Quarter Courses
Fall Term 2016-2017

Classes Start: Wednesday, August 31, 2016

Online Check-In (formerly known as registration):
Monday, August 15, 2016 – Tuesday, August 30, 2016
Please visit the Harvard University Knowledge Center website for more information

Deadlines and Holidays: Please visit the GSAS Calendar to view deadlines and holidays for the 16-17 academic year

For information: Call 617-432-4134 or email dms_courses@hms.harvard.edu
BCMP 308qc. Cell Fate Decisions in Development and Disease
Alan B. Cantor, George Daley, Ramesh Shivdasani and Zhe Li
Enrollment: Limited to 15

Cell Biology 306qc. Teaching 100: The Theory and Science of Teaching
Johanna L. Gutlerner and Christopher Wood
Enrollment: Limited to 25

Cell Biology 309qc. The Basics of Translation
Spyros Artavanis-Tsakonas and David Van Vactor

HBTM 302qc. Imaging and Microscopy Methods in Biology and Medicine
Lev Perelman, Le Qiu and Vladimir Turzhitsky

Immunology 307qc. Cancer Immunology
Kai Wucherpfennig, Catherine Wu, Michael Goldberg and Stephanie Dougan
Enrollment: Limited to 15

Medical Sciences 300qc. Conduct of Science
Raju Kucherlapati and Kristin White

Medical Sciences 302qc. Conduct of Science Refresher
Raju Kucherlapati and Kristin White

Neurobiology 306qc. Quantitative Methods for Biologists (offered August 2016)
Michael Springer and Richard T. Born
Enrollment: Limited to 80

Neurobiology 309qc. The Molecular Pathology and Current Therapies for Retinal Diseases
Dong Feng Chen, Joseph F. Arboleda-Velasquez, Kinsang Cho, Daniel Sun and Petr Baranov
Enrollment: Limited to 25
*BCMP 308qc. Cell Fate Decisions in Development and Disease*
Alan B. Cantor, George Daley, Ramesh Shivdasani and Zhe Li

2 Units. Enrollment: Limited to 15.

W., 1:30-3:30 PM

This quarter course will offer students an in-depth examination of current knowledge regarding mechanisms of cell fate decisions. It will examine these processes in the context of developmental cell plasticity, cellular reprogramming, and cancer. This will primarily be a literature-based course with examination and discussion of key studies in the field. Concepts involving the instructive role of lineage-specific transcription factors, transcription factor cross-antagonism, feedback loops, gene regulatory networks, multilineage priming, pioneer factors, epigenetics, chromatin remodeling factors, “super enhancers”, stem cell bias, lineage identity maintenance, mitotic bookmarking, non-coding RNAs, cell polarity, asymmetric cell division, Notch signaling, lateral inhibition, lineage plasticity, and cellular reprogramming will be explored. These ideas will be examined in the context of several different tissue systems and organisms.

Class Notes: Course meets Wednesdays, September 21, 28, October 5, 12, 19, 26 and November 2, 9, 16

**Fall 2016**

**Meeting Dates:** Wednesday, September 21, 2016 through Wednesday, November 16.

**Location:** Karp Family Research Building (1 Blackfan Circle, Boston), 7th floor conference room.

**Course Head:** Alan Cantor, alan.cantor@childrens.harvard.edu
*Cell Biology 306qc, Teaching 100: The Theory and Science of Teaching*
Johanna L. Gutlerner and Christopher Wood

2 Units. Enrollment: Limited to 15.

Th., 1:00 – 3:30.

For many graduate students, teaching will be part of their career, whether as mentoring, formal classroom teaching, or outreach. In addition, the theory and research evidence accumulating in the disciplines of cognitive psychology, neuroscience, and from STEM classrooms, has turned the question of, 'How do we best teach science?' into its own scientific discipline. The Theory and Science of Teaching focuses on understanding why certain teaching methods are effective by examining the scientific research and theoretical frameworks that support these methods. We will read and discuss foundational educational and cognitive psychology texts and primary literature, and then develop an annotated lesson plans that allows us to put these ideas into practice.

Note: The course has been designed as a companion to Genetics 302qc: Teaching 101, but neither course is a prerequisite of the other.

**Fall 2016**
**Meeting Dates:** Thursday, September 29, 2016 through Thursday, November 17, 2016
**Location:** TMEC 447
**Course Head:** Johanna Gutlerner, Johanna_gutlerner@hms.harvard.edu and Christopher Wood, Christopher_Wood@hms.harvard.edu
*Cell Biology 309qc. The Basics of Translation*
Spyros Artavanis-Tsakonas and David Van Vactor

2 Units.

W. 5:30 – 7:00 p.m.

Multiple perspectives from early phase basic research all the way to defining therapeutic strategies, clinical trial design and business models for bringing effective compounds to the marketplace.

Note: This Course Begins in October, and highlights a different advanced topic each week that will illustrate how investigation of basic principles and phenomena in cell and molecular biology open important doorways to understanding of disease mechanisms. One primary research article and one review article will be assigned each week to prepare students for discussion.

Assessment: In addition to mandatory weekly reading and discussion participation, one 6 page written assignment and oral presentation will be designed to help students integrate the course material, improve communication skills, and identify novel experimental approaches: Write and present a proposal to launch a project with long-range therapeutic value for a neurodegenerative disorder.

Class Notes: Course meets Wednesdays, October 12, 19, 26, November 2, 9, 16, 23, 30 and December 7, 14

**Fall 2016**

**Meeting Dates:** Wednesday, October 12, 2016 through Wednesday, December 14, 2016  
**First Meeting Location:** Biogen in Kendall Sq, Building 6.  
**Location:** SGMB 502  
**Course Head:** David Van Vactor, Davie@hms.harvard.edu; 617-432-2195  
**Teaching Assistant:** Maria Jesus Olarte

**Instructions and Directions to Biogen in Kendall Sq.**

- The Kendall Square/MIT Red Line T-station is located on Main Street, just outside of the Marriott Hotel.  
- Please bring your ID with you for entrance to the building, as required by Biogen Security. Name tags will be created for you to wear while on Biogen property  
- The course will take place in Bldg 6, 115 Broadway, Cambridge  
- Find below the map of Biogen in Kendall Sq.
**BIOGEN Bldg Legend:**

Bldg 1 – 225 Binney Street  
Bldg 2 – 250 Binney Street  
Bldg 6 – 115 Broadway  
Bldg 7 – 105 Broadway  
Bldg 8 – 125 Broadway  

*Reflect address changes by City of Cambridge effective 2015*
*HBTM 302qc. Imaging and Microscopy Methods in Biology and Medicine*
Lev Perelman, Le Qiu and Vladimir Turzhitsky

2 Units.

T., 3:00 – 5:00 p.m.

Introduce modern imaging modalities with emphasis on modalities frequently employed in cellular, molecular biology and medicine. Overview of noninvasive medical imaging techniques frequently used in scientific research: X-ray CT, MRI, ultrasound, PET/SPECT and optical imaging.

Class Notes: Course meets Tuesdays, October 11, 18, 25, November 1, 8, 15, 22, 29 and December 6.

**Fall 2016**

**Meeting Dates:** Tuesday, October 11, 2016 through Tuesday, December 6, 2016

**Location:** TMEC 446

**Course Head:** Lev Perelman, lperelman@fas.harvard.edu
There have been many exciting recent developments in the cancer immunology field, and multiple therapeutic approaches have shown efficacy against diverse types of cancer. This course will emphasize new mechanistic insights, in particular on the following topics: Mechanisms of spontaneous protective anti-tumor immunity; Key effector cell populations of anti-tumor immunity; Inflammation and tumor microenvironment; Immunosuppressive mechanisms in tumor immunity; Targeting of inhibitory receptors; Cancer vaccines; New approaches for delivery of immunotherapies into tumors.

Note: Must be PhD student at Harvard or postdoctoral fellow

Class Notes: Course meets Mondays, October 31, November 7, 14, 21, 28 and December 5, 12

Fall 2016
Meeting Dates: Monday, October 31, 2016 through Monday, December 12, 2016
Location: Modell Center, 2nd floor conference room
Course Head: Kai Wucherpfennig, Kai_Wucherpfennig@dfci.harvard.edu
Medical Sciences

*Medical Sciences 300qc. Conduct of Science*
Raju Kucherlapati and Kristin White

2 Units. Time to be arranged

This course is a required course for all DMS students and all who receive support from NIH training grants. The goal of this course is to inform students about the appropriate conduct of research and the many ethical and social problems that they may encounter during their research career in graduate school. The course consists of three lectures for the entire class and five highly interactive sessions with a small group of fellow students moderated by a faculty member. Some of the issues that will be discussed in this course include appropriate methods of collecting laboratory data, interactions with members of the laboratory and the mentor and issues dealing with research misconduct.

Note: All current G2 students must register for this course on their Fall Semester 2016 study cards. Specific enrollment instructions will be sent to current G2s and other eligible students in the upcoming weeks. Please contact Tatevik Holmgren (Tatevik_Holmgren@hms.harvard.edu) for enrollment inquiries.

Note: Restricted to GSAS graduate students on the Longwood campus.

**Fall 2016**
**Meeting Dates:** Thursday, September 29, 2016 through Friday, December 2, 2016
**Course Directors:** Raju Kucherlapati and Kristin White
**Course Administrator:** Tatevik Holmgren
**Location:** Armenise 125 (D) Amphitheater

**Lecture One on Thursday, September 29, 2016:** Proactive, Responsible, Ethical Approaches to Societal Impacts of Research, Dr. George Church, and Robert Winthrop Professor of Genetics

**Lecture Two on Thursday, October 27, 2016:** Gretchen Brodnicki, J.D., HMS Dean for Faculty and Research Integrity (The lecture topic/title will be announced at a later date.)

**Lecture Three on Thursday, November 3, 2016:** Financing Scientific Research and Peer Review, Dr. Raju Kucherlapati, Course Co-Director and Paul C. Cabot Professor of Genetics

(All lectures will begin promptly at 3:30 p.m. and end at 5 p.m. Mandatory registration for students will begin at 3 p.m.)
This course is a required course for all DMS students and all who receive support from NIH training grants. This is a refresher course for advanced graduate students. The goal of this course is to inform students about the appropriate conduct of research and the many ethical and social problems that they may encounter during their research career in graduate school. The course consists of three lectures for the entire class and four highly interactive sessions with a small group of fellow students moderated by a faculty member. Some of the issues that will be discussed in this course include appropriate methods of collecting laboratory data, interactions with members of the laboratory and the mentor and issues dealing with research misconduct.

Note: All current G5 students must register for this course on their Fall Semester 2016 study cards. G5 students are required to attend at least two out of the three didactic sessions. Specific enrollment instructions will be sent to current G5s and other eligible students in the upcoming weeks. Please contact Tatevik Holmgren (Tatevik_Holmgren@hms.harvard.edu) for enrollment inquiries.

Note: Restricted to GSAS graduate students on the Longwood campus.

**Fall 2016**

**Meeting Dates:** Thursday, September 29, 2016 through Friday, December 2, 2016  
**Course Directors:** Raju Kucherlapati and Kristin White  
**Course Administrator:** Tatevik Holmgren  
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Neurobiology

**Neurobiology 306qc. Quantitative Methods for Biologists (offered in August 2016)**
Michael Springer and Richard T. Born

2 Units. Enrollment: Limited to 80.

M., W., F., 10:00 – 4:00; T., Th., 1:00 – 5:00

The goals of this course are to introduce students to programming in the MATLAB environment and to begin using this tool for analyzing data and for gaining intuition about the behavior of complex systems through the use of numerical simulations.

Note: This boot camp course will meet in August. Please contact Jennie Epp, Jennie_Epp@hms.harvard.edu for enquiries.

**August 2016**
Meeting Dates: August 8, 2016 through August 19, 2016
Location: Maxwell Dworkin G115 (33 Oxford St, Cambridge), Aug 8, 10, 12, 15, 17, and 19(MWF) (10-4). TMEC 227, Aug 9, 11, 16, and 18 (T. Th) (1-5)
Course Instructor: Michael Springer, Michael_Springer@hms.harvard.edu

**Please put this course on your fall term study card if you wish to receive credit for it.**
Retinal diseases are major causes of irreversible blindness. A surge of progress resulting from studies in the disease mechanisms and the development of new imaging technology have led to a huge step forward in the therapies for diagnosing and treating retinal diseases and preventing blindness. This course will offer students an in-depth examination of current knowledge regarding retinal diseases, molecular pathology, and therapy, with an emphasis on recent breakthroughs and discussion of key studies in the field. The class consists of lectures and group discussions that focus on seminal papers selected from both the basic science and clinical ophthalmology, which will serve as a basis for teaching students basic concepts of ophthalmology and becoming familiar with animal models of retinal diseases. Each session will review the landmark publications on a particular topic or disease. As the retina has long served a standard model for studying the CNS, the class will foster discussion on the implications of these studies in other disease mechanisms and therapy.

Notes: Offered in alternate years.

**Fall 2016**

**Meeting Dates:** Monday, September 12, 2016 through Monday, November 28, 2016  
**Location:** Schepens Eye Research Institute (20 Staniford Street, Boston), 2nd floor conference room  
**Course Head:** Dong Feng Chen, Dongfeng_Chen@meei.harvard.edu

**The Molecular Pathology and Current Therapies for Retinal Diseases**

**Preliminary Outline of Sessions:**

- 9/12. Overview of progress and seminal papers in retinal diseases and therapy (Chen)
- 9/19. Diabetic retinopathy (Arboleda)
- 9/26. Proliferative Vitreoretinopathy (Arboleda)
- 10/3. Retinal degenerative diseases and age-related macular degeneration (Baranov)
- 10/17. Live imaging of the retina (Cho)
- 10/24. Regenerative therapy for the retina (Cho)
- 10/31. Glaucoma (Sun)
- 11/7. Retinal inflammatory diseases (Sun)
- 11/14. Ophthalmology Clinical Trials (Baranov)
- 11/21. Summary and Discussion on Writing and Reviewing a Scientific Paper (All course instructors)