigorous in depth. BBS serves as a focal point for research, education, and career development in the biological sciences and sponsors exciting initiatives, including new courses (like genomics and informatics; and laboratory practicals in confocal microscopy, immunocytochemistry, and molecular biology); informal scientific exchanges; career counseling and development; and numerous social activities.

BBS is composed of the faculty in the departments of Cell Biology; Cellular and Molecular Physiology; Experimental Pathology; Genetics; Immunobiology; the Interdepartmental Neuroscience Program; Microbial Pathogenesis; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; Neurobiology; and Pharmacology; and it draws relevant faculty from various clinical departments. The program is divided into several interest-based tracks whose identity may change with the changing interests of faculty. Currently, the tracks are: (1) Computational Biology and Bioinformatics; (2) Molecular Cell Biology, Genetics, and Development; (3) Immunology; (4) Microbiology; (5) Molecular Biophysics and Biochemistry; (6) Neuroscience; (7) Pharmacological Sciences and Molecular Medicine; and (8) Physiology and Integrative Medical Biology. Each track draws its faculty from several departments and has a specific set of recommended courses and activities for first-year students. Entering students

apply to and then affiliate with a track, which places them with the group of students and faculty that most closely reflects their interests. Nevertheless, the courses, faculty, students, and, most important, laboratory research opportunities in all tracks remain completely available at all times, regardless of a student's primary track.

Entering students are admitted to Yale University as members of the BBS program and generally affiliate with the track to which they initially applied. The total number of students admitted each year is approximately seventy to eighty, with between five and twenty-five being admitted to any one track, depending on the interests and quality of the applicant pool. A student remains a member of the track for his or her first year and generally takes courses (with the advice of the track adviser or director) and performs at least three three-month rotations in a laboratory at Yale. At the end of the first year students generally select an adviser and also a department or academic program in which they take a qualifying examination in the second year and through which they eventually will earn a Ph.D. Advisers may be any full-time or affiliated Yale faculty member, regardless of their department or the student's track.

For the duration of their studies all students receive a stipend, which increases yearly, full tuition, health coverage, and a yearly allotment for travel to scientific meetings or courses. Financial support comes from university fellowships, National Institutes of Health (NIH) training grants, grants from foundations and companies, and from the Bristol-Myers Squibb Educational Alliance.

### *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

A strong background in the basic sciences, along with computer science training, is expected.

#### MOLECULAR CELL BIOLOGY, GENETICS, AND DEVELOPMENT

No additional requirements or recommendations.

#### IMMUNOLOGY

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. In special cases, Medical College Admission Test (MCAT) scores may be substituted for the GRE General Test scores.

**MICROBIOLOGY**

No additional requirements or recommendations.

**MOLECULAR BIOPHYSICS AND BIOCHEMISTRY**

Actual course requirements in a student's background area are flexible. Desirable courses include biology; biochemistry; general, organic, and physical chemistry; physics; and math.

**NEUROSCIENCE**

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. Laboratory research experience is beneficial but is not a formal requirement. Medical College Admission Test (MCAT) scores may be substituted for the GRE General Test scores.

**PHARMACOLOGICAL SCIENCES AND MOLECULAR MEDICINE**

No additional requirements or recommendations.

**PHYSIOLOGY AND INTEGRATIVE MEDICAL BIOLOGY**

No additional requirements or recommendations.

Program materials are available by request to John Alvaro, Administrative Director, BBS Program, Yale University, PO Box 208084, New Haven CT 06520-8084; telephone 203.785.3735; fax 203.785.3734; e-mail, [bbs@yale.edu](mailto:bbs@yale.edu); Web site, [info.med.yale.edu/bbs](http://info.med.yale.edu/bbs).

**THE COWLES FOUNDATION**

30 Hillhouse, 432.3702

*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, 432.3610

*Director*

Christopher Udry

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, the process of 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 by means of cross-sectional and intertemporal studies and the analysis of policies that affect that process. An increasing share of the research involves statistical study of the behavior of households and firms as revealed in sample surveys by the application of microeconomic theory. Current projects include research on technology development, choice and transfer, household consumption, investment and demographic behavior, agricultural research and productivity growth, labor markets and the returns to education of women and men, labor markets and migration, income distribution, and international economic relations, including monetary and trade policies. The center's research faculty hold appointments in the Department of Economics and other departments at Yale, and accordingly have teaching as well as research responsibilities.

The center administers, jointly with the Department of Economics, the Yale master's degree training program in International and Development Economics, in which most students have experience as economists in foreign central banks, finance ministries, and public and private development agencies. It presents a regular series of workshops on trade and development, on the microeconomics of labor and population, and on economic history and includes among its publications book-length studies, reprints by staff members, and discussion papers.

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.

## INSTITUTION FOR SOCIAL AND POLICY STUDIES

77 Prospect, 432.3234

*Director*

Donald P. Green

*Executive Committee*

Karl Ulrich Meyer, Kelly Brownell, Alvin Klevorick, Benjamin Polak, Ian Shapiro

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 numerous interdisciplinary faculty seminars, research publications, postdoctoral programs, and the undergraduate major in Ethics, Politics, and Economics. Through these activities, ISPS seeks to shape public policies of local, national, and international significance.

Among the major programs at ISPS are: the Agrarian Studies Program, James Scott, director; the Program in Ethics, Politics, and Economics, Seyla Benhabib, director; the Yale University Interdisciplinary Center for Bioethics, Robert Levine and Margaret Farley, directors; and the Center for the Study of American Politics, Alan Gerber, director.

For more information, refer to the ISPS Bulletin and the Web site, [www.yale.edu/isps](http://www.yale.edu/isps).

## INTERNATIONAL SECURITY STUDIES

31 Hillhouse, 432.6242

### *Director*

Paul Kennedy

International Security Studies (ISS) supports interdisciplinary research and teaching in grand strategy, international history, and security studies, with particular reference to diplomatic and military history. Its goals are to fill the critical national need for educators and leaders with knowledge of these fields; to advance the arts of recognizing, defining, analyzing, training in, and teaching its areas of interest; and to provide a forum for informed and independent discussions of historical and contemporary policy-thinking and policy-making on security-relevant issues. ISS is not a degree-granting program: it facilitates the work and welcomes the participation of students from all academic departments and the professional schools. ISS is supported by Yale University, British Petroleum, the Smith Richardson Foundation, the George Frederick Jewett Foundation, the Arthur Vining Davis Foundations, the John M. Olin Foundation, and by the Friends of ISS, an organization of private donors.

Until it closed in 2005, United Nations Studies at Yale (UNSY), directed by Bruce Russett, existed under the umbrella of ISS. UNSY was a policy-relevant think-tank on key issues concerning the future of the UN. UNSY projects included a collaborative study with the World Bank on *The Political Economy of Civil Wars*; an analysis of Democracy, Interdependence, International Organizations, and Peace; the Yale–United Nations Oral History Project, which collected over ninety interviews with United Nations personnel; and the three-volume *Public Papers of Secretary-General Boutros Boutros-Ghali*. Information on these projects can be found at [www.yale.edu/iss](http://www.yale.edu/iss).

ISS sponsors conferences, lectures, seminars, and workshops and offers research grants and internship support for Yale graduate and undergraduate students. ISS emphasizes both the training of doctoral candidates in its fields of interest and its Grand Strat-

egy Project. The project seeks to revive the study and practice of grand strategy by preparing students to be leaders by teaching them to appreciate and apply the principles of grand strategy; by devising methods to teach grand strategy at the graduate and undergraduate levels; and by promoting a broader recognition of the centrality of grand strategy to successful leadership. The project, launched in January 2000, combines historical depth and analytical range with the belief that training future leaders at both the graduate and undergraduate levels is the best long-term investment that ISS can make in the future.

ISS's *Annual Report* is available at [www.yale.edu/iss](http://www.yale.edu/iss), as is ISS's *Grand Strategy Project Review*. Inquiries should be directed to International Security Studies, Yale University, PO Box 208353, New Haven, CT 06520-8353. Further information on ISS can also be found at [www.yale.edu/iss](http://www.yale.edu/iss).

## JUDAIC STUDIES

451 College, 432.0843

### *Chair*

Ivan Marcus [F]

Steven Fraade (*Acting* [Sp])

### *Director of Graduate Studies*

Steven Fraade

### *Professors*

Steven Fraade (*Religious Studies*), Benjamin Harshav (*Comparative Literature*), Warren Zev Harvey (*Visiting, Religious Studies*), Christine Hayes (*Religious Studies*), Paula Hyman (*History; Religious Studies*), Ivan Marcus (*History; Religious Studies*), Tessa Rajak (*Visiting, Classics; History*)

### *Associate Professor*

Esther Chazon (*Visiting, Religious Studies*)

### *Assistant Professor*

Marci Shore (*Visiting, History*)

### *Lecturers*

Mara Benjamin (*Religious Studies*), Daniel Stein Kokin (*History*), David Lambert (*Religious Studies*)

### *Senior Lector*

Ayala Dvoretzky (*Near Eastern Languages & Civilizations*)

### *Lectors*

Shiri Goren (*Near Eastern Languages & Civilizations*), Robert Hawley (*Near Eastern Languages & Civilizations*), Yechiel Schur (*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* (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](http://www.yale.edu/judaicstudies).

## Courses

### GENERAL SURVEYS

**JDST 761a<sup>u</sup>, History of Jewish Culture to the Reformation. Ivan Marcus.**

TRH 11.30–12.45

A broad introduction to the history of Jewish culture from its beginnings until the late Middle Ages, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Judaism, Christianity, and Islam. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. *Also HIST 535a<sup>u</sup>, RLST 773a<sup>u</sup>.*

**[JDST 781b<sup>u</sup>, History of Jewish Culture, 1500 to the Present.]**

### BIBLICAL PERIOD

**JDST 701a<sup>u</sup>, Introduction to the Old Testament (Hebrew Bible). Christine Hayes.**

MW 10.30–11.20, I HTBA

The Old Testament (Hebrew Bible) as an expression of the religious life and thought of ancient Israel, and a foundational document of Western civilization. A wide range of methodologies, including source criticism and the historical-critical school, tradition criticism, redaction criticism, and literary and canonical approaches to the study and interpretation of the Bible. Special emphasis on the Bible against the backdrop of its historical and cultural setting in the ancient Near East.

**JDST 702a<sup>u</sup>, Exodus and Exile in the Hebrew Bible. David Lambert.**

TRH 2.30–3.45

This course examines the theme of exodus in the Hebrew Bible. We examine the political, historical, literary, and theological dimensions of key biblical narratives in their ancient Near Eastern contexts and in formative Judaism and Christianity. *Also RLST 786a<sup>u</sup>.*

**JDST 703b<sup>U</sup>, Good Deeds in Judaism and Christianity. David Lambert.**

MW 2.30–3.45

This course examines the language used in the Hebrew Bible to depict ideal behavior and also considers this subject in works of early Judaism and Christianity. Readings concentrate on wisdom literature. *Also RLST 787b<sup>U</sup>.*

**CLASSICAL PERIOD****JDST 721b<sup>U</sup>, Introduction to Judaism in the Ancient World: From Temple to Talmud. Steven Fraade.**

TTH 1–2.15

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 cult; interpretations of scriptures; religious imagination; law and life; the rabbi; faith in reason; Sabbath and festivals; history and its redemption. No prior background in Jewish history assumed.

**JDST 722b, Ancient Judaism. Christine Hayes.**

T 10–12

An in-depth survey of the history and literature of Judaism in late antiquity though 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. This 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. *Also RLST 675b.*

**JDST 725a<sup>U</sup>, The Dead Sea Scrolls and the History of Ancient Judaism. Steven Fraade.**

TTH 1–2.15

An examination of the place of the Dead Sea Scrolls and the Qumran community within the history of ancient Judaism. We focus on the major genres of the sectarian scrolls, with an eye to understanding the community's history, religious ideology, social structures, and place within the broader varieties of Graeco-Roman Judaism. Texts are available in English translation. No prerequisites. *Also RLST 753a<sup>U</sup>.*

**JDST 727a<sup>U</sup>, Mishnah Seminar: Tractate Ta'anit on Fasting. Steven Fraade.**

Th 9.30–11.20

Close study of a section of the Mishnah, the earliest digest of Jewish law, treating procedures for public fasts in response to drought and other forms of collective adversity. Particular attention to the textual practices of rabbinic legal discourse in relation to its social function, and to the interplay of law and narrative. Prerequisite: reading fluency in ancient Hebrew, or two years of college Hebrew. L5. *Also RLST 752a<sup>U</sup>.*

**JDST 729a<sup>U</sup>, Talmud Seminar: Sources of Jewish Law and Rabbinic Authority. Christine Hayes.**

MW 1–2.15

How can a legal system based on an eternal and immutable revelation grow and develop, and what are the special anxieties that attend human administration of a divine legal system? Exploration of the sources of Jewish law and authority in the Talmudic period; the interaction of divine revelation and human interpretation; and the theoretical basis and practical application of the rabbis' authority to both administer and interpret—at times radically—biblical

law. Secondary readings in comparative law, contemporary legal theory, and legal interpretation inform our analysis of the Hebrew sources. Prerequisite: reading knowledge of Hebrew. *Also RLST 785a<sup>u</sup>.*

**JDST 731a<sup>u</sup>, New Approaches to Josephus. Tessa Rajak.**

W 1.30–3.20

Close readings and discussion of central issues and key passages in the writings of Flavius Josephus, with consideration of recent debates on the historian in relation to his environment. Knowledge of Greek not required, but opportunities are offered to consider issues of expression and style in the original. *Also CLSS 803a<sup>u</sup>, HIST 505a<sup>u</sup>.*

**JDST 732b<sup>u</sup>, Diaspora Interaction among Jews, Greeks, and Romans. Tessa Rajak.**

TTh 11.30–12.45

An in-depth study of the primary evidence and of the leading modern interpretations of the Mediterranean Jewish diaspora, from the Hellenistic Age to late antiquity. The emphasis is on understanding the relationships between Jews and “pagans” in a world of ethnic diversity and on exploring the connections among politics, society, culture, and religion. Knowledge of the original languages not required. *Also CLSS 806b<sup>u</sup>, HIST 506b<sup>u</sup>.*

**JDST 733b<sup>u</sup>, The Dead Sea Scrolls and Jewish Prayer in Late Antiquity. Esther Chazon.**

Th 9.30–11.20

A wide selection of the hundreds of prayers uncovered in the Dead Sea Scrolls is studied in depth with a view to the Scrolls’ impact on major issues in Second Temple Judaism and the institution of the synagogue liturgy by the rabbis and authors of the first prayer books. *Also RLST 759b<sup>u</sup>.*

**JDST 756b, The Required Ancient Judaism Seminar: Biblical Interpretation in Ancient Judaism. Steven Fraade, John Collins.**

W 1.30–3.20

An examination of the variety of forms and methods of biblical interpretation from the Hellenistic period into late antiquity. Topics may be drawn from inner-biblical interpretation, Dead Sea Scrolls, Alexandrian Judaism, pseudepigrapha, midrash, targum, and early Christianity. *Also RLST 756b.*

**MEDIEVAL AND EARLY MODERN PERIODS**

**JDST 762a<sup>u</sup>, Jewish Philosophy from Maimonides to Spinoza. W. Zev Harvey.**

MW 2.30–3.45

A discussion of the role of the intellect and the passions in the writings of major Jewish philosophers from Maimonides through Spinoza. *Also RLST 789a<sup>u</sup>.*

**[JDST 764b<sup>u</sup>, Jews in Muslim Lands from the Seventh to the Sixteenth Century.]**

**JDST 765a<sup>u</sup>, Jewish Intellectual and Cultural Life in Early Modern Italy.**

Daniel Stein Kokin.

TTh 2.30–3.45

This course explores the intellectual and cultural life of Jews in Italy from the fifteenth through early seventeenth century. Christian attitudes toward, and interest in, Judaism and Jewish sources are of special interest, including Jewish philosophy in the Humanist movement; Christian Hebraism; the rise of printing; the Ghetto; censorship and anti-Semitism; and Jewish confraternities and preaching. *Also HIST 583a<sup>u</sup>.*

**JDST 766b<sup>U</sup>, Jewish Messianisms in Historical Context and Theory.****Daniel Stein Kokin.**

Th 1.30–3.20

An exploration of the development and place of messianism in Jewish history and theology. The course focuses on major messianic figures (e.g., Bar Kokhba, Shlomo Molkho, Shabbetai Tzvi) and influential theories of messianism (e.g., Maimonides, Abraham Abulafia, Avraham Yitzhak Kook). Classic scholarly approaches to messianism are also studied and evaluated. *Also HIST 584b<sup>U</sup>.*

**[JDST 790b, Jews in Christian and Muslim Lands from the Fourth to Sixteenth Century.]****MODERN PERIOD****JDST 782a<sup>U</sup>, Jews and Modernity in Eastern Europe and Russia. Marci Shore.**

TTh 10.30–11.20, 1 HTBA

This course explores the variety of ways in which Jews and Jewish communities in Eastern Europe responded to a radically changing world in the nineteenth and twentieth centuries. How did Jews engage with new ideas about time and history, and about nation and class, which wreaked havoc with traditional societies – both Jewish and non-Jewish – in this part of the world? *Also HIST 687a<sup>U</sup>.*

**JDST 783b<sup>U</sup>, Jews and Cosmopolitanism in Modern European Intellectual History.****Marci Shore.**

TTh 11.30–12.45

This seminar, inspired by Isaac Deutscher's essay "The Non-Jewish Jew," examines Jewish contributions to "cosmopolitan" ideas in modern European intellectual history. Topics include Marxism, psychoanalysis, and deconstruction. *Also HIST 688b<sup>U</sup>.*

**JDST 784a<sup>U</sup>, Memory, Memoirs, and Modern Jewish History. Paula Hyman.**

W 1.30–3.20

An exploration of the representation of Jewish historical experience from the seventeenth to the twentieth century through a selection of memoirs. Focus on the construction of identity, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. *Also HIST 952a<sup>U</sup>, RLST 762a<sup>U</sup>.*

**JDST 785a<sup>U</sup>, Weimar German-Jewish Thought. Mara Benjamin.**

Th 1.30–3.20

Seminar focusing on early twentieth-century German-Jewish theology; emphasis on strategies for reading religious texts in light of nineteenth-century critiques of religion. In-depth treatment of Martin Buber and Franz Rosenzweig; attention to other contemporaneous Jewish and Christian thinkers; contemporary literature on religious hermeneutics. *Also RLST 779a<sup>U</sup>.*

**JDST 788a<sup>U</sup>, The Holocaust in Historical Perspective. Paula Hyman.**

MW 10.30–11.20, 1 HTBA

A survey of the major issues raised by the Holocaust, including the roots of Nazism; different theoretic perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. *Also HIST 979a<sup>U</sup>, RLST 768a<sup>U</sup>.*

## THE MACMILLAN CENTER FOR INTERNATIONAL AND AREA STUDIES AT YALE

Luce Hall, 34 Hillhouse, 432-3410  
[www.yale.edu/macmillan](http://www.yale.edu/macmillan)

Director  
 Ian Shapiro

### *Executive Committee*

Nancy L. Ruther (*Secretary; Associate Director, The MacMillan Center*), Deborah Davis (*Sociology, on leave [Sp]*), Michael Donoghue (*Ecology & Evolutionary Biology*), Daniel Esty (*Law; Forestry & Environmental Studies, on leave [F]*), Paul Freedman (*History*), Harvey Goldblatt (*Slavic Languages & Literatures*), Michael Graetz, (*Law*), Daniel Junior (*Associate Director, The MacMillan Center*), Stathis Kalyvas (*Political Science*), Richard Kane (*Associate Director, The MacMillan Center*), William Kelly (*Anthropology*), Charles Long (*Deputy Provost*), Mary Miller (*History of Art*), Douglas Rae (*School of Management*), Susan Stokes (*Political Science*), Christopher Udry (*Economics, on leave [Sp]*).

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, societies and cultures around the world. The MacMillan Center endeavors to make understanding the world outside the borders of the U.S. an integral part of liberal education and professional training at the University. It brings together scholars from across 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 ten degree programs. The six undergraduate majors include African Studies; East Asian Studies; Ethnicity, Race, and Migration; International Studies; Latin American Studies; and Russian and East European 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 Management; Law; Forestry & Environmental Studies; and Epidemiology and Public Health. Additionally, the programs offer six Graduate Certificates of Concentration: in African Studies; European Studies; International Development Studies; International Security Studies; Latin American 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 Agrarian Studies; the Center for the Study of Globalization; Ethnicity, Race, and Migration Program; European Union Studies; Genocide Studies; the Gilder Lehrman Center for the Study of Slavery, Resistance, and Abolition; International Affairs; International and Comparative Political Economy; International Security Studies; and United Nations Studies.

The MacMillan Center provides opportunities for scholarly research and intellectual innovation; awards nearly 450 fellowships and grants each year; encourages faculty/student interchange; sponsors more than 500 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 (exclusive of Europe) comprising 1.4 million volumes in the languages of various areas. Through 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.

For details on degrees, programs, and faculty leadership, please consult [www.yale.edu/macmillan](http://www.yale.edu/macmillan).

## COUNCIL ON AFRICAN STUDIES

The MacMillan Center for International and Area Studies

142 Luce Hall, 34 Hillhouse, 432.3436

[www.yale.edu/macmillan/african](http://www.yale.edu/macmillan/african)

Graduate Certificate of Concentration in African Studies

### *Chair*

Christopher Udry (*Economics*)

### *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 Certificate 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 764a, 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 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 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](mailto:african.studies@yale.edu).

## COUNCIL ON EUROPEAN STUDIES

The MacMillan Center for International and Area Studies  
 242 Luce Hall, 34 Hillhouse, 432.3423  
[www.yale.edu/macmillan/europeanstudies](http://www.yale.edu/macmillan/europeanstudies)  
 Graduate Certificate of Concentration in European Studies

### *Chair*

Laura Engelstein

### *Faculty*

For faculty listings, see the section on European and Russian Studies, under Degree-Granting Departments and Programs in this bulletin.

### *Participating Staff*

Jonathan Brent (*Yale University Press*), Brian Carter (*PIER*), Tatjana Lorkovic (*Library*), Susanne Roberts (*Library*), Kevin Repp (*Beinecke Library*)

The European Studies Council formulates and implements new curricular and research programs reflective of current developments in Europe. The geographical scope of the council's activities extends from Ireland to the lands of the former Soviet Union. Its

definition represents a concept of Europe that embraces the conventional divisions into Western, Central, and Eastern Europe, and is understood to include the Balkans and Russia. In 2000 and 2003, the U.S. Department of Education 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, 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, and also the Hellenic Studies program, which offers instruction in Modern Greek language, literature, history, and culture.

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 Certificate 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 Union visiting fellow during the 2005–2006 academic year was Peter Oliver, a lawyer attached to the commission's legal service, who specializes in competition policy (i.e., anti-trust and merger policy) and represents the commission in competition cases before the European Court of Justice and the Court of First Instance. Also, from 2003 to 2006, European Studies hosted the distinguished scholar Slobodan Prosperov Novak, who teaches the Serbian and Croatian languages as well as courses on South Slavic literatures and cultures.

Given the special objective of the European Studies Council to encourage research and discussion on projects of a pan-European nature or those involving comparison among several countries, the faculty are available to supervise work on European economic, political, and cultural integration. Specific studies might focus on such themes as labor migration and the issue of immigration in general; the problems of socialist or center parties in countries with or without Communist experiences; the common tendencies in various national literatures or art; or common problems in the relations between European countries and other parts of the world.

### *Fields of Study*

Comparative literature; economics; history; political science; law; Slavic languages and literatures; sociology.

### *Special Requirements for the Graduate Certificate of Concentration in European Studies*

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 upon 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. Note that students who choose to pursue the Certificate of Concentration in European Studies may not pursue other certificates.

### *Specific Requirements*

1. Language proficiency in two modern European languages, in addition to English. For each language 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 through completing course work, by placement testing at Yale, or by other means as approved by the council adviser. 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.
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.

The courses should also include a variety of disciplines, and only two courses may be “directed readings” or “independent study.” No more than four of the six courses may count from any one discipline or school. Courses may count toward the student’s degree, as well as toward the certificate. A minimum grade of HP must be obtained for the course to be counted toward the certificate. Courses from the student’s home department are eligible. Language courses are not eligible.

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.

The paper will be read by two faculty members selected by the council adviser. The readers will be evaluating the paper for the quality of research, knowledge of the relevant literature, and the depth of analysis of the topic. The qualifying paper must be fully footnoted and have a complete bibliography.

### *Progress Reports and Filing for the Award of the Graduate Certificate of Concentration*

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.

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. No later than the fourth week of the term of the expected award, the candidate should demonstrate how he/she has or will have completed all the requirements in a timely fashion.

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. Students may elect to retrieve the certificate award in person from the council after commencement. Otherwise, the council will send the certificate award to the student by mail after commencement.

For course listings, see European and Russian Studies, under Degree-Granting Departments and Programs in this bulletin.

Program materials are available upon request to the Council on European Studies, Yale University, PO Box 208206, New Haven, CT 06520-8206.

## INTERNATIONAL AFFAIRS COUNCIL

The MacMillan Center for International and Area Studies  
 210 Luce Hall, 34 Hillhouse, 432.3418  
 Graduate Certificate of Concentration in Development Studies  
 Graduate Certificate of Concentration in Security Studies

### *Chair*

John Gaddis (*History*)

### *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 in conjunction with graduate degree programs in the Graduate School of Arts and Sciences and the professional schools to allow students 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 for this 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 declare their intention to pursue the certificate early in their degree program, and must do so no later than their penultimate term of enrollment.

Candidates for the certificate will receive preference, after students enrolled in the Council's degree programs, for International Affairs Council travel, research, and speaker funds that are awarded through annual competitions.

## REQUIREMENTS

1. 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 requirements. These courses will draw primarily on Graduate School offerings in economics, political science, history, anthropology, and sociology and courses at the professional schools, including Law, Management, Forestry & Environmental Studies, and Epidemiology and Public Health. Candidates may petition the faculty adviser to have other relevant courses count.

Up to two courses may be directed readings/independent study courses.

No more than four courses may count from any one discipline or school.

A minimum grade of HP must be attained or the course will not be counted toward the certificate.

2. Language proficiency:

Students must demonstrate proficiency in one relevant language other than English. This would involve the equivalent of two years of study at Yale with a passing grade. 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. Economics proficiency:

Students 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. Research requirement:

In the context of one of the courses, 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. An M.A. thesis may, on the determination of the faculty adviser, be used to fulfill this requirement.

Candidates must seek approval from the faculty adviser for the research paper no later than the fourth week of the term in which they plan to complete it. The final paper will be read by two faculty members (one of whom may be the faculty member teaching the class), who must both approve it as meeting the research requirement.

If the paper is of sufficient quality, the faculty adviser may submit it for publication in the IAC Development Studies Working Paper Series.

### *Graduate Certificate of Concentration in Security Studies*

The graduate certificate of concentration in 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 Security Studies may be pursued in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools to allow 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 Security Studies faculty adviser may set a limit on the number of applicants accepted for this program in any given year.

The certificate courses and research should be planned, in consultation with the Security Studies faculty adviser, to clearly demonstrate fulfillment of the goals of the

Security Studies certificate. Certificate candidates should declare their intention to pursue the certificate early in their degree program, and must do so no later than their penultimate term of enrollment.

Candidates for the certificate will receive preference, after students enrolled in the Council's degree programs, for International Affairs Council travel, research, and speaker funds that are awarded through annual competitions.

## REQUIREMENTS

### 1. Six courses in the area of International Security:

Each year the Security Studies faculty adviser will provide a list of courses that will count toward this six-course requirement. These courses will draw primarily on Graduate School offerings in anthropology, economics, history, political science, and sociology and courses at the professional schools, including Forestry & Environmental Studies, Law, Management, and Epidemiology and Public Health. Candidates may petition the faculty adviser to have other relevant courses counted.

One of these six courses must have a core focus on International Security issues. The Security Studies faculty adviser will provide a list of courses each year that meet this requirement.

Up to two courses may be directed readings or independent study courses.

No more than four courses may count from any one discipline or school.

A minimum grade of HP must be attained or the course will not be counted toward the certificate.

Up to three courses may focus on a particular region.

### 2. Language proficiency:

Candidates must demonstrate proficiency in one relevant language other than English. This would involve the equivalent of two years of study at Yale with a passing grade. The language should be either a major world language relevant to security studies or the language of the region on which the candidate is focusing.

### 3. Research requirement:

In the context of one of the courses, candidates must write a substantial research paper. The paper must demonstrate the ability to use interdisciplinary resources in security studies, including, where appropriate, primary sources, field research, data analysis, and non-English sources. An M.A. thesis may, on the determination of the faculty adviser, be used to meet this requirement.

Candidates must seek approval from the faculty adviser for the research paper no later than the fourth week of the term in which they plan to complete it. The final paper will be read by two faculty members (one of whom may be the faculty member teaching the class), who must both approve it as meeting the research requirement.

If the paper is of sufficient quality, the faculty adviser may submit it for publication in the IAC Security Studies Working Paper Series.



For more information, visit <http://www.yale.edu/macmillan/iac/certificates.htm>, write to International Affairs Council, Yale University, PO Box 208206, New Haven CT 06520-8206, or call 203.432.3418.

## COUNCIL ON LATIN AMERICAN AND IBERIAN STUDIES

The MacMillan Center for International and Area Studies

Luce Hall, 34 Hillhouse, 432.3422

[www.yale.edu/macmillan/las](http://www.yale.edu/macmillan/las)

Graduate Certificate of Concentration in Latin American Studies

### *Chair*

Enrique Mayer (*Anthropology*)

### *Professors*

Rolena Adorno (*Spanish & Portuguese*), Mark Ashton (*Forestry & Environmental Studies*), Richard Burger (*Anthropology*), Hazel Carby (*African American Studies; American Studies*), Amy Chua (*Law*), Carlos Eire (*History; Religious Studies*), Eduardo Engel (*Economics*), Robert Evenson (*Economics*), Aníbal González (*Spanish & Portuguese*), Roberto González Echevarría (*Spanish & Portuguese*), K. David Jackson (*Spanish & Portuguese*), Gilbert Joseph (*History*), Enrique Mayer (*Anthropology*), Robert Mendelsohn (*Forestry & Environmental Studies*), Maria Rosa Menocal (*Spanish & Portuguese*), Mary Miller (*History of Art*), Florencia Montagnini (*Forestry & Environmental Studies*), Stephen Pitti (*History*), T. Paul Schultz (*Economics*), Stuart Schwartz (*History*), Susan Stokes (*Political Science*), Robert Thompson (*History of Art*), Noël Valis (*Spanish & Portuguese*), Michael Veal (*Music*), Elisabeth Wood (*Political Science*)

### *Associate Professors*

Richard Bribiescas (*Anthropology*), Lisa Curran (*Forestry & Environmental Studies*), Nora Groce (*Epidemiology & Public Health*), Kellie Jones (*History of Art*), Jaime Lara (*Divinity*), Leonard Munstermann (*Senior Research Scientist, Epidemiology & Public Health*), Patricia Pessar (*Adjunct, American Studies*)

### *Assistant Professors*

Jennifer Bair (*Sociology*), Jennifer Baszile (*History*), Irene Brambilla (*Economics*), Marcello Canuto (*Anthropology*), Jason Cortes (*Spanish & Portuguese*), Paulo da-Luz-Moreira (*Spanish & Portuguese*), Thad Dunning (*Political Science*), Seth Fein (*History*), Iván Fernández Peláez (*Spanish & Portuguese*), Moira Fradinger (*Comparative Literature*), Lillian Guerra (*History*), Susan Hyde (*Political Science*), Kellie Jones (*History of Art*), Jill Lane (*Theater & American Studies*), Óscar Martín (*Spanish & Portuguese*), Paulina Ochoa Espejo (*Political Science*), Alicia Schmidt-Camacho (*American Studies*), Renzo Taddei (*Anthropology*)

### *Lecturer*

Nancy Ruther (*Political Science*), Natalia Sobrevilla Perea (*International Affairs Council*)

*Professors Emeriti*

Emilia Viotti da Costa (*History*), Josefina Ludmer (*Spanish & Portuguese*), Juan Linz (*Political Science; Sociology*), Gustav Ranis (*Economics*).

César Rodríguez, *Curator, Latin American Collection, Sterling Memorial Library*

Although there is no advanced degree in Latin American Studies at Yale, graduate and professional students may draw upon resources of many departments in order to make Latin America their field of concentration while working toward their respective degrees in conventional disciplines.

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, is contingent on the successful completion of the candidate's Yale University degree program.

Limited financial resources, such as the Foreign Language and Area Studies fellowships, 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. Lesser-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 ability to use field resources, ideally in one or more languages of the region.

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 term-long, thematically integrated lecture series and special seminars as well as conferences that bring visiting speakers 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, as the 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 490,000 printed volumes, plus newspapers and microfilms, CD-ROMs, films, sound recordings, maps, and musical scores. 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.

The Yale libraries have substantial collections of publications and research materials from Spain and Portugal relating to most disciplines in the humanities and social sciences. The Yale library's Iberian collections comprise several hundred thousand volumes as well as newspapers, microfilms, electronic publications, films, maps, and musical scores. The collections are particularly strong in literature and history and include languages and literatures of the peninsula.

Information about the Graduate Certificate of Concentration in Latin American Studies should be addressed to the Council on Latin American and Iberian Studies, Yale University, PO Box 208206, New Haven, CT 06520-8206; e-mail: [latin.america@yale.edu](mailto:latin.america@yale.edu); or telephone 203.432.3422.

## COUNCIL ON MIDDLE EAST STUDIES

The MacMillan Center for International and Area Studies

Luce Hall, 34 Hillhouse, Ste 232, 432.5596

[www.yale.edu/macmillan/cmcs](http://www.yale.edu/macmillan/cmcs)

Graduate Certificate of Concentration in Modern Middle East Studies

### *Chair*

Ellen Lust-Okar (*Political Science*)

### *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*), Owen Fiss (*Law*), Benjamin Foster (*Near Eastern Languages & Civilizations*), Steven Fraade (*Religious Studies*), Beatrice Gruendler (*Near Eastern Languages & Civilizations*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Stanley Insler (*Linguistics*), Bentley Layton (*Religious Studies*), Ivan Marcus (*History*), Ashgar Rastegar (*Medical School*), W. Michael Reisman (*Law*), Lamin Sanneh (*Divinity; History*), Harvey Weiss (*Near Eastern Languages & Civilizations*), Robert Wilson (*Divinity*)

### *Associate Professors*

Frank Griffel (*Religious Studies*), Ellen Lust-Okar (*Political Science*)

### *Assistant Professors*

Michael Gasper (*History*), Kaveh Khoshnood (*Epidemiology & Public Health*), Hala Nassar (*Near Eastern Languages & Civilizations*)

*Lecturer*

Adel Allouche (*History; Religious Studies*)

*Senior Lectors*

Fereshteh Amanat-Kowssar, Ayala Dvoretzky, Bassam Frangieh

*Librarians*

Simon Samoeil (*Sterling Memorial Library*), Ulla Kasten (*Babylonian Collection*), Susan Matheson (*Yale University Art Gallery Ancient Arts*), Fereshteh Molavi (*Persian Bibliographer*), Nannette Stahl (*Judaica Collection*)

Students with an interest in the Middle East should apply to one of the University's degree-granting departments, like Anthropology, History, Linguistics, Near Eastern Languages and Civilizations, Political Science, or Religious Studies. The Council on Middle East 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 Middle East-related courses.

The council brings together faculty and students sharing an interest in the Middle East by sponsoring conferences, discussions, films, and a 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. The center supports a number of projects and activities, including postdoctoral and visiting scholar appointments, summer and academic year language fellowships, and an extensive outreach program as well as conferences, travel funds, and research projects. The National Resource Center is funded by the United States Department of Education.

As of the academic year 2004–2005, the council offers a Graduate Certificate of Concentration in Modern Middle East Studies.

*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).
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 administrative assistant of the council, Barbara Papacoda, e-mail, [barbara.papacoda@yale.edu](mailto:barbara.papacoda@yale.edu).

## COUNCIL ON SOUTH ASIAN STUDIES

The MacMillan Center for International and Area Studies  
Luce Hall, 34 Hillhouse Avenue, Ste. 232, 432.5596

*Chair*

Phyllis Granoff

### FACULTY ASSOCIATED WITH THE COUNCIL ON SOUTH ASIAN STUDIES

*Professors*

Akhil Amar (*Law*), Paul Bracken (*School of Management; Political Science*), William Burch (*Forestry & Environmental Studies*), Ravi Dhar (*School of Management*), Michael R. Dove (*Forestry & Environmental Studies*), Sara Suleri Goodyear (*English*), Phyllis Granoff (*Religious Studies*), Stanley Insler (*Linguistics*), Ravindran Kannan (*Computer Science*), Bernard Lytton (*Emeritus, School of Medicine*), Gustav Ranis (*Emeritus, Economics*), Subrata Sen (*School of Management*), T. N. Srinivasan (*Economics*), Shyam Sunder (*School of Management*), Jacob Thomas (*School of Management*), Christopher Udry (*Economics*)

*Associate Professors*

Jacob Dalton (*Religious Studies*), Nihal deLanerolle (*School of Medicine*), William Deresiewicz (*English*), David Graeber (*Anthropology*), Sudhir Karunakaran (*School of Management*), Karuna Mantena (*Political Science*), Priyamvada Natarajan (*Astronomy*), Rohini Pande (*Economics*)

*Assistant Professors*

Tanya Agathocleous (*English*), J. Bernard Bate (*Anthropology*), S. Shameem Black (*English*), Mayur Desai (*Psychiatry/VAMC*), El Mokhtar Ghambou (*English*), Sanda Lwin (*English; American Studies*), Ganapathi Narayanamoorthy (*School of Management*), Diana Paulin (*English; Theater Studies*), Mridu Rai (*History*)

*Lecturers*

Carol Carpenter (*Forestry & Environmental Studies*), Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*), Hugh Flick (*Religious Studies*), Dhooleka Sarhadi Raj (*Anthropology*)

*Senior Lector*

Seema Khurana (*Hindi/MacMillan Center*)

*Lector*

Elayaperumal Annamalai (*Anthropology; Linguistics; Tamil/MacMillan Center*)

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 Council on South Asian Studies 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 Council on South Asian Studies, Yale University, PO Box 208206, New Haven, CT 06520-8206; or see our Web site, [www.yale.edu/ycias/southasia](http://www.yale.edu/ycias/southasia).

*Courses*

**ANTH 546a, Anthropology and Contemporary Social Theory.** Dhooleka Raj.

For description see under Anthropology.

**HINDI 515<sup>U</sup>, Elementary Hindi.** Seema Khurana.

M 1 HTBA, TTh 1–2.15, W 2.30–3.45

An in-depth introduction to modern Hindi, including the Devanagari script. Through a combination of graded texts, written assignments, audiovisual material, and computer-based exercises, the course provides cultural insights and increases proficiency in understanding, speak-

ing, reading, and writing Hindi. Emphasis placed on spontaneous self-expression in the language. No prior background in Hindi assumed.

**HNDI 530a<sup>U</sup>, Intermediate Hindi I. Seema Khurana.**

TRH 2.30–3.45, W 4–5.15

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. After HNDI 515 or equivalent.

**HNDI 531b<sup>U</sup>, Intermediate Hindi II. Seema Khurana.**

TRH 2.30–3.45, W 4–5.15

Continuation of HNDI 530a, focusing on further development of proficiency in the four language skill areas. After HNDI 530a or equivalent.

**HNDI 557b<sup>U</sup>, Hindi in the Diaspora. Seema Khurana.**

TRH 4–5.15

An advanced language course focused on reading and discussion. Development of overall proficiency in the language and knowledge of issues affecting the Hindi-speaking diaspora through exposure to selected Hindi literature and popular culture including film, theater, and news reports. Prerequisite: HNDI 540a or permission of instructor.

**HNDI 598a<sup>U</sup> or b<sup>U</sup>, Advanced Tutorial. Seema Khurana.**

I HTBA

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 culminate in a term paper or its equivalent. Permission to enroll requires submission of a detailed project proposal and its approval by the language studies coordinator. Prerequisite: HNDI 540a or permission of instructor.

**INDC 652b, Vedic Prose. Stanley Insler.**

For description see under Linguistics.

**INDC 771b, Middle Indic: Pali and Prakrit. Stanley Insler.**

For description see under Linguistics.

**RLST 554b, Religious Histories of Tibet. Jacob Dalton.**

For description see under Religious Studies.

**RLST 556a, Medieval Indian Religions. Phyllis Granoff.**

For description see under Religious Studies

**RLST 561a<sup>U</sup>, Introduction to Classical Tibetan Texts. Jacob Dalton.**

For description see under Religious Studies.

**TAML 515<sup>U</sup>, Introductory Tamil. E. Annamalai.**

MTWThF 9.30–10.20

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.

## COUNCIL ON SOUTHEAST ASIA STUDIES

The MacMillan Center for International and Area Studies  
Luce Hall, 34 Hillhouse, 432.3431, seas@yale.edu

### *Chair*

J. Joseph Errington

### *Professors*

William Burch (*Forestry & Environmental Studies*), Michael Dove (*Forestry & Environmental Studies*), J. Joseph Errington (*Anthropology*), Robert Evenson (*Economics*), William Kelly (*Anthropology*), Benedict Kiernan (*History*), James Scott (*Political Science*), Mimi Yiengpruksawan (*History of Art*)

### *Associate Professor*

Lisa Curran (*Forestry & Environmental Studies*)

### *Assistant Professor*

Sarah Weiss (*Music*)

### *Lecturers and Lectors*

Carol Carpenter (*Forestry & Environmental Studies*), Amity Doolittle (*Forestry & Environmental Studies*), Quang Phu Van (*Southeast Asian Languages*), Indriyo Sukmono (*Southeast Asian Languages*)

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 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 Rich Richie, Curator, Southeast Asia Collection, Sterling Memorial Library (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 the 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 and program materials, 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](http://www.yale.edu/seas).



## Courses

### INDN 520<sup>U</sup>, Elementary Indonesian. Indriyo Sukmono.

5 HTBA

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.

### INDN 527<sup>U</sup>, Intermediate Indonesian. Indriyo Sukmono.

3 HTBA

Continues practice in colloquial Indonesian conversation and reading and discussion of texts.

### INDN 560, Readings in Indonesian. Indriyo Sukmono.

For students with advanced Indonesian language skills working on modern Indonesian literature.

### VIET 515<sup>U</sup>, Elementary Vietnamese. Quang Phu Van.

MTWThF 9.30–10.20

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.

### VIET 530<sup>U</sup>, Intermediate Vietnamese. Quang Phu Van.

MTWThF 10.30–11.20

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.

### 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)

Osborn Memorial Laboratories, Rm 101, 165 Prospect Street, 432.3837  
[www.biology.yale.edu/oib](http://www.biology.yale.edu/oib)

### Advisory Committee

Durland Fish, Vice Director (*Epidemiology & Public Health*)

Leo Hickey (*Geology & Geophysics*)

Andrew Hill (*Anthropology*)

Richard Prum (*Ecology & Evolutionary Biology*)

Nancy Ruddle (*Epidemiology & Public Health*)

Oswald Schmitz (*Forestry & Environmental Studies*)

David Skelly, Director (*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 WLH, 100 Wall, 432.0845

### *Chair*

Laura Wexler

### *Professors*

Julia Adams (*Sociology*), Linda Bartoshuk (*Psychology*), Seyla Benhabib (*Political Science*), Kelly Brownell (*Psychology*), Jill Campbell (*English*), Hazel Carby (*African American Studies; American Studies*), Kang-i Sun Chang (*East Asian Languages & Literatures*), George Chauncey (*History*), Deborah Davis (*Sociology*), Kathryn Dudley (*American Studies; Anthropology*), Glenda Gilmore (*History; American Studies; African American Studies*), Sara Suleri Goodyear (*English*), Dolores Hayden (*Architecture; American Studies*), Margaret Homans (*English; Women's, Gender & Sexuality Studies*), Paula Hyman (*History; Religious Studies*), Matthew Jacobson (*History; American Studies*), L. Serene Jones (*Divinity; Women's, Gender & Sexuality Studies*), David Joselit (*History of Art*), Marianne LaFrance (*Psychology; Women's, Gender & Sexuality Studies*), Joanne Meyerowitz (*History*), Charles Musser (*Film Studies; American Studies*), David Musto (*Child Study Center*), Judith Resnik (*Law*), Frances Rosenbluth (*Political Science*), Cynthia Russett (*History*), Harold Scheffler (*Anthropology*), Vicki Schultz (*Law*), Reva Siegel (*Law*), William Summers (*Molecular Biophysics & Biochemistry*), Emilie Townes (*Divinity*), Laura Wexler (*American Studies; Women's, Gender & Sexuality Studies*), Robert Wyman (*Molecular, Cellular & Developmental Biology*)

### *Associate Professors*

Jessica Brantley (*English*), Hannah Brueckner (*Sociology*), Kamari Clarke (*African American Studies; Anthropology*), Elizabeth Dillon (*English; American Studies*), Laura Frost (*English*), Nora Groce (*Epidemiology & Public Health*), Janet Henrich (*School of Medicine*), Susan Lederer (*History of Science & Medicine*), Mary Lui (*History*), Michael Mahoney (*History*), Naomi Rogers (*History of Science & Medicine; Women's, Gender & Sexuality Studies*), Eric Worby (*Anthropology*)

*Assistant Professors*

Jennifer Bair (*Sociology; Women's, Gender & Sexuality Studies*), Bernard Bate (*Anthropology*), Averil Clarke (*Sociology*), Moira Fradinger (*Comparative Literature*), Terri Francis (*Film Studies*), Jill Lane (*Theater Studies; American Studies*), Sanda Lwin (*English; American Studies*), Karen Nakamura (*Anthropology*), Hala Kh. Nassar (*Near Eastern Languages & Civilizations*), Alondra Nelson (*Sociology; African American Studies*), Naomi Pabst (*African American Studies*), Diana Paulin (*English; American Studies*), Nicole Rice (*English*), Alicia Schmidt Camacho (*American Studies*), Rachel Sherman (*Sociology*), Ludger Viefhues (*Religious Studies; Women's, Gender & Sexuality Studies*)

*Lecturers*

David Agruss (*Women's, Gender & Sexuality Studies; Comparative Literature*), Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*), Kathleen Cleaver (*African American Studies*), Tirza Latimer (*Women's, Gender & Sexuality Studies; History of Art*), Rebecca Tannenbaum (*History*)

*Graduate Studies Council for the WGSS Graduate Qualification*

Julia Adams (*Sociology*), David Agruss (*Women's, Gender & Sexuality Studies; Comparative Literature*), Jill Campbell (*English*), Hazel Carby (*African American Studies; American Studies*), M. Kamari Clarke (*African American Studies; Anthropology*), Elizabeth Dillon (*English; American Studies*), Moira Fradinger (*Comparative Literature*), Margaret Homans (*English; Women's, Gender & Sexuality Studies*), L. Serene Jones (*Divinity; Women's, Gender & Sexuality Studies*), Marianne LaFrance (*Psychology; Women's, Gender & Sexuality Studies*), Jill Lane (*Theater Studies; American Studies*), Joanne Meyerowitz (*History*), Alondra Nelson (*Sociology; African American Studies*), Naomi Rogers (*History of Science & Medicine; Women's, Gender & Sexuality Studies*), Alicia Schmidt Camacho (*American Studies*), Emilie Townes (*Divinity*), Laura Wexler (*American Studies; Women's, Gender & Sexuality Studies*)

*Fields of Study*

The Program in Women's, Gender, and Sexuality Studies establishes 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 (sexual practices, identities, discourses, and institutions) are studied as they intersect with class, race, ethnicity, and nationality. 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. Graduate students who wish to receive the Qualification in Women's, Gender, and Sexuality Studies must (1) complete one of the designated graduate courses in the theory of gender and sexuality; (2) complete a set of

electives to be determined in consultation with their individual WGSS graduate adviser; (3) demonstrate the capacity to pursue independent research in Women's, Gender, and Sexuality Studies by writing a qualifying paper; and (4) submit a course syllabus that demonstrates the ability to teach in this field. Students who fulfill these expectations will receive a letter from the chair, indicating that they have completed the work for the Qualification.

Applications and program information are available on request from Linda Anderson, Program in Women's, Gender, and Sexuality Studies, 432.0845, [linda.anderson@yale.edu](mailto:linda.anderson@yale.edu).

### *Courses*

#### **WGSS 615b, Gender and Media in India. J. Bernard Bate.**

T 1.30–3.20

Examination of narratives of gender in India. Folkloristic and anthropological approaches to gendered performance in story, song, and theater. Recent feminist examinations of television, film, advertising, and literature. Topics include classical epic (*Ramayana*, *Shilapathigaram*). Also ANTH 548b<sup>u</sup>.

#### **WGSS 700a, Religions, Pluralism, and Philosophy. Ludger Viefhues.**

TRH 11.30–12.45

A critical survey of different philosophical models addressing religious diversity in the twentieth century. Based on the epistemological motives in this literature, the course discusses the methodological assumptions underlying the constructions of religious diversity by philosophers of religion. We study how theories from religious studies, feminist philosophy, anthropology, and non-Western writings on religious life and practice change the understanding of what religious diversity is, and how philosophy could learn from it. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. Also RLST 502a<sup>u</sup>.

#### **WGSS 701b, Queer Ethnographies. Karen Nakamura.**

MW 1–2.15

This course engages in a broad reading of classic and contemporary ethnographies of non-mainstream genders and sexualities. Our emphasis is on understanding anthropology's contribution to and relationship with gay and lesbian studies and queer theory. Over the course of the term, we read and talk about what constitutes a queer ethnography, and the history and future of an anthropology of sexuality. Also ANTH 508b<sup>u</sup>.

#### **WGSS 702b, Theoretical Approaches to Gender and Sexuality. David Agruss.**

W 1.30–3.20

This course examines a wide range of theoretical and literary analytical approaches to the study of gender and sexuality—historicism, psychoanalysis, deconstruction, ideology critique, and postcolonial theory—in order to understand their particular protocols, strengths, and weaknesses, but also in order to work toward imagining alternate approaches to thinking about gender and sexuality analytically. We pay particular attention to the research interests of members of the class in order to work collectively toward theoretical strategies applicable to our own work. We read works by George Chauncey, Michel Foucault, David M. Halperin, Joan W. Scott, Judith Butler, Sigmund Freud, Kaja Silverman, Christopher Lane, Diana Fuss, Eve Kosofsky Sedgwick, Lee Edelman, Lisa Duggan, Jacques Derrida, Louis Althusser, Rosemary Hennessy, Judith Halberstam, Ann Laura Stoler, Anne McClintock, Timothy Mitchell, David Eng, Amy Villarejo, and others. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. Also CPLT 883b.

**WGSS 703a, Ethics of Images. David Joselit.**

W 1.30–3.20

This wide-ranging class considers the ethical and political nature of how images circulate. While it includes a primary focus on modern art, it necessarily considers how images were theorized and exercised power and influence in earlier eras. Authors tentatively include Plato, Aristotle, Hans Belting, Jacques Rancière, Michael Fried, Leo Bersani, Judith Butler, Laura Mulvey, Susan Sontag, Kobena Mercer, Georges Did-Huberman, Lisa Tickner, and David Freedberg. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also HSAR 701a.*

**WGSS 704a, Work and Gender. Vicki Schultz.**

MT 4.10–6

This course examines how workplaces, jobs, and workers come to be structured along gendered lines. The class reads theoretical accounts, empirical studies, ethnographies, and legal cases to obtain an understanding of the mechanisms through which work becomes gendered. Among the questions the course addresses are: Does the workplace reflect or rather actively reproduce gendered social relations and identities? What is the relationship among wage work, citizenship, and gender? How do structural features of organizations tend to reproduce sex segregation and gender harassment? How should we understand the relationship between gender and sexuality at work? Which theories ground past and present interpretations of the law's ban on sex discrimination? Which theories should do so? The representation of gender and work in the popular media is also explored, through an accompanying, required, in-class film series. Self-scheduled examination. *Also LAW 20398, SOCY 601a.*

**WGSS 705b, Black Women's Film and Video. Terri Francis.**

W 3.30–5.20, screenings M 9.30 P.M.

Study of films and videos by black women of the post-civil rights generation. Attention to filmmaking as a critical practice that engages cinematic perceptions of black womanhood through various modes of representation and narrative forms. Films placed in contexts of African American film history and black women's authorship in performance and literature. *Also AFAM 731b<sup>u</sup>, FILM 717b<sup>u</sup>.*

**WGSS 706b, Cultural Studies in the Americas. Alicia Schmidt Camacho.**

T 10.30–11.20

A bilingual seminar with readings from Latin America, the Caribbean, and the United States devoted to culture, popular movements, and social theory. The course pairs cultural texts with theoretical readings and historical monographs. We consider questions of global political and economic transformations in the region; discourses and practices of migration and displacements; nationalism and transnational movements; processes of racial, gender, class, and sexual formation; and vernacular and official discourses of rights and justice. We address these themes through an examination of popular movements and expressive cultures, and mass media. Students need basic familiarity with the Spanish language to participate fully. *Also AMST 635b.*

**WGSS 707b, Transnationalism, Modernities, and Diasporas. M. Kamari Clarke.**

T 2.30–4.20

As anthropologists continue to grapple with changing notions of "the field" from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic contexts. Drawing on a range of ideas from world systems theories of globalization to analyses of gender and globalization to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes and the ways that scholars are transforming the discipline as they attempt to understand contemporary flows of people, capital,

ideas, legal regimes, and resources. These processes disrupt the once homogenizing tendencies of ethnography and instead push us to examine different factors involved in understanding locality and globality. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also AFAM 573b, AFST 695b, ANTH 595b.*

**WGSS 709b, Desire and the Formation of Faith. L. Serene Jones.**

T 1.30–3.20

This course is a theological exploration of the place of desire in the formation of human life and faith. We look at both historical theological readings and contemporary discussions of the issue, covering material ranging from Paul and Augustine to Bell, Ward, Jordan, and Irigaray. Classical philosophical texts as well as theoretical readings in the Marxists and psychoanalytic traditions are also included. Of particular interest in the contemporary readings is the place of desire in the logic of global capitalism and in the construction of ecclesial life. Attention is given, as well, to the relation between Divine desire, human desire for God, and human desire more broadly conceived. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also REL 763b.*

**WGSS 711a, Trauma and Grace. L. Serene Jones.**

W 1.30–3.20

This course explores recent works in the field of "Trauma Studies" and its critical and constructive relation to religious understandings of the nature of grace and redemption. Central to our discussions is an investigation of the myriad ways both individual and collective violence affects persons' capacity to know, to remember, and to act, and how these effects potentially challenge theological understandings of how we know grace, how we remember, and how we assess the ethical character of religious practice. Attention is given specifically to the long-term effects of collective violence on war veterans, national bodies, and discrete populations (chattel slavery, domestic violence). Classical theologians (Augustine, Calvin) as well as contemporary thinkers (Barth, Williams, Cavanaugh, Von Balthasar) are brought into critical conversation with the myriad issues that experiences of traumatic violence bring to theological reflection. *Also REL 765a.*

**WGSS 712a, Readings in the History of Sexuality. George Chauncey, Joanne Meyerowitz.**

W 1.30–3.20

Selected topics in the history of sexuality. Emphasis on key theoretical works and recent historical literature. *Also HIST 775a, AMST 866a.*

**WGSS 713a, Legitimacy, Pluralism, and Judgment. Seyla Benhabib.**

W 1.30–3.20

This course focuses on questions of pluralism and judgment in contemporary critical theory. What is the source of pluralism in ethics? In law? What is the range of legitimate variations among different human rights traditions across cultures and countries? How is pluralism to be distinguished from relativism? What are the "burdens of judgment" according to Rawls? According to Hannah Arendt? Readings from Habermas, Taylor, Bernard Williams, Rawls, Arendt, O'Neill, Hermann, and Doyle. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also PLSC 585a, PHIL 700a.*

**WGSS 714a, Postcolonialism and Its Discontents. Sara Suleri Goodyear.**

T 1.30–3.20

A reading of theoretical and fictional texts from the Indian subcontinent, Afghanistan, and the Middle East to raise questions of cultural, religious, and racial identities. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also CPLT 727a, ENGL 935a.*

**WGSS 715b, American Legal History: Citizenship and Race. Kathleen Cleaver.**

Th 2.30–4.20

The seminar examines the evolution of U.S. citizenship as defined and interpreted by courts during the nineteenth and twentieth centuries, with particular attention to the way historical events that defined race have affected citizenship. Topics of study include the Thirteenth, Fourteenth, and Fifteenth Amendments to the U.S. Constitution, the 1866 Civil Rights Act, Reconstruction legislation, immigration restrictions imposed on Asians, legislation impacting the racial classification of Mexicans, statutes governing the citizenship of indigenous native peoples, racially based prohibitions against voting, education, and employment, and efforts to reduce them by civil rights legislation culminating with the 1964 Civil Rights Act. Each seminar participant has to research several topics and make a presentation to the class on at least one topic. Engagement in seminar discussion and the drafting of research papers are the basis for grading students. This seminar is open to seniors. *Also AFAM 829b.*

**WGSS 725a, Race and Medicine in America, 1800–2000. Susan Lederer.**

Th 1.30–3.20

An examination of the history of race and medicine in the United States, primarily but not exclusively focused on African Americans' encounters with the health care system. Topics include slavery and health; doctors, immigrants, and epidemics; the Tuskegee Syphilis Study and the use of minorities as research subjects; and race and genetic disease. *Also AMST 883a, HIST 761a, HSHM 637a<sup>II</sup>.*

**WGSS 735b, Transnational Imaginaries. Hazel Carby.**

W 1.30–3.20

This interdisciplinary seminar discusses what is meant by globalization and the new world order. If globalization is a process currently dominated by the United States as empire, how do critical and dissenting intellectuals imagine alternative structures of citizenship and belonging? Final paper. This course fulfills the theory requirement for the Graduate Qualification in Women's, Gender, and Sexuality Studies. *Also AFAM 749b, AMST 648b.*

**WGSS 750b<sup>U</sup>, Visuality and Violence. Laura Wexler.**

Th 3.30–5.20

Examination of different sets of photographic images — documentary, medical, and digital images; family snapshots; stereotypes and anti-stereotypes of race and gender; portraiture; advertising; industrial images; and art — in light of major writings on photographic representation. Study of how different ways of making and displaying images of the body invest it with culturally specific and historically informative meanings. *Also AMST 870b<sup>U</sup>.*

**WGSS 755b, Equality, Citizenship, and Sovereignty: Comparative Perspectives.**

Judith Resnik, Reva Siegel.

M 4.10–6

This course examines how different nations and federations define and implement laws on citizenship and equality. We consider how transnational laws and supranational norms concerning citizenship relate to national law, and how claims for equal treatment of citizens and/or of persons alters understandings of nations' sovereignty. Readings include constitutional provisions, statutes, cases from various countries, essays and articles from the fields of law, history, and political theory. We also host visitors who are engaged in thinking through these problems. Papers at the permission of the professors, with the possibility of an extra credit. No credit/fail option. Enrollment limited. Self-scheduled examination. Note: Permission of the instructors is required for enrollment. FAS students must enroll under the Law School course number and can then submit a form with the Registrar's Office if they wish to have the course listed on their transcript under the WGSS course number. FAS students cannot initially enroll under the WGSS course number. *Also LAW 21450.*



**WGSS 775b<sup>U</sup>, Feminist/Queer Performance/Art. Tirza Latimer.**

MW 11.30–12.45

This interdisciplinary graduate/undergraduate seminar examines the ways in which notions and representations of gender and sexual identity have been revolutionized by feminists and queer activists working in the arenas of political protest, performance, and performance art. The literature of performance/art is historically contextualized and read critically as a form of performance in and of itself.

**WGSS 785b, Antidiscrimination Law. Reva Siegel.**

HTBA

This course examines how law concerning discrimination has developed since the 1960s, focusing on questions of race, sex, and sexual orientation, with some consideration of disability and religion. The course first builds a constitutional framework, examining selected topics in equal protection and substantive due process law, concluding with Congress's power to enforce constitutional rights under Section Five of the Fourteenth Amendment. It then surveys topics in federal employment discrimination law, with occasional consideration of related bodies of civil rights legislation. What are different ways of understanding inequality and how it varies by group, within groups, and over time? When and how should law intervene? Are there distinctive roles that courts and legislatures might play in this process? The course explores these questions in a variety of settings, including education, the military, the criminal justice system, and the workplace, as well as in the regulation of reproduction, sexuality, and family. Scheduled examination. Note: Permission of the instructor is required for enrollment. FAS students must enroll under the Law School course number and can then submit a form with the Registrar's Office if they wish to have the course listed on their transcript under the WGSS course number. FAS students cannot initially enroll under the WGSS course number. *Also LAW 21417.*

**YALE CENTER FOR THE STUDY OF GLOBALIZATION**

Betts House, 393 Prospect Street, 432.1900, [globalization@yale.edu](mailto:globalization@yale.edu)

YaleGlobal Online Magazine: [www.yaleglobal.yale.edu](http://www.yaleglobal.yale.edu)

Center Website: [www.ycsg.yale.edu](http://www.ycsg.yale.edu)

*Director*

Ernesto Zedillo

The Yale Center for the Study of Globalization (YCSG) is devoted to examining the impact of our increasingly integrated world on individuals, communities, and nations. The Center's purpose is to support the creation and dissemination of ideas for seizing the opportunities and overcoming the challenges presented by globalization. It is focused on producing practical policies to enable the world's poorest and weakest citizens to share in the benefits brought by globalization. YCSG also explores solutions to problems that, even if they do not result directly from integration, are global in nature and can therefore be effectively addressed only through international cooperation. The Center draws on the rich intellectual resources of the Yale community, scholars from other universities, and experts from around the world.

On campus, the Center supports teaching and research on the many facets of globalization, while helping to enrich debate through workshops, conferences, and public pro-



grams. Faculty as well as graduate and undergraduate students receive support for research projects and activities that enhance the study of globalization, have policy implications, or further the following goals: (1) to produce and disseminate ideas that will help nations take advantage of globalization's opportunities and overcome its challenges, or (2) to explore solutions to problems that, even if they do not result directly from international integration, are global in nature and can therefore be effectively addressed only through international cooperation.

The Center furthers its mission through collaboration with a variety of institutions across the globe. Projects resulting from these collaborations provide the means by which YCSG can 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. These collaborations include the following projects:

- International Task Force on Trade and Finance for the U.N. Millennium Development Project
- International Task Force on Global Public Goods
- Commission on the Private Sector and Development
- The World Bank
- Ethical Globalization Initiative
- Center for Global Development

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](http://www.yaleglobal.yale.edu)), the Center's flagship publication, explores the growing interconnectedness of the world and aims to analyze and promote debate on all aspects of globalization. The magazine posts three original articles per week, re-publishes and archives articles from around the globe, and offers video recordings of the Center's events at Yale.

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# Policies and Regulations

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## ADMISSIONS

[www.yale.edu/graduateschool/admissions/](http://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.

Students who seek a professional degree from Yale University should identify and contact the appropriate school as identified on pages 508–9. Holders of American Ph.D. or Sc.D. degrees, or their foreign 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 (please see Nondegree Study on pages 457–58 for more information or visit the Web site listed above).

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, official 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 which may be required by your 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 you are applying. The Office of Graduate Admissions will not release application materials, including standardized test scores, letters of recommendation, or transcripts, to 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.

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). The examination 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 you are 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.

All applicants who accept offers of admission to Ph.D. programs and whose native language is not English must present acceptable scores on the Test of Spoken English (TSE) or SPEAK test before being appointed as teaching fellows with instructional responsibilities. The TSE is also administered in the United States and abroad by ETS. The SPEAK test is administered by Yale's English Language Institute on campus only.

International applicants who accept offers of admission will be required to give appropriate evidence of necessary financial support for one or two academic years, depending on their program of study, before the University will be able to issue visa documents.

Applicants are typically notified of decisions regarding their applications during the month of 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 foreign equivalent. Offers of admission are contingent on students' providing official evidence of having completed the bachelor's degree or foreign equivalent prior to registration. 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 three times may not apply again.

## 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 about part-time study, please turn to page 462.

### *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 are issued 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](http://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. 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. Such students hold standard graduate student assistantship in research appointments in the faculty member’s department. The appointment is funded by the faculty member. 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 a tuition fee.

Cumulative enrollment in the DSR is limited to two years. Students enrolled in the DSR who are subsequently admitted to degree programs may receive academic and tuition credit for work done 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 but students may be encouraged to take one or more courses in a related department. 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.

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; 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 page 471).

### *Exchange Scholar Program*

[www.yale.edu/graduateschool/academics/exchange.html](http://www.yale.edu/graduateschool/academics/exchange.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. For applications, contact Assistant Dean Edward Barnaby ([edward.barnaby@yale.edu](mailto:edward.barnaby@yale.edu)), Room 134, Hall of Graduate Studies (HGS). 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

##### *Center for International and Area Studies*

Fox International Fellowship Program (Moscow State University; University of Cambridge; Free University, Berlin; Fudan University, Shanghai; University of Tokyo; El Colegio de Mexico, Mexico City; Sciences Po, Paris; Jawaharlal Nehru University, New Delhi)

##### *Council on East Asian Studies*

Inter-University Center for Japanese Language Studies, Yokohama; Inter-University Board for Chinese Language Studies, Tsinghua University, Beijing; International Chinese Language Program, National Taiwan University, Taipei Tokyo University

##### *Economic Growth Center*

Research Institute for Economics and Business Administration (Kobe University, Japan)

##### *Economics*

University of Mannheim, Germany

##### *Engineering*

Ecole Normale Supérieure de Cachan (ENSC), France

##### *Graduate School*

Royal Holloway College, University of London, England; The Connecticut Department of Education and the State of Baden-Württemberg Exchange, Germany; University of Konstanz, Germany

##### *French*

Ecole Normale Supérieure, Paris

##### *German*

Free University, Berlin, Germany

##### *History of Science and Medicine*

Ecole Normale Supérieure, Paris, France

*Linguistics*

Tokyo Metropolitan University, Japan

*Molecular, Cellular, and Developmental Biology*

Peking University, Beijing, China

*Political Science*

Nuffield College, University of Oxford, England

*Sociology*

University of Copenhagen, Denmark

**PROGRAMS IN DEVELOPMENT***History of Science and Medicine*

Ecole des Hautes Etudes en Sciences Sociales, Paris, France

*Summer Study*

[www.yale.edu/summer](http://www.yale.edu/summer)

Many graduate students remain in New Haven during the summer for independent study and research (see Summer Registration, page 478). Although the Graduate School does not offer courses in the summer, a program of undergraduate courses is available, as well as an intensive program of instruction in languages, and graduate students may wish to take advantage of those programs while in New Haven. For further details on summer offerings at Yale, please contact Yale Summer and Special Programs, PO Box 208282, New Haven CT 06520-8282.

**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 field work 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 pre-dissertation 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, please see Transfer Credit and Advanced Standing on page 463).

Students must register each term until the dissertation is submitted or until six years (twelve terms) of study have been completed. Students who have not completed the dissertation by the end of the sixth year of study 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 on May 1 of all students admitted to candidacy. Students do not need to petition for extended registration, however, in order for the student to submit the dissertation to the Graduate School or graduate. Before a period of extended registration is approved, the student's adviser and director of graduate studies must certify that the student is making good progress on the dissertation, will be working full-time on it during the year, and has a reasonable prospect of completing it by the end of the registration period. Students who receive extended registration must register online each term and should be at Yale or in another location conducive to writing the dissertation.

#### *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 next page). 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.

#### *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.

#### **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 in 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 departmental 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. Only courses offered by the Graduate School and officially numbered on the graduate level can fulfill requirements for the doctoral degree. Although departments may set more stringent requirements, to meet the minimum Graduate School quality requirement for the Ph.D., students must achieve the grade of Honors in at least one full-year or two full-term graduate courses, taken after matriculation in the Graduate School and during the nine-month academic year. The Honors requirement must be met in courses other than those concerned exclusively with dissertation research and preparation.

A student who has not met the Honors requirement at the end of the fourth term of full-time study will not be permitted to register for the fifth term. 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 departmental listings. Students should consult with the director of graduate studies for further information about this requirement.

#### **PROSPECTUS**

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. The appropriate form and typical content of a prospectus inevitably vary from field to field. In most cases, however, a prospectus should contain the following information:

1. 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 field work 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.

Although it is difficult to prescribe a standard length for the prospectus, it should be long enough to include essential information for all proposed topics but concise enough to focus clearly on the subject. About seven pages, including bibliography, should be sufficient in most cases.

#### 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. 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. Teaching is required in some departments and is an expectation in all. 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 some 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 (Richard Sleight for the natural sciences and Anthropology, Linguistics, Psychology, and Statistics; Pamela Schirmeister for the humanities and Economics, Political Science, and Sociology). 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. PTAs 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” (pages 493–94).

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, homework 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 homework 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 homework; 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 Test of Spoken English (TSE), or (3) having received a degree from an institution where the principal language of instruction is English. (Degrees awarded en route to the Ph.D. at Yale will not satisfy this requirement.) In some instances, a student’s director of graduate studies (DGS) may require that students with degrees 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 semester 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 DGS should agree on the teaching the student will do in the fifth 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 both the teaching fellowship and a supplemental University Fellowship equal to 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. Principal advisers of doctoral candidates must have appointments on the Graduate School faculty.

The originality of a dissertation may consist of the discovery of significant new information or principles of organization, the achievement of a new synthesis, the development of new methods or theories, or the application of established methods to new materials.

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. This does not mean that sections of the dissertation cannot constitute essentially discrete units. Dissertations in the physical and biological sciences, for example, often present the results of several independent but related experiments.

Given the diverse nature of the fields in which dissertations are written and the wide variety of topics that are explored, it is impossible to designate an ideal length for the dissertation. Clearly, however, a long dissertation is not necessarily a better one. The value of a dissertation ultimately depends on the quality of its thought and the clarity of its exposition. 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 in two to three years.

In accordance with general University policy, classified or restricted research is not acceptable as part of the dissertation. Exceptions must be approved in advance by the appropriate Degree Committee.

For information about submission of the dissertation, please see Dissertation Submission under Policies and Regulations. Students should also consult the booklet entitled *Preparation and Submission of the Doctoral Dissertation*, available at the Student Information Office, Room 140, Hall of Graduate Studies (HGS).

## *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 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 departmental 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 the director of graduate studies in both departments and the appropriate associate dean agree on the student's program of study prior to enrollment in courses. 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. 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-four departments and programs: African Studies, American Studies, Applied Mathematics, 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, Germanic Languages and Literatures, History, History of Medicine and Science, International and Development Economics (IDE), International Relations, Mathematics, Medieval Studies, Molecular Biophysics and Biochemistry, 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 two-year programs, see departmental listings.

With the approval of the department and the appropriate associate dean, a student may be admitted for part-time study toward the master's degree. In that case, tuition will be charged on a per-course basis. Part-time study does not change the one- or two-year full-tuition obligation described above. Part-time students must complete all degree requirements within five years of continuous registration.

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 where 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, please 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., and M.D./Ph.D. 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 departmental statements on pages 183–85 and 252–63.

#### **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 Medical School 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 Medical School 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 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 a 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 at SOM may apply to both schools simultaneously. Students already enrolled at the Graduate School normally apply to SOM after taking one course at SOM for matriculation any time after they have passed their Ph.D. qualifying examinations at the Graduate School but prior to beginning the fifth year of study. This pattern, however, is flexible, and students interested in the joint degree should consult the Web pages of their departments or programs for further information. Students registered in SOM may apply to the Graduate School during the first year of study at SOM. Following admission to both programs, each student must complete a form requesting joint-degree status. The form must be signed by the appropriate associate dean at the Graduate School and at SOM and the student's director of graduate studies.

A student in the Graduate School who wishes to pursue the joint degree will normally be required to take one course in SOM before applying there. The student will need to obtain the permission of the SOM instructor and state his or her intention to apply to the joint-degree program. The Graduate School will waive one course during the term in which the student takes this preliminary course at SOM. For students in some disciplines, this prerequisite to admission will be waived. The student is expected to complete the qualifying exams and prospectus according to the standard schedule set by the Graduate School. The student will normally begin study at SOM after completing the departmental Ph.D. qualifying examinations at the Graduate School, but there are exceptions to this pattern described on the departmental Web sites. Upon admission to SOM, the joint-degree student will register at SOM for the first-year core of courses. Students may not fulfill any Graduate School requirements during this time, nor may they serve as teaching fellows in the Graduate School in any capacity. The student must register for a third term at SOM and complete four additional courses, normally prior to the beginning of the sixth year of study at the Graduate School. Depending on the schedule of individual students, they may or may not complete all four of these remaining courses within a single term at SOM. If they do not, they may complete outstanding courses while registered at the Graduate School, but in all circumstances, students are required to pay a third term of tuition to SOM.

A student who has been admitted to the Graduate School while completing the first-year core at SOM may begin course work in the Graduate School the following year. Once a joint-degree student has matriculated at the Graduate School, it is expected that the student remain registered continuously until completing the qualifying exams. During this time, the student may undertake limited course work at SOM, but may not register there for the third and final term until he or she has passed the departmental exams at the Graduate School. Prospective students who apply simultaneously may start the joint degree at either school and follow the schedules outlined above.

All joint-degree students are subject to the codes of conduct published in the bulletins of their respective programs. Joint-degree students will receive separate transcripts from SOM and the Graduate School. Each transcript will list the courses required for the respective school's portion of the joint degree. Each course taken may be counted toward

one degree only. The transcripts will reflect the joint-degree status. If a joint-degree student decides not to complete both degrees, he or she may petition both schools to receive a single degree if the requirements for the single degree, including the two-year tuition requirement at SOM, are met.

### *Petitioning for Degrees*

Graduate School degrees are awarded twice each year, at Commencement in May and in the fall (normally in December, depending on the schedule of the Yale Corporation). Degrees are not granted automatically. Students must file a petition for each degree by the appropriate date (see Schedule of Academic Dates and Deadlines). Petitions that have received favorable recommendations from the student's department are reviewed by the appropriate degree committee. When the degree committee has given its approval, the petition is forwarded to the Faculty of the Graduate School and then to the Yale Corporation. If the petition is successful, the student will be notified in writing by the dean of the Graduate School.

Students enrolled in Ph.D. programs should not petition for M.A./M.S. and M.Phil. degrees until the end of the term in which requirements for the degree are completed (e.g., students completing degree requirements during the spring term should petition for award of the degree the following fall). Students in terminal M.A./M.S. programs may petition for their degrees in the term in which they expect to complete them.

### *Dissertation Submission*

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 made available in the University library and published on microfilm (UMI Company). The only required fee associated with submission is \$20 for binding of the library copy of the dissertation. UMI charges authors \$45 if they wish to register a copyright. Publication on microfilm does not prevent the author from publishing the dissertation in another format at any time. Fees are subject to change.

Students must register continuously until either they have submitted the dissertation or six years have elapsed since matriculation, whichever comes first. During the first six years, students must be registered through the term of dissertation submission. Registration beyond the sixth year is not required. Registered students who submit dissertations will remain registered until the end of the term and will retain all privileges of registration (for example, 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.

Dissertations must be written in and submitted in English except in some disciplines where 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.

The Graduate School does not require departments to evaluate the dissertations of degree candidates who are no longer registered. In practice, however, departments normally agree to evaluate these dissertations.

### *Commencement*

[www.yale.edu/commencement](http://www.yale.edu/commencement)

[GScommencement@yale.edu](mailto:GScommencement@yale.edu)

There is only one University Commencement ceremony each year, on a Monday in late May. All degrees awarded for both December and May of each academic year are presented at the May ceremony. The Graduate School Diploma Ceremony takes place at noon on Monday in Woolsey Hall, following the University Ceremony in the morning. However, students receiving master's degrees from the Yale Center for International and Area Studies (YCIAS) and the Economic Growth Center receive their diplomas in a separate ceremony held at Luce Hall, 34 Hillhouse Avenue. Included are master's candidates in African Studies, East Asian Studies, European and Russian Studies, International and Development Economics, and International Relations.

All degree candidates for the M.A., M.S., M.Eng., and M.Phil., whether terminal or en route, or the Ph.D. are encouraged to march at Commencement and receive their diploma from the dean. If the student does not attend the ceremony, the diploma may also be mailed. Tickets are not required for degree candidates or their guests, but degree candidates who march are responsible for the rental or purchase of their own academic regalia, or cap and gown; details are listed on the Web site above. Degree candidates will receive information on Commencement each year, but they should also see the information on the Commencement Web site. The Office of Graduate Student Life of the McDougal Center coordinates Commencement for the Graduate School.

## 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 pages 478–81) 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 the Yale University Health Service (see page 503).

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 on pages 464 and 465 (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.

### *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 \$25 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. 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.

A student who wishes to audit a course must receive permission from the instructor before enrolling as an auditor, as not all faculty permit auditors in their classes. The minimum general requirement for auditing is attendance in two-thirds of the class sessions; instructors may set additional requirements for auditing their classes.

### **COURSE CHANGES**

Once the course enrollment form has been submitted to the registrar, all changes must be 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, 140 HGS, as well as from the student's department.

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. A fee of \$25 per course will be charged for changes made after midterm (fall term: October 24; spring term: March 5).

### *Grades*

The grades assigned in the Graduate School are:

- H = Honors
- HP = High Pass
- P = Pass
- F = Fail
- TI = Temporarily Incomplete
- I = Incomplete
- NM = No Mark Submitted

A mark of “Y” is assigned as the grade for the first term of a full-year course and can 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, all students enrolled in the course must receive these marks; individual students may not receive grades for 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 a request for the Temporary Incomplete (TI) with the intended completion date, signed by the instructor and the director of graduate studies. The instructor will indicate the mark of TI on the grade sheet, which is to be submitted to the Office of the Registrar by the appropriate grade submission deadline. Only one TI for courses taken 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. Courses for which no mark is submitted (NM) will be converted to a permanent Incomplete (I) after one term.

"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 of \$25 will be charged to students who register in residence after the close of the registration period but within the first ten days of the term. Registration after the tenth day of the term requires the permission of the director of graduate studies, the registrar, and, in some instances, of the appropriate associate dean. Additional fees may be imposed for registration after the tenth day of the term. 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 (142 HGS) as soon as possible.

#### REGISTRATION IN ABSENTIA

Ph.D. students who have not yet completed the four-year full-tuition requirement and whose program of study requires full-time dissertation research, full-time field work, 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 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. After four years of registration, students are no longer required to register in absentia when studying away from New Haven. They must, however, complete a continuous registration form. For additional information, see Eligibility for Fellowships under Financing Graduate School.

Students who are enrolled in the Yale Health Plan and are registering in absentia should consult the staff of the Member Services department at the University Health Services 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 on page 463 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 these requirements are charged a Continuous Registration Fee (CRF). Students who are granted permission to register beyond the sixth year are also charged this fee. Forms for continuing registration are available at the Registrar's Office and in the departments and must be submitted by the end of the registration period for that term.

#### SUMMER REGISTRATION

Most Ph.D. students and 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 and are engaged in degree-related activities at least half-time remain registered through August 31.

#### 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 recommendation of a Yale Health Plan (YHP) physician, as described below; see Medical Leave of Absence.
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 dura-



tion 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 one term or one year, to a maximum total of two years of leave, may be granted for students in Ph.D. programs. Leaves of absence for students in M.A./M.S. programs are not renewable. Students who fail to register for the term following the end of the approved leave will be considered to have withdrawn from the Graduate School.

3. Students on leave may complete, *by the appropriate deadline for the term in which the course was taken*, 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.
4. 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.
5. 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 six weeks prior to the end of the approved leave.

#### *Personal Leave of Absence*

A student who is current with his or her degree requirements and who wishes to interrupt study temporarily because of personal exigencies may request a personal leave of absence. The general policies governing leaves of absence are described above. Students are eligible for personal leaves 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 write to the appropriate associate dean 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 leave of absence, or who apply for a leave but are not granted one, and who do not register for any term, will be considered to have withdrawn from the Graduate School.

Students on a personal leave of absence are not eligible for financial aid, including loans, or for the use of University facilities normally available to registered students. Students granted a personal leave may continue to be enrolled in the Yale Health Plan (YHP) by purchasing coverage through the Student Affiliate Coverage plan. In order to secure continuous YHP coverage, 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 granted. Coverage is not automatic; enrollment forms are available from the Member Services department of the Yale Health Service, 17 Hillhouse Avenue, 203.432.0246.

#### *Medical Leave of Absence*

A student who must interrupt study temporarily because of illness or injury may be granted a medical leave of absence with the approval of the appropriate associate dean, on the written recommendation of a physician on the staff of the University Health Services and of the student's department. Final decisions concerning requests for medical leaves will be communicated to students from their associate dean in writing.

The Graduate School reserves the right to place a student on a medical leave of absence when, on the recommendation of the director of the University Health Services or the chief of the Division of Mental Hygiene, the dean of the Graduate School determines that the student is a danger to self or others because of a serious medical problem.

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. Students who are placed on a medical leave during any term will have their tuition adjusted according to the same schedule used for withdrawals (please see Schedule of Academic Dates and Deadlines). Before re-registering, a student on medical leave must secure written permission to return from a physician at the University Health Services. Advanced Ph.D. students may return at any time, with the permission of the Yale Health Plan. Forms for requesting a medical leave of absence are available at the Graduate School Student Information Office.

Students on medical leave of absence are not eligible for financial aid, including loans, or for the use of University facilities normally available to registered students. Health coverage options during a leave of absence are described on page 502. 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 term in which the leave is started, if they apply for this coverage through the Yale Health Plan within thirty days of the start of their leave. Coverage is not automatic; enrollment forms are available from the Member Services department of the Yale University Health Services, 17 Hillhouse Avenue, 203.432.0246.

#### *Leave of Absence for Parental Responsibilities*

A student who is making satisfactory progress toward his or her degree requirements and wishes to, or must, interrupt study temporarily for reasons of pregnancy, maternity or paternity care, may be granted a leave of absence for parental responsibilities. 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. The general policies governing all leaves of absence are described above, including information about health coverage. A student who is making satisfactory progress toward his or her degree requirements is eligible for a leave of absence for parental responsibilities any time after matriculation.

Students on leave of absence for parental responsibilities are not eligible for financial aid, including loans, or for the use of University facilities normally available to registered students. Health coverage options during a leave of absence are described on page 502. 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 term in which the leave is started, if they apply for this coverage through the Yale Health Plan within thirty days of the start of their leave. Coverage is not automatic; enrollment forms are available from the Member Services department of the Yale Health Service, 17 Hillhouse Avenue, 203.432.0246.

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. Students granted 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.

#### **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 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. Withdrawal forms are available at the Graduate School Student Information Office.

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, are considered to have 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 on page 502.

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. Neither readmission nor financial aid is guaranteed to students who withdraw. The deadline for making application for readmission is January 2 of the year in which the student wishes to return to the Graduate School. The student's application will be considered by the department, which will make a recommendation for review by the appropriate associate dean. The student's remaining tuition obligation will be determined at the time of readmission. 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.

### *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. 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 Report of the Committee on Freedom of Expression at Yale, pages 484–86.)
8. Refusal to comply with the direction of a University police officer or other University official, including a member of faculty, acting in the performance of her or his duties.

9. 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.
10. Misrepresentation or lying during a formal inquiry by University officials.
11. Misrepresentation in applying for admission or financial aid.
12. Theft, misuse of funds, or willful damage of University property.
13. Trespassing on University property to which access is prohibited.
14. The possession or use of explosives, incendiary devices, or weapons on or about the campus is absolutely prohibited.
15. Interference with the proper operation of safety or security devices, including fire alarms, electronic gates, and sprinkler systems.
16. 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. 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 are available at registration along with *Programs and Policies* and may also be obtained at other times from the office of each of the associate deans of the Graduate School or via the Graduate School Web site ([www.yale.edu/graduateschool/academics/forms/grievanceProcedures.pdf](http://www.yale.edu/graduateschool/academics/forms/grievanceProcedures.pdf)). 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 are available at registration along with *Programs and Policies* and may also be obtained at other times from the office of each of the associate deans of the Graduate School, the Information Office, or via the Graduate School Web site: [www.yale.edu/graduateschool/academics/forms/grievanceProcedures.pdf](http://www.yale.edu/graduateschool/academics/forms/grievanceProcedures.pdf)). 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.



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# Financing Graduate School

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## TUITION AND FEES, 2006 – 2007

### *Tuition\**

Full-time study, per term	\$14,650
Full-time study in IDE, per term	15,150
Half-time study, per term	7,325
Master's programs, less than half time per term	
One-quarter time study, per term	3,664
Division of Special Registration (DSR, nondegree study)	
Course work, per course, per term (including audited courses)	3,664
Visiting Affiliated Research Graduate Students, per term	14,650
Visiting Assistants in Research, per term	1,836
Visiting Assistants in Research appointed for half-term or the summer only	918

### *Fees†*

Continuous Registration Fee (CRF), per term (see page 478)	\$293
Special in absentia registration, per term (see pages 477–78)	293
YHP Hospitalization/Specialty Coverage, twelve months‡	1,096
YHP Prescription Plus Coverage, twelve months	425

For fees relating to registration and course enrollment see pages 475–76.

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 the Department of 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.

## 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.

\* 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.

‡ Hospitalization fees are for single students. Rates are higher for students needing dependent coverage.

*Bills*

Beginning October 2006, Yale will no longer mail paper bills. The official means of communicating monthly financial account statements to members of the Yale University community who have active official Yale e-mail accounts will be through the University's Internet-based system for electronic bill presentation and electronic 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. 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](http://www.yale.edu/sis/ebep)) are sent to all students who have activated their official Yale e-mail accounts and to all student-designated authorized payers. It is imperative that all students activate and 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 a late charge 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. The late charge will be imposed as follows:

<i>If fall-term payment in full is not received</i>		<i>Late charge</i>
by August 1		\$110
by September 1	an additional	110
by October 1	an additional	110
<i>If spring-term payment in full is not received</i>		<i>Late charge</i>
by December 1		\$110
by January 2	an additional	110
by February 1	an additional	110

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 \$20 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 \$110 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*

Yale University eBill-ePay, the University's system for electronic bill presentment and electronic payment, is the preferred means for payment of bills. It can be found at [www.yale.edu/sis/ebep/](http://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. The student's bank account information is password protected and secure. The student receives a printable confirmation receipt. Students can make payments twenty-four hours a day, seven days a week, up to 4 P.M. on their due date and avoid late fees. (The eBill-ePay system will not be available when the system is undergoing upgrade, maintenance, or repair.) Students have control over access to their account. A student can also authorize up to three people 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. We know from experience that payments made through such services arrive without proper account identification and always require manual processing that results in delayed crediting to the student's account, as well as resulting late fees and anxiety. Students should use Yale eBill-ePay to pay online.

### *Yale Payment Plan*

The Yale Payment Plan is a payment service that allows students and their families to pay tuition, room, and board in eleven or twelve equal monthly installments throughout the year based on individual family budget requirements. It is administered for the University by Sallie Mae Business Office Solutions. To enroll by telephone, call 800.635.0120. The fee to cover administration of the plan is \$65. The deadline for enrollment is June 22. For additional information, please contact Sallie Mae Business Office Solutions at the number above or visit their Web site at [www.tuitionpay.com](http://www.tuitionpay.com).

### *Yale Charge Account Plan*

Students who sign and return a Yale Charge Card Authorization form will be able to charge designated optional items and services to their student accounts, including toll

calls made through the University's telephone system. The University may withdraw this privilege from students who do not pay their monthly bills on a timely basis. The authorization form is available at <http://yale.edu/sfas/financial/ChargeAccAuthBillAgree.pdf>.

## TRANSCRIPTS

Transcripts may be ordered in writing at the Office of the Registrar for the Faculty of Arts and Sciences (246 Church Street, third floor), or faxed, with a signature, to 203.432.2334. For each transcript order, the charge for the first transcript is \$7, with a charge of \$3 for each additional transcript. Normally a transcript order is processed within forty-eight hours after receipt. In some circumstances it may be possible to provide a transcript within twenty-four hours after receipt of the order; there is an additional charge of \$10 for such requests. For overnight delivery, additional mailing charges may be imposed. [www.yale.edu/sfas](http://www.yale.edu/sfas)

## 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. Yale University Fellowships are awarded at the time of admission. Doctoral students are normally provided a level of support comparable to the fellowship awarded at admission, from the first through the fourth year of study. Eligible students in the humanities and social sciences receive a University Dissertation Fellowship in the fifth or sixth year of study. Eligible students in the humanities and social sciences also receive fellowships during the fifth and sixth years of study to cover the cost of the Continuous Registration Fee.

In addition to grants and fellowships for tuition and living costs, eligible Ph.D. students receive a Health Award, which covers the full cost of single-student Yale Health Plan Hospitalization/Specialty Coverage, half the cost of two-person coverage, and the full cost for dependent children. Students for whom a Medical Leave of Absence or a Leave of Absence for Parental Responsibilities is approved (see pages 480–81) will continue to be eligible for the Health Award for the remainder of the term in which the leave was started, if they apply for Student Affiliate coverage through the Yale Health Plan within thirty days of the start of their leave. Information about Yale Health Plan Basic Coverage, provided at no cost to students enrolled at least half-time in M.A., M.S., or Ph.D. programs, may be found on page 500.

Students who do not participate in the Yale Health Plan Hospitalization/Specialty Coverage will not be provided with Health Awards. Yale Health Plan 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.

### *Application for University Fellowship Support*

Applicants for admission to the DSR and to terminal M.A. departments and programs are required to complete the financial statement contained in the application brochure.

Applicants for admission to Ph.D. departments and 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. Tuition assistance is not available beyond the fourth year of study. Students are strongly encouraged to seek financial support from external sources (see pages 495–96, External Fellowships and Combined Award Policy).

### *University Fellowships*

The Graduate School awards University Fellowships in most departments. Fellowships are awarded at admission to entering students on the basis of recommendations made by individual departments to the appropriate associate dean. Fellowship awards are based on merit.

The Graduate School provides Ph.D. students with a level of support during the second, third, and fourth years of study comparable to that awarded at admission. 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. If during the teaching years a student's teaching fellowship is less than the standard departmental stipend, the Graduate School provides a supplemental fellowship to bring the annual stipend/fellowship to the level of the department's standard stipend. Students in the humanities and social sciences may defer a teaching year, and the supplemental fellowship, into the fifth or sixth year (see page 466).

To assist students in the completion of their studies, the Graduate School awards Summer Study Fellowships to eligible students at the time of admission. These fellowships may be used in any of the first five summers of study. University Dissertation Fellowships are awarded during the academic year to eligible students in years four, five, or six in the humanities and social sciences.

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. It is important to note that no University Fellowships, with the exception of the Summer Study Fellowships, are awarded during the summer.

In most departments in the humanities and social sciences, the fellowship stipends of students in the third and fourth years of study will be derived from teaching fellowships. When a student teaches in the third or fourth year, the teaching fellowship will comprise the student's fellowship stipend, according to the terms of the offer of admission. Students who teach in their first or second year when such teaching is not a departmental requirement will not receive more than the amount of the standard departmental stipend from the total combined support of a University Fellowship and a teaching fellowship. When students do teach before the departmental teaching years, they are advised to take a University Fellowship rather than a teaching fellowship in the later year.

In departments where there are insufficient opportunities for undergraduate teaching, doctoral students may continue to receive fellowship stipends in their third and

fourth years of study up to the level of the standard departmental stipend. Stipend support will normally be withheld if a student in the third or fourth years refuses a teaching position or elects not to teach. Exceptions to this policy require the permission of the appropriate associate dean and the director of the Teaching Fellow Program.

### *Dissertation Fellowships*

In addition to the substantial regular fellowships awarded to students, the Graduate School offers University Dissertation Fellowships to eligible advanced graduate students in the humanities and social sciences during their fourth, fifth, or sixth year of study. 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 must be taken in consecutive terms (either the fall and spring terms of a single academic year or the spring and fall terms of consecutive academic years). With the permission of the Graduate School, it may be interrupted in certain circumstances in order to accept an external fellowship. 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. A student may be awarded a dissertation fellowship for one year only. 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 from the Graduate School Web site: [www.yale.edu/graduateschool/financial/UDF\\_Form.pdf](http://www.yale.edu/graduateschool/financial/UDF_Form.pdf) or from the appropriate associate dean.

### *Teaching Fellowships*

#### TEACHING AND ADMISSION OFFERS

Letters of admission inform students of their programs' requirement for teaching. In many programs there are specific years when students teach. For example, most humanities and social science students will participate in teaching in their third and fourth years. In the natural sciences, the timing of teaching is earlier or is flexible across several years. When students are teaching as specified in their letters of admission, teaching assignments will not be adjusted in response to changes in course enrollments. Appointments for these students will change only if a course is cancelled or if the student, course instructor, and DGS all agree upon a reassignment.

Upon admission, many students receive financial aid packages that include teaching fellowships. The admission letter sets the minimum annual total stipend (including the teaching fellowship), which will be awarded even if appropriate teaching is not available or if the teaching fellowship is less than the standard departmental stipend. Such funding adjustments are made with the participation of a student's associate dean and DGS.

Teaching appointments outside those specified in the letter of admission are contingent on a graduate student's satisfactory academic progress and on sufficient course enrollment. Because the Graduate School considers teaching experience an integral part

of graduate education, every effort will be made to assign students to another course at an equivalent level if enrollments are lower than anticipated. Ph.D. students who teach in their first or second year, or when such teaching is not a departmental requirement, will receive the full teaching fellowship, plus a supplemental fellowship, bringing their combined stipend up to the level awarded in the admission letter. M.A. students will receive the full teaching fellowship; any other financial aid will be awarded according to the policies of their programs.

#### 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 will be permitted to teach 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 PTAs, 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 DGS, the appropriate associate dean, and the director of the 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

The Graduate School expects that each term departments and programs will send letters of appointment to graduate students, signed by both the department and the TFP director, 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 prepared by the department or program, reviewed by the TFP, and sent to the student.

#### TEACHING FELLOW LEVELS

There are five 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 duties of a TF 1 are primarily (a) grading, (b) tutoring in language courses, or (c) a modest 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 a course. A TF 1 does not engage in regular classroom teaching. Approximate weekly effort, 5 hours. The 2006–2007 teaching fellowship is \$2,200 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 TF 1. Approximate weekly effort, 10 hours. The 2006–2007 teaching fellowship is \$4,400 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 2006–2007 teaching fellowship is \$6,600 per term.

*Teaching Fellow 3.5:* This appointment is appropriate for TFs who lead and grade one section in English, History of Art, 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 Intensive TFs. Approximate weekly effort, 17.5 hours. The 2006–2007 teaching fellowship is \$7,700 per term.

*Teaching Fellow 4:* This appointment is appropriate for TFs in humanities and social science departments where 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 2006–2007 teaching fellowship is \$8,800 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. 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 2006–2007 teaching fellowship is \$8,900 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 full-time basis. In some instances, there is a federal payback provision, which is ordinarily satisfied by serving in health-related research or teaching at the conclusion of training. Information about this obligation and other matters relating to traineeships is available from the director of graduate studies or the principal investigator of the specific training grant in question.

### *Research Appointments*

Graduate 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 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**

All current students and applicants for admission are strongly encouraged to compete for outside fellowships. These fellowships, 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 must report to their associate dean any scholarship/fellowship received from an outside agency or organization.

Students are allowed to hold outside awards in conjunction with University stipends up to combined levels that are significantly higher than the normal stipend. During the nine-month academic year, the sum of the Graduate School's initial stipend award and all outside awards may total the standard department/program nine-month 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 stipend award will be reduced accordingly.

In humanities and social science departments, up to 3/12 of the external award may be reserved for the summer (when this is permitted by the awarding agency), prior to calculating the nine-month combined award. When outside awards include restricted funds (e.g., for tuition support), the restricted funds will not be used in calculating the combined stipend.

University Fellowship stipends awarded as a result of this formula are subject to all applicable policies, including replacement of stipends by teaching fellowships, and are awarded for the nine-month academic year. Administration of external awards is subject to rules and requirements specific to each external sponsor.

## 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. 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 Stafford Loans and Federal Perkins Loans. The Graduate School also offers special “bridge loans” in the fall term to students whose financial aid is concentrated in the spring term. For full details, consult the director or associate director of finance.

The College Work-Study (CWS) program, which is federally funded, enables eligible graduate students to meet a portion of their academic year financial need through part-time employment.

All students applying for any of these federal programs must fill out a Free Application for Federal Student Aid (FAFSA). Information on loan and work-study programs is contained in *Financial Information for Entering Graduate Students* included with your 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/](http://www.fafsa.ed.gov/)).

International students are eligible to borrow from Graduate School loan funds, but normally only in the third and fourth years of study. These loans are limited in number, require a U.S. citizen as co-signer, and may not exceed \$5,000 per academic year. Because Graduate School loan funds are limited, this policy may change from year to year. Interest-bearing loans are available to international students from private lenders, but require a U.S. citizen as cosigner. 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 twenty-year level repayment stream, and no prepayment penalty. Information is available from the Financial Aid Office, 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 Financial Aid Office in 129 HGS.

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# University Services and Facilities

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## LIVING ACCOMMODATIONS

### *Graduate Housing — On Campus*

[www.yale.edu/gradhousing/](http://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 4:30 P.M., Monday through Friday.

Applications for 2006–2007 are available as of April 1 online and can be submitted directly from the Web site ([www.yale.edu/graduatehousing](http://www.yale.edu/graduatehousing)). 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](mailto:grad.dorms@yale.edu), tel. 203.432.2167, fax 203.432.4578. For more apartment information, contact [grad.apts@yale.edu](mailto:grad.apts@yale.edu), tel. 203.432.8270, fax 203.432.0177.

### *Off-Campus Listing Service*

[www.yale.edu/offcampuslisting](http://www.yale.edu/offcampuslisting)

The University's Off-Campus Housing service, limited to current or incoming members of the Yale community, is located at 155 Whitney Avenue, 3d floor, and is open from 8:30 A.M. to 3:30 P.M., Monday through Friday. The listings may also be accessed from any computer at Yale at [www.yale.edu/offcampushousing](http://www.yale.edu/offcampushousing).

### *University Properties*

[www.yale.edu/universityproperties](http://www.yale.edu/universityproperties)

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.

## HEALTH SERVICES

[www.yale.edu/uhs/](http://www.yale.edu/uhs/)

Yale University Health Services (YUHS) is located on campus at 17 Hillhouse Avenue. YUHS 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 twenty-three-bed inpatient care facility (ICF), a round-the-clock urgent care clinic, and such specialty services as allergy, dermatology, orthopedics, and a travel clinic. YUHS also includes the Yale Health Plan (YHP), a health coverage option that coordinates and provides payment for the services outlined above, as well as for emergency treatment, off-site specialty services, inpatient hospital care, and other ancillary services. YUHS's services are detailed in the *YHP Student Handbook*, available through the YHP Member Services Department, 203.432.0246, or on the YHP Web site at [www.yale.edu/uhs](http://www.yale.edu/uhs).

### *Eligibility for Services*

All full-time Yale degree-candidate students who are paying at least half tuition are enrolled automatically for YHP Basic Coverage. YHP 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 Hygiene. In addition, treatment for urgent medical problems can be obtained twenty-four hours a day through Urgent Care.

Students on leave of absence or on extended study and paying less than half tuition are not eligible for YHP Basic Coverage but may enroll in YHP Student Affiliate Coverage. Students enrolled in the Division of Special Registration as nondegree special students or visiting scholars are not eligible for YHP Basic Coverage but may enroll in the YHP 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 YHP 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 YHP Member Services Department. Enrollment applications for the YHP Student Affiliate Coverage, Billed Associates Plan, or Fee-for-Service Program are available from the YHP Member Services Department.

All students are welcome to use specialty and ancillary services at YUHS. Upon referral, YHP will cover the cost of these services if the student is a member of YHP Hospitalization/Specialty Coverage (see below). If the student has an alternate insurance plan, YHP will assist in submitting the claims for specialty and ancillary services to the other plan and will bill through the Office of Student Financial Services for noncovered charges and services.

### *Health Coverage Enrollment*

The University also requires all students eligible for YHP Basic Coverage to have adequate hospital insurance coverage. Students may choose YHP 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.

#### YHP HOSPITALIZATION/SPECIALTY COVERAGE

For a detailed explanation of this plan, see the *YHP Student Handbook*, which is available online at [www.yale.edu/uhs/for\\_students/student\\_hb/studenthb.pdf](http://www.yale.edu/uhs/for_students/student_hb/studenthb.pdf).

Students are automatically enrolled and charged a fee each term on their Student Financial Services bill for YHP 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 September 1 through August 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, YHP 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 August 31.

*Waiving the YHP Hospitalization/Specialty Coverage:* Students are permitted to waive YHP Hospitalization/Specialty Coverage by completing a waiver form that demonstrates proof of alternate coverage. Waiver forms are available from the YHP Member Services Department. It is the student's responsibility to report any changes in alternate insurance coverage to the YHP Member Services Department. Students are encouraged to review their present coverage and compare its benefits to those available under the YHP. 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 YHP Hospitalization/Specialty Coverage but later wish to be covered must complete and send a form voiding their waiver to the YHP 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. YHP premiums will not be prorated.

#### YHP STUDENT TWO-PERSON AND FAMILY PLANS

A student may enroll his or her lawfully married spouse or same-gender domestic 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 the YHP Basic Coverage and the YHP Hospitalization/Specialty Coverage. YHP Prescription Plus Coverage may be added at an additional cost. Coverage is not automatic and enrollment is by application. Applications are available from the YHP Member Services Department or can be downloaded from the YUHS Web site ([www.yale.edu/uhs](http://www.yale.edu/uhs)) 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.

#### YHP STUDENT AFFILIATE COVERAGE

Students on leave of absence or extended study or students paying less than half tuition may enroll in YHP Student Affiliate Coverage, which includes services described in both the YHP Basic and the YHP Hospitalization/Specialty Coverage. Prescription Plus Coverage may also be added for an additional cost. Applications are available from the YHP Member Services Department or can be downloaded from the YUHS Web site ([www.yale.edu/uhs](http://www.yale.edu/uhs)) and must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

#### YHP PRESCRIPTION PLUS COVERAGE

This plan has been designed for Yale students who purchase YHP Hospitalization/Specialty Coverage and student dependents who are enrolled in either the Two-Person Plan, the Student Family Plan, or Student Affiliate Coverage. YHP Prescription Plus Coverage provides protection for some types of medical expenses not covered under YHP Hospitalization/Specialty Coverage. Students are billed for this plan and may waive this coverage. 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. For a detailed explanation, please refer to the *YHP 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 YHP Hospitalization/Specialty Coverage and/or YHP Prescription Plus Coverage. The student will not be eligible for any YHP benefits, and the student's YHP 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 YHP 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 YHP Student Affiliate Coverage.

*Leaves of Absence:* Students who are granted leaves of absence are eligible to purchase YHP Student Affiliate Coverage during the term(s) of the leave. If the leave occurs during the term, YHP Hospitalization/Specialty Coverage will end on the date the leave is granted and students may enroll in YHP 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 YHP Hospitalization/Specialty Coverage will be applied toward the cost of Affiliate Coverage. Coverage is not automatic and enrollment forms are available at the YHP Member Services Department or can be downloaded from the YUHS Web site ([www.yale.edu/uhs](http://www.yale.edu/uhs)). 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 YHP Hospitalization/Specialty Coverage and



YHP Prescription Plus Coverage. They may purchase YHP Student Affiliate Coverage during the term(s) of extended study. This plan includes services described in both the YHP Basic and the YHP Hospitalization/Specialty Coverage. Coverage is not automatic and enrollment forms are available at the YHP Member Services Department or can be downloaded from the YUHS Web site ([www.yale.edu/uhs](http://www.yale.edu/uhs)). 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 YHP, please refer to the *YHP Student Handbook*, available from the YHP Member Services Department, 203.432.0246, 17 Hillhouse Avenue, PO Box 208237, New Haven CT 06520-8237.

### *Required Immunizations*

*Measles (Rubeola) and German Measles:* 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, 2006. 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 YHP and will be charged accordingly.

## COMPUTING AND TELECOMMUNICATIONS

[www.yale.edu/its/](http://www.yale.edu/its/)

Information Technology Services (ITS), located at 175 and 221 Whitney Avenue, is the University central computing and communications services organization, providing academic computing, data networking, telephone services, voice and video networking, computer sales, training, printing and copying services, and general user support ([www.yale.edu/its](http://www.yale.edu/its)).

Student Computing of Academic Media & Technology (AMT), a unit of ITS, furnishes general purpose computing clusters at many locations on campus ([www.yale.edu/cluster](http://www.yale.edu/cluster)), including the Graduate School's McDougal Center and the graduate student residences (Helen Hadley Hall and the Hall of Graduate Studies), where the computing facility is accessible to residents twenty-four hours a day ([www.yale.edu/sc/](http://www.yale.edu/sc/)). Windows and Apple computers and laser printers are available for open use by the Yale community at Connecticut Hall, Cross Campus Library, Dunham Laboratories, Kline Biology Tower, and the Social Sciences Statistical Laboratory.

The online purchasing site ([www.yale.edu/eportal/](http://www.yale.edu/eportal/)) sells computers, networking cards, modems, and printers, as well as software and supplies. Apple, IBM, 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/sc/purchase](http://www.yale.edu/sc/purchase)) for more information and recommendations for purchasing computer supplies. Up-to-date information on pricing and on ordering can be found at the eportal Web site ([www.yale.edu/eportal/](http://www.yale.edu/eportal/)). Information about computer hardware repairs can be obtained at the repair Web site ([www.yale.edu/repair/](http://www.yale.edu/repair/)) or by calling the ITS Help Desk at 203.432.9000.

### *Network Access to Yale Services and Beyond*

[www.yale.edu/networkservices/grad\\_prof.htm](http://www.yale.edu/networkservices/grad_prof.htm)

ITS Network Services manages Yale's voice and data networks, including long distance, voice mail, operator services, cellular phones, video conference services, Internet and Internet 2 connectivity, and all the related cable and distribution facilities on Central Campus and in the Medical Center. The University provides a large, central system for e-mail, Web page hosting, and other services for the Graduate School, Yale College, and selected professional schools ([www.yale.edu/computing](http://www.yale.edu/computing)).

Use of many of Yale's network resources requires a NetID and password. All new graduate students are automatically assigned a NetID, and all students in the Graduate School are provided with e-mail accounts.

Most rooms in on-campus residences, offices, and laboratories are equipped with Ethernet data outlets.

To enhance support for graduate student research activities, the University provides network roaming access for laptop computers. Laptop Ethernet ports and wireless Ethernet access sites are available in on-campus residences, in the McDougal Center Common Room and 119 HGS, in the Sterling Memorial Library (SML) reading room and, for doctoral students, in the SML carrels. Wireless access points are available in many buildings on campus. Registered users can access network resources through wired or wireless connections ([www.yale.edu/amt/doco/wireless/](http://www.yale.edu/amt/doco/wireless/)).

ITS Network Services provides on-campus telecommunications services, including local and long-distance phone service, voice mail, and operator services, as well as basic cable TV service in on-campus residences. Long-distance service for telephones on campus is available through the University's private network, YALENET. On-campus long-distance or toll calls require a toll authorization number (TAN), which can be

arranged through the telecommunications office as well as through departmental offices. Phone cards and personal calling cards may also be used. YALENET calling cards are available to address off-campus needs.

## OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS

[www.oiss.yale.edu/](http://www.oiss.yale.edu/)

The Office of International Students and Scholars (OISS) coordinates services and support to 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 monthly international coffee hours, daily English conversation groups, U.S. culture workshops, and receptions for newly arrived graduate students, postdocs, 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 maintains an extensive Web site ([www.oiss.yale.edu](http://www.oiss.yale.edu)) 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 household 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. The *ISPY E-Group* is an interactive list of over 300 members to connect spouses, partners, and families at Yale. To subscribe to any list, send a message to [oiss@yale.edu](mailto: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.

## 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 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, 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 about the International Center, call 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 English Language Institute currently offers a six-week intensive summer language program in English as a Second Language (ESL). The School 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/studentLife](http://www.yale.edu/graduateschool/studentLife)) 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. Incoming international students also are offered an informal buddy system called the “international student mentor program” that pairs them with current students for friendship and informal advising prior to and upon arrival in New Haven. The center’s staff and graduate fellows also provide special programs of interest to international students throughout the year, including foreign language films, social events, monthly international coffee hours, arts and music outings, workshops on cultural adjustment, safety, and health, and professional development seminars on careers, teaching, and writing. The McDougal Student Life Office co-sponsors and supports the activities of many graduate student nationality groups and intercultural performance groups.

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**RESOURCE OFFICE ON DISABILITIES**

[www.yale.edu/rod](http://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 30. 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 in William L. Harkness Hall (WLH), Rooms 102 and 103. Access to the Resource Office is through the Cross Campus entrance to WLH. Office hours are Monday through Friday, 8.30 A.M. to 4.30 P.M. Voice callers may reach staff at 203.432.2324; TTY/TDD callers at 203.432.8250. The Resource Office may also be reached by e-mail ([judith.york@yale.edu](mailto:judith.york@yale.edu)) or through its Web site ([www.yale.edu/rod](http://www.yale.edu/rod)).

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# The Work of Yale University

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The work of Yale University is carried on in the following schools:

**Yale College:** 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; telephone, 203.432.9300; e-mail, [undergraduate.admissions@yale.edu](mailto:undergraduate.admissions@yale.edu); Web site, [www.yale.edu/admit/](http://www.yale.edu/admit/)

**Graduate School of Arts and Sciences:** 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](http://www.yale.edu/graduateschool), write to [graduate.admissions@yale.edu](mailto: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:** 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.). Courses in public health for qualified students. Master of Public Health (M.P.H.), 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 University School of Medicine, 367 Cedar Street, New Haven CT 06510; telephone, 203.785.2643; fax, 203.785.3234; e-mail, [medical.admissions@yale.edu](mailto:medical.admissions@yale.edu); Web site, <http://info.med.yale.edu/education/admissions/>

For additional information about the Department of Epidemiology and Public Health, an accredited School of Public Health, please write to the Director of Admissions, Yale School of Public Health, PO Box 208034, New Haven CT 06520-8034; e-mail, [eph.admissions@yale.edu](mailto:eph.admissions@yale.edu); Web site, <http://publichealth.yale.edu/>

**Divinity School:** 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; telephone, 203.432.5360; fax, 203.432.7475; e-mail, [divinityadmissions@yale.edu](mailto:divinityadmissions@yale.edu); Web site, [www.yale.edu/divinity/](http://www.yale.edu/divinity/). Online application, <http://apply.embark.com/grad/yale/divinity/>

**Law School:** Courses for college graduates. Juris Doctor (J.D.). For additional information, please write to the Admissions Office, Yale Law School, PO Box 208329, New Haven CT 06520-8329; telephone, 203.432.4995; e-mail, [admissions.law@yale.edu](mailto:admissions.law@yale.edu); Web site, [www.law.yale.edu/](http://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; telephone, 203.432.1696; e-mail, [gradpro.law@yale.edu](mailto:gradpro.law@yale.edu); Web site, [www.law.yale.edu/](http://www.law.yale.edu/)

**School of Art:** 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 University School of Art, PO Box 208339, New Haven CT 06520-8339; telephone, 203.432.2600; e-mail, [artschool.info@yale.edu](mailto:artschool.info@yale.edu); Web site, [www.yale.edu/art/](http://www.yale.edu/art/)

**School of Music:** 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; telephone, 203.432.4155; fax, 203.432.7448; e-mail, [gradmusic.admissions@yale.edu](mailto:gradmusic.admissions@yale.edu); Web site, [www.yale.edu/music/](http://www.yale.edu/music/)

**School of Forestry & Environmental Studies:** 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.).

For additional information, please write to the Office of Academic Services, Yale School of Forestry & Environmental Studies, 205 Prospect Street, New Haven CT 06511; telephone, 800.825.0330 or 203.432.5100; e-mail, [fesinfo@yale.edu](mailto:fesinfo@yale.edu); Web site, [www.yale.edu/environment/](http://www.yale.edu/environment/)

**School of Architecture:** Courses for college graduates. Professional degree: Master of Architecture (M.Arch.); nonprofessional degree: Master of Environmental Design (M.E.D.).

For additional information, please write to the Yale School of Architecture, PO Box 208242, New Haven CT 06520-8242; telephone, 203.432.2296; e-mail, [gradarch.admissions@yale.edu](mailto:gradarch.admissions@yale.edu); Web site, [www.architecture.yale.edu/](http://www.architecture.yale.edu/)

**School of Nursing:** Courses for college graduates. Master of Science in Nursing (M.S.N.), Post Master's Certificate, Doctor of Nursing Science (D.N.Sc.).

For additional information, please write to the Yale School of Nursing, PO Box 9740, New Haven CT 06536-0740; telephone, 203.785.2389; Web site, <http://nursing.yale.edu/>

**School of Drama:** 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 Registrar's Office, Yale School of Drama, PO Box 208325, New Haven CT 06520-8325; telephone, 203.432.1507; Web site, [www.yale.edu/drama/](http://www.yale.edu/drama/)

**School of Management:** Courses for college graduates. Professional degree: Master of Business Administration (M.B.A.).

For additional information, please write to the Admissions Office, Yale School of Management, PO Box 208200, 135 Prospect Street, New Haven CT 06520-8200; telephone, 203.432.5932; fax, 203.432.7004; e-mail, [mba.admissions@yale.edu](mailto:mba.admissions@yale.edu); Web site, [www.mba.yale.edu/](http://www.mba.yale.edu/)

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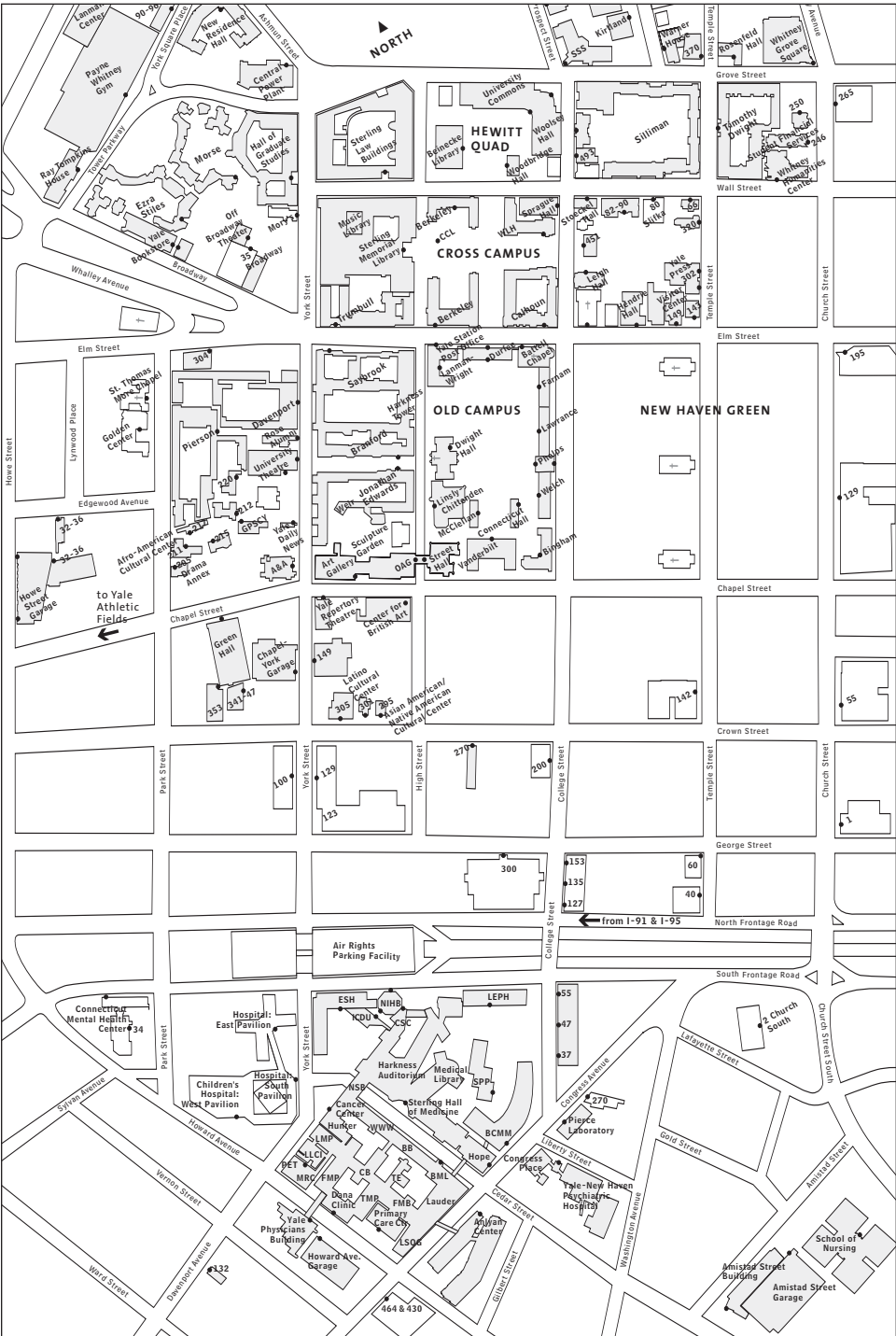
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HEALTH EMERGENCY: 432.0123

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204 York Street (GYPSY bar; social activities)

GRADUATE-PROFESSIONAL STUDENT SENATE: 432.2632

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