Details of Courses Co-listed as Medical School and Graduate School Courses
(These can be taken for credit in years 1 & 2 without scheduling conflicts)

**These courses are being offered for credit as far as we know**

Course selections for students in lab and/or on the wards
MEDC 999 01 (CRN TBA) Courses in School of Medicine Staff 2 HTBA (2nd years)
QUAL 999 01 (CRN TBA) Preparing for Qualifying Exams Staff 2 HTBA
CAND 999 01 (CRN TBA) Prep: Admission to Candidacy Staff 2 HTBA
DISR 999 01 (CRN TBA) Diss Research - in Residence Staff 2 HTBA
MEDR 999 01 (CRN TBA) Clinical Clerkships Staff 2 HTBA

Suggested courses for incoming 1st years (please do not register until after you meet with Drs.
Kazmierczak and Gorelick at the Annual Program meeting): September 4th:
MEDC 999 01 (13318) Courses in School of Medicine Staff 2 HTBA (1st and 2nd years)
CBIO 502 01 (12298) Molecules to Systems Peter Takizawa, 3 HTBA
CBIO 601 01 (12299) Mol&CelBasisOfHumanDisease Fred Gorelick, James Jamieson Th 4.00-5.30
MB&B 800 01 (12818) Adv Topics Molecular Medicine Susan Baserga, Konigsberg M 11.00-1.00
(Please note: you must also let Leigh Cromley know that you want to take the advanced class).

INP 70101 (12898) Principles of Neuroscience DiLeone, Louvi TF 2.15-3.45 (for those interested in Neuroscience)

B&BS 501: Responsible Conduct of Research: You will register for this in the Spring, however, there is ONE session in the Fall. September 8th; 9 a.m.

“The Cellular and Molecular Basis of Human Disease” is a graduate requirement for MD-PhD students and an elective for regular medical students. The course emphasizes the connections between basic science and human physiology as well as diseases and uses lecture and seminar formats. It is designed for students who are committed to considering a career in medical research or students who wish to explore scientific topics in depth. This course parallels the content of the Master Courses in the first and second years of medical school. Topics are often introduced with a short lecture given by eminent faculty who provide excellent role models for your academic careers. The lecture is followed by sessions in which 2 students review relevant manuscripts under the mentorship of a faculty mentor and present the material to the group. Students in the class are encouraged to submit questions to the presenters beforehand concerning techniques and concepts that may not be clear from the papers and which will be addressed during the presentation. In addition, sessions also discuss selection of research topics and obstacles to publishing findings and securing research funding. Student evaluations are based on attendance, participation in group discussions, and formal presentations. The course runs from October to mid-April and provides graduate credit. The organizational meeting and introduction will be on September 13th at 5 pm (room number to be announced). The class will meet on most Thursdays until mid-April from 5-6:30 and provide graduate credit for those who need it. F. Gorelick, J.D. Jamieson, George Lister, Karin Finberg, and Jonathan Bogan are organizers. Alice Lu and Laura Yockey are MD-PhD students and will be our TAs first and second semester, respectively.

NBIO 701 [01]/NSCI 701 [01], Principles of Neuroscience Ralph DiLeone, Angeliki Louvi
General neuroscience seminar: lectures, readings, and discussion of selected topics in neuroscience. Emphasis is on how approaches at the molecular, cellular, physiological, and organismal levels can lead to understanding of neuronal and brain function. WF 3:15–4:45
PATH 650 [02], Cellular and Molecular Biology of Cancer  David Stern, Qin Yan
A comprehensive survey of cancer research from the cellular to the clinical level. The relation of cancer to intracellular and intercellular regulation of cell proliferation is emphasized, as are animal models for cancer research. Background in molecular genetics and cell biology is assumed. Open to advanced undergraduates with permission of the organizers. MWF 1–2

PATH 690 [01], Molecular Mechanisms of Disease  Narendra Wajapeyee, Demetrios Braddock.
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. T, TH 2-3:30

MB&B 800 [01], Advanced Topics in Molecular Medicine  Susan Baserga, William Konigsberg.
The seminar, which covers topics in the molecular mechanisms of disease, illustrates timely issues in areas such as protein chemistry and enzymology, intermediary metabolism, nucleic acid biochemistry, gene expression, and virology. M.D. and M.D./Ph.D. students only. Prerequisite: biochemistry (may be taken concurrently). M 11–1

NSCI 510b/NB 500b, Structural and Functional Organization of the Human Nervous System  Charles Greer, Michael Schwartz
An integrative overview of the structure and function of the human brain pertaining to major neurological and psychiatric disorders. Neuroanatomy, neuropathology, 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. Two-hour laboratory sections in close collaboration with faculty members. Lectures in neurophysiology cover various aspects of neural function at the cellular level, with a strong emphasis on the mammalian nervous system. Clinical correlations consist of regular sessions given by one or two faculty members representing both basic and clinical sciences. These sessions relate neurological symptoms given by one or two faculty members representing both basic and clinical sciences. Prerequisite: biochemistry (may be taken concurrently). M 11–1

STAT 645 [02], Statistical Methods in Genetics and Bioinformatics  Hongyu Zhao
Introduction to problems, algorithms, and data analysis approaches in computational biology and bioinformatics; stochastic modeling and statistical methods applied to problems such as mapping disease-associated genes, analyzing gene expression microarray data, sequence alignment, and SNP analysis. Statistical methods include maximum likelihood, EM, Bayesian inference, Markov chain Monte Carlo, and some methods of classification and clustering; models include hidden Markov models, Bayesian networks, and the coalescent. The limitations of current models, and the future opportunities for model building, are critically addressed.
Prerequisite: STAT 538a, 542b, or 661a. Prior knowledge of biology is not required, but some interest in the subject and a willingness to carry out calculations using R is assumed.
Th 1-2:50

CB&B 740 [01], Clinical and Translational Informatics  Richard Shiffman, Michael Krauthammer
The course provides an introduction to clinical and translational informatics. Topics include (1) overview of biomedical informatics, (2) design, function, and evaluation of clinical information systems, (3) clinical decision making and practice guidelines, (4) clinical decision support systems, (5) informatics support of clinical research, (6) privacy and confidentiality of clinical data, (7) standards, (8) issues in defining the
clinical phenotype, and (9) topics in translational bioinformatics. Permission of the instructor required.

**CB&B 752 [01]/CPSC 752au/MB&B 752au/MCDB 752au, Bioinformatics: Practical Application of Simulation and Data Mining** Mark Gerstein

Bioinformatics encompasses the analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. It represents a major practical application for modern techniques in data mining and simulation. Specific topics to be covered include sequence alignment, large-scale processing, next-generation sequencing data, comparative genomics, phylogenetics, biological database design, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, normalization of microarray data, mining of functional genomics data sets, and machine learning approaches for data integration. **Prerequisites:** biochemistry and calculus, or permission of the instructor. MW 1–2:15

**MD-PhD Student Seminars**

**Research in Progress.** These seminars, which are held from 5:00-6:30pm, provide a forum for students engaged in dissertation research to present their work to MD-PhD students and faculty. All students in their research years are required to prepare a 12-minute research talk, which is followed by ample time for questions and discussion. Pizza and beverages are provided.

The RIP seminars are important for students at all stages of their training, and attendance is expected. Our goals for the seminars include:

- Create a setting in which students can improve their presentation skills.
- Provide a forum for discussion and feedback from a multidisciplinary audience of peers and program faculty.
- Serve as an opportunity for 1st, 2nd, and 3rd year students to learn about mentors and research opportunities at Yale University.
- Improve networking among all MD-PhD classes.
- Provide an opportunity for informal discussion and socializing between students, program faculty and research mentors.

**RIP Dates during ’16-17:** Sept. 19; Oct. 10; Nov. 14; Dec. 5; Jan. 17; Feb. 20; Mar. 6; Apr. 3

**Responsible Conduct of Research**

The Office of Student Research and the MD/PhD Program co-sponsor a compact ethics course that satisfies the NIH requirements for students supported on training grants. In addition to subject matter requirements, it is essential that accurate attendance records are maintained for each grant. The course will be perceived as an elective, but in essence is **mandatory** for all students supported by training grant or other sources. **First-year MD/PhDs and medical students matriculating into the MD/PhD Program in their initial year must take this course. A “refresher” must also be taken once the student has completed 4 years in the MD/PhD Program.**

The course is held in six (6) 1.5 hour sessions during the Spring 2017 semester, and will be held in Hope 110. The course format is lecture with group discussion and case studies. In addition to being listed as a medical school course, it is also co-listed with the Graduate School to ensure application to the transcripts of the MD/PhD students (B&BS 501). The topics to be covered and corresponding dates are:

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<th>Topic</th>
<th>Faculty Member(s)</th>
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<tr>
<td>Mentor/Mentee Responsibilities and Relationships</td>
<td>Dr. Michael Caplan</td>
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<td>The lecture is separated from the remaining course dates/times</td>
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<td>Conflict of Interest</td>
<td>Dr. Stephanie Spangler</td>
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<td>And Research Misconduct and Policies for</td>
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<td>Handling Misconduct</td>
<td>Dr. Lawrence Cohen, Ms. Merle Waxman</td>
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<td>Peer Review</td>
<td>Dr. Fred Gorelick</td>
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<td>And Responsible Authorship and Publications</td>
<td>Dr. Marina Picciotto</td>
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<td>Data Acquisition and Laboratory Tools, Management, Sharing and Ownership</td>
<td>Dr. David Schatz</td>
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<td>And Collaborative Research Including Collaborations With Industry</td>
<td>Dr. David Lewin</td>
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<td>Policies Regarding Human Subjects and Live Vertebrate Animal Subjects in Research and Safe Laboratory Practice</td>
<td>Dr. Sandra Alfano</td>
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<td>and Live Vertebrate Animal Subjects in Research and Safe Laboratory Practice</td>
<td>Dr. James Macy</td>
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<td>The Scientist as a Responsible Member of Society, Contemporary Ethical Issues in Biomedical Research, and the Environmental and Social Impacts of Scientific Research</td>
<td>Ms. Cathleen King</td>
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<td><strong>The Responsible Conduct of Research course is mandatory for all first-year MD-PhD students and medical students who have matriculated with the Program (attendance is taken). A “refresher” must be completed after 4 years of enrollment in the MD/PhD Program.</strong></td>
<td><strong>Dr. Robert Levine</strong></td>
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