

Division of Medical Sciences

Ph.D. Programs at Harvard Medical School

# Quarter Courses

Spring Semester

2012-2013

**Holidays:**

President's Day, Monday, February 18, 2013

**Add Deadline: Monday, March 11, 2013**

**Drop Deadline: Tuesday, March 26, 2013**

Details Available at:

[http://www.hms.harvard.edu/dms/Current/DMS\\_Quarter\\_Courses.html](http://www.hms.harvard.edu/dms/Current/DMS_Quarter_Courses.html)

For Information Call: 617-432-0162

## Spring 2013 Quarter Courses

**\*BCMP 303qc. Molecular Movies: Advanced 3D Visualization with Maya**

Catalog Number: 61072 Enrollment: Limited to 18.

*Gael McGill (Medical School) and David Lopes Cardozo (Medical School)*

**\*BCMP 307qc. Approaches to Drug Action, Discovery, and Design**

Catalog Number: 52371 Enrollment: May be limited.

*Nathanael Gray (Medical School) and members of the Department*

*Curriculum fellow: Catherine Dubreuil*

**\*BCMP 309qc. Principles of Drug Action in Man - (New Course)**

Catalog Number: 63265 Enrollment: May be limited.

*Timothy J. Mitchison (Medical School)*

*Curriculum fellow: Catherine Dubreuil*

**\*Cell Biology 302qc. Advanced Experimental Design for Biologists**

Catalog Number: 91286 Enrollment: Limited to 24.

*Randy King (Medical School) and David Jonathan Glass (Medical School)*

**\*Cell Biology 304qc. Introduction to Human Gross Anatomy**

Catalog Number: 61023 Enrollment: Limited to 15.

*David Lopes Cardozo (Medical School), Gerald Greenhouse (Medical School), Everett Anderson, Mohini Lutchman*

**\*Cell Biology 307qc. Molecular Aspects of Chromatin Dynamics**

Catalog Number: 91774 Enrollment: Limited to 25.

*Raul Mostoslavsky (Medical School), Danesh Moazed (Medical School), Johnathan Whetstine (Medical School), and Lee Zou (Medical School), and members of the Department*

**\*Cell Biology 308qc. Introduction to Histology**

Catalog Number: 38084 Enrollment: Limited to 11

*Adrian Salic (Medical School), Stephen Daniel Liberles (Medical School), Gerald Greenhouse (Medical School)*

**\*Cell Biology 309qc. Advanced Topics in Cell Biology**

Catalog Number: 14797

*David Van Vactor (Medical School) and members of the Department*

**\*Genetics 302qc. Teaching 101: Bringing Effective Teaching Practices to your Classroom**

Catalog Number: 91159 Enrollment: Limited to 15.

*Fred Winston (Medical School) and Johanna Gutlerner*

**\*Genetics 304qc. A Short Course on Inheritance and Weird Stuff**

Catalog Number: 75405

*Chao-Ting Wu (Medical School)*

**\*HBTM 304qc. Drug Development: From Concept to Commercialization - (New Course)**

Catalog Number: 83871

*Michael Goldberg (Medical School) 7037*

**\*Immunology 302qc. Clinical Sessions**

Catalog Number: 40428

*Rachael Ann Clark (Medical School)*

**\*Immunology 303qc. The Warring Genomes: Innate Immunity and Host Defense**

Catalog Number: 55535

*Jonathan C. Kagan (Medical School)*

**\*Immunology 305qc. Neuro-immunology in Development, Regeneration and Disease - (New Course)**

Catalog Number: 98545

*Beth Stevens (Medical School) and Clifford Woolf (Medical School)*

**\*Immunology 306qc. Systems Immunology – (New Course)**

Catalog Number:

*Nir Hacohen (Medical School), Nick Haining (Medical School), Christophe Benoist (Medical School) and visiting speakers*

**\*Microbiology 301qc. Molecular Mechanisms of Microbial Pathogenesis**

Catalog Number: 76052 Enrollment: Limited to 15.

*Marcia Goldberg (Medical School) and Simon L. Dove (Medical School)*

**\*Neurobiology 303qc. Tools for Statistical Inference in Experimental Science**

Catalog Number: 65564 Enrollment: Limited to 35.

*Gary I. Yellen (Medical School) and David A. Harmin (Medical School)*

**\*Neurobiology 306qc. Quantitative Methods for Biologists – (Incoming Students Bootcamp Course)**

Catalog Number: 85319 Enrollment: Limited to 120.

*Michael Springer (Medical School) and Richard T. Born (Medical School)*

**\*Neurobiology 307qc. Molecular Causes of Congenital Defects of the CNS**

Catalog Number: 93018 Enrollment: Limited to 12.

*Mary R. Loeken (Medical School)*

**\*Pathology 301qc. The Molecular Bases of Eye Disease**

Catalog Number: 85085

*Darlene Ann Dartt (Medical School)*

**\*SHBT 301qc. Speech and Hearing Laboratory Visits - (New Course)**

Catalog Number: 14124

*Bertrand Delgutte (Medical School)*

**January 2013 Quarter Courses – *Already in Progress. Register on Spring Study Card.***

**\*BCMP 301qc. Translational Pharmacology**

Catalog Number: 97487 Enrollment: May be limited.

*Donald M. Coen (Medical School) and David E. Golan (Medical School)*

**\*Cell Biology 310qc. Current Topics in Cancer Biology Research Course**

Catalog Number: 60742

*Charles Stiles (Medical School), Karen Cichowski (Medical School), and Andrea McClatchey (Medical School)*

*Curriculum Fellow: Narveen Jandu, PhD*

**\*DRB 330qc. (formerly \*DRB 330.) Advanced Experimental Methods: Experimental Approaches to Developmental Biology**

Catalog Number: 6590 Enrollment: Limited to 16.

*Paola Arlotta (Medical School), David L. Van Vactor (Medical School), and members of the Department*

**\*Genetics 390qc. (formerly \*Genetics 390.) Advanced Experimental Methods: Experimental Approaches in Genetic Analysis**

Catalog Number: 8039 Enrollment: Limited to 8.

*Fred Winston (Medical School) and members of the Department*  
*Curriculum Fellow: Leah Brault*

**\*HBTM 301qc. Case Studies in Human Biology and Translational Medicine**

Catalog Number: 95905 Enrollment: Will be limited.

*Caren Grossbard Solomon (Medical School) and Mary Elizabeth Hamel (Medical School)*

**\*Microbiology 302qc. Introduction to Infectious Disease Research: Infectious Diseases Consortium Boot Camp**

Catalog Number:

*Eric Rubin (Medical School) and members of the Department*

*Curriculum Fellow: Zofia Gajdos*

**\*Virology 301qc. Advanced Topics in Virology**

Catalog Number: 33563

*Alan N. Engelman (Medical School)*

**\*BCMP 303qc. Molecular Movies: Advanced 3D Visualization with Maya**

Catalog Number: 61072 Enrollment: Limited to 18.

Gael McGill (Medical School) David Lopes Cardozo (Medical School)

Quarter course (spring term). F., 9–12.

Explore Maya's vast visualization toolset. Advanced techniques in each of the phases of the 3D production pipeline will be presented including dynamics systems like Hair, nCloth, nParticles and PaintFx. Introduction to Maya's Embedded Language (MEL).  
*Note:* Go to [http://www.med.harvard.edu/dms/Current/DMS\\_Quarter\\_Courses.html](http://www.med.harvard.edu/dms/Current/DMS_Quarter_Courses.html) for more details.

*Prerequisite:* Molecular Movies: Introduction to 3D Visualization with Maya required or permission by the instructor.

This quarter course is a continuation of the BCMP 302qc. quarter course offered in the Fall. We will continue to explore Maya's vast visualization toolset. More advanced techniques in each of the phases of the 3D production pipeline will be presented including dynamics systems like Hair, nCloth, nParticles and PaintFx. An introduction to Maya's Embedded Language (MEL) will also be given.

Session 1 - Fri 4/19 (9-12): Maya Review

Session 2 - Fri 4/26 (9-12): Advanced Modeling

Session 3 - Fri 5/3 (9-12): Complex Animation

Session 4 - Fri 5/10 (9-12): PaintFx

Session 5 - Fri 5/17 (9-12): Advanced Dynamics: Hair & nCloth systems

Session 6 - Fri 5/24 (9-12): Introduction to MEL

Session 7 - Fri 5/31 (9-12): Rendering with Mental Ray

Session 8 - Fri 6/7 (9-12): Compositing 3D Render Layers in After Effects

**Spring 2013**

Meeting Dates: April 19, 26, May 3, 10, 17, 24, 31, 7

First Meeting: Friday, April 19, 2013

Final Meeting: Friday, June 7, 2013

Location: Countway Library of Medicine, L2-025

Class size: 18

Course Head: Gael McGill [mcgill@crystal.harvard.edu](mailto:mcgill@crystal.harvard.edu)

**\*\*If you plan to take a quarter course you must register for it on your study card\*\***

**\*BCMP 307qc. – Molecular Approaches to Drug Action, Discovery, and Design**

Catalog Number: 52371 Enrollment: May be limited.

*Nathanael Gray (Medical School) and members of the Department*

*Curriculum fellow: Catherine Dubreuil*

*Quarter course (spring term). Tu., Th., 3:30-5.*

Application of molecular, systems, and structural biology, genetics, genomics, enzymology, and chemistry to drug action and development of new therapies. Analyzes molecular underpinnings of pharmacological principles. Examples drawn from numerous diseases including cancer, AIDS, Alzheimer's and infectious diseases. This class includes small group paper based discussions and a case study (target choice) to reinforce the lectures, and to promote critical reading and thinking. Moreover, students may have to prepare chalk talks to promote thinking about experimental design based on questions provided in lecture will be. The final assessment is a written and oral proposal based in an unmet clinical need for which you discover a new drug with specifics regarding disease, molecular pathway or target, discovery approach, and validation of strategy/testing of compound, with some consideration for how to turn the compound into a clinically useful drug.

*Note:* This course pairs with \*BCMP 309qc. Principles of Drug Action in Man.

**Schedule**

Date/Room*	FACULTY	TOPIC
Tu 3/12	Gray	Finding new drug targets
Th 3/14	Gray	Lead identification
Tu 3/19	Spring Break	NO CLASS
Th 3/21	Spring Break	NO CLASS
Tu 3/26	Gray	Lead optimization I
Th 3/28	Gray	Lead optimization II
Tu 4/2	Sliz*(exercises)	Structure-based design I
Th 4/4	Sliz *(exercises)	Structure-based design II
Tu 4/9	Sliz *(exercises)	Structure-based design III
Th 4/11	Dubreuil	Proposal Critiques
Tu 4/16	Xu Wu	Targeting Developmental Pathways

Th 4/18	Gray/Federation	Paper discussion
Tu 4/23	Jeffrey Way	Protein Therapeutics –
Th 4/25	Gray/Federation	Paper discussion; exp des activity-linked to Protein therapeutics lecture 4/23
Tu 4/30	TBD	Antibiotics/natural products
Tu 5/2	James Bradner	Targeting Chromatin Regulators
Th 5/7	TBD	Entrepreneurism- start-up company and/or venture capital
Tu 5/9	Students	Proposal presentations

**Spring 2013**

Meeting Dates: March 12, 14, 26, 28, April 2, 4, 9, 11, 16, 18, 23, 25, 30, May 2, 7, 9

First Meeting: Tuesday, March 12, 2013

Final Meeting: Thursday, May 9, 2013

Location: TMEC Bldg., 324

Class size: May be limited

Course Head: Nathanael Gray, [nathanael\\_gray@dfci.harvard.edu](mailto:nathanael_gray@dfci.harvard.edu)

Curriculum Fellow: Catherine Dubreuil, [catherine\\_dubreuil@hms.harvard.edu](mailto:catherine_dubreuil@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****



**\*BCMP 309qc. Principles of Drug Action in Man - (New Course)**

Catalog Number: 63265

*Timothy J. Mitchison (Medical School)*

*Curriculum fellow: Catherine Dubreuil*

*Quarter course (spring term). Tu., Th., 3:30–5:30.*

BCMP309qc will familiarize students with central concepts in drug action in man at the level of molecules, cells, tissues and patients, and in relevant methods. These concepts and methods are central to modern drug development and regulatory evaluation. We will cover drug-target interactions, drug distribution and clearance (Pharmacokinetics, PK) and drug action (Pharmacodynamics, PD) at a quantitative level. Tuesday session will be interactive lectures, Thursday sessions will be paper discussions or problem solving workshops using simple mathematical models and computer programs. We will illustrate these concepts through discussion of important small molecule, protein and nucleic acid drugs. The course will culminate in a discussion of cutting edge efforts to integrate molecular information with quantitative models of drug action (PK-PD models).

The course is pass-fail but will include quantitative take-home problem sets. Our emphasis will be on learning, not grading!

*Prerequisites:* Familiarity with basic biochemistry and molecular structure. Experience with mathematical modeling software – e.g. MATLAB – is a plus but not required. We will schedule introductory session and office hours to help students with software and quantitative problems as needed. Experience in introductory pharmacology is a plus but not required. We will not duplicate introductory material, but will provide students who lack this experience will catch-up reading.

**Schedule**

<b>Date/Room*</b>	<b>FACULTY</b>	<b>TOPIC</b>
Tu 1/29	Mitchison	Drug-receptor and drug-enzyme interactions
Th 1/31	Mitchison	Drug-receptor interactions: paper discussion
Tu 2/5	Mitchison	Drug-pathway interactions
Th 2/7	Mitchison	Drug-receptor interactions: workshop
Tu 2/12	Mitchison	Single cell pharmacology and methods
Th 2/17	Mitchison	Drug-enzyme interactions: workshop
Tu 2/19	Mitchison	Pharmacokinetics – chemistry meets physiology
Th 2/21	Mitchison	Drug-pathway-cell interactions: paper discussion
Tu 2/26	Mitchison	Measurements in the human body & biomarkers
Th 2/28	Mitchison	Pharmacokinetics: workshop
Tu 3/5	Mitchison	Integration of PK-PD models with cell and molecular pathways
Th 3/7	Guest	PK-PD Models: guest lecture

**Spring 2013**

Meeting Dates: January 29, 31, February 5, 7, 12, 17, 19, 21, 26, 28, March 5, 7

First Meeting: Tuesday January 29, 2013

Final Meeting: Thursday, March 7, 2013

Location: TMEC Bldg., 324 (TMEC Bldg., 447 on January 29 and 31)

Course Head: Timothy J. Mitchison, [timothy\\_mitchison@hms.harvard.edu](mailto:timothy_mitchison@hms.harvard.edu)

Curriculum Fellow: Catherine Dubreuil, PhD, [catherine\\_dubreuil@hms.harvard.edu](mailto:catherine_dubreuil@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Cell Biology 302qc. Advanced Experimental Design for Biologists**

Catalog Number: 91286 Enrollment: Limited to 24.

*Randy King (Medical School) David Glass (Medical School)*

*Quarter course (spring term). Tu., Th., 4–6.*

This course will build on the experimental design “boot camp” presented at the beginning of the academic year. Taught as a workshop, the course will do “case studies” on particular problems in experimental design, helping students to ask questions in a way that potential answers are not missed; validate systems appropriately to make sure they are able to answer the experimental question; make sure the appropriate controls are in place for particular experiments; make sure that they are doing the most appropriate experiment; consider alternative approaches to a problem, to control for artifacts of particular systems. Students will be asked to flowchart particular projects, and adapt flowcharts as necessary. Also, time will be spent on data interpretation as well as model-building and validation. Though the focus of the course is not on proposal writing, the course will provide an excellent foundation for students as they begin to think about writing PQE proposals.

Course Website: MyCourses CB300C-Spring 2013

**Spring 2013**

Meeting Dates: February 5, 7, 12, 14, 19, 21, March 5, 7, 12 (3-5pm), 14

First Meeting: Tuesday, February 5, 2013

Final Meeting: Tuesday, May 14, 2013

Location: TMEC Bldg., 309

Class size: 24

Course Heads: Randy king, [randy\\_king@hms.harvard.edu](mailto:randy_king@hms.harvard.edu), David Glass,  
[David\\_Glass@hms.harvard.edu](mailto:David_Glass@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Cell Biology 304qc. Introduction to Human Gross Anatomy**

Catalog Number: 61023 Enrollment: Limited to 10.

*David Lopes Cardozo (Medical School), Gerald Greenhouse, Everett Anderson, Mohini Lutchman*

*Quarter course (spring term). M., F., 12:30-5, W. 12:30-7.*

Lectures, laboratory dissections, prosections, and group discussions will provide students an opportunity to explore the gross structure and function of the human body. The course will provide a foundation for the student to acquire practical skills in recognizing, dissecting, and differentiating key anatomical structures. Structure/function relationships will be emphasized and some foundation will be provided for understanding the anatomic basis of diseases. Some discussion of human evolution and comparative anatomy will be included in the lectures.

Class size is limited to 15. To receive credit students must attend all sessions and participate enthusiastically. All sessions will be held in the TMEC Building on the Longwood Medical Campus. Textbooks, anatomical atlases, and computer programs will be available for student use.

Session 1: **Monday, June 24, 12:30-5:00.** Introduction followed by lecture and dissection *back and posterior upper limb*

Session 2: **Wednesday, June 26, 12:30-7:00.** Lecture and dissection *laminectomy: exposure of the spinal chord, meninges, spinal nerves.* (12:30-5:00); discussion of clinical cases that highlight structure and function of the back and spinal chord. (5:00-7:00, pizza or sandwiches provided)

Session 3: **Friday, June 28, 12:30-5:00.** Lecture and dissection *gluteal region and posterior lower limb*

Session 4: **Monday, July 1, 12:30-7:00.** Lecture and dissection *chest muscles and upper limb.* (12:30-5:00); discussion of clinical cases that highlight structure and function of the gluteal region and lower limb (5:00-7:00, pizza or sandwiches provided)

Session 5: **Wednesday, July 3, 12:30-7:00.** Lecture and dissection of the *hand* (12:30-5:00); discussion of clinical cases that highlight structure and function of the upper limb and hand (5:00-7:00, pizza or sandwiches provided)

Session 6: **Friday, July 5, 12:30-5:00.** Lecture and dissection *anterior lower limb and foot*

Session 7: **Monday, July 8, 12:30-7:00.** Lecture and dissection of *thorax—lungs, pleural cavities, mediastinum, heart, great vessel* (12:30-5:00); discussion of clinical cases that highlight structure and function of organs in the thorax (5:00-7:00, pizza or sandwiches provided)

Session 8: **Wednesday, July 10, 12:30-7:00.** Lecture and dissection *abdominal wall, abdominal viscera, retroperitoneum, pelvis* (12:30-5:00); discussion of clinical cases that highlight structure and function of abdominal organs (5:00-7:00, pizza or sandwiches provided).

Session 9: **Friday, July 12, 12:30-5:00.** Lecture and dissection *neck*

Session 10: **Monday, July 15, 12:30-7:00.** Lecture and dissection *cranial cavity—discussion of brain structure function* by David Cardozo (12:30-5:00); tutorial discussion

with Dana Stearns, MD, of function of cranial nerves (5:00-7:00, pizza or sandwiches provided)

Session 11: **Wednesday, July 17, 12:30-7:00**. Lecture and dissection *face, oral cavity, pharynx, larynx* (12:30-5:00); tutorial discussion with Bjorn Olsen of genes & morphogenetic processes that relate to cranial-facial development (5:00-7:00, pizza or sandwiches provided)

Session 12: **Friday, July 19, 12:30-5:00**. Dissection of eye and inner ear.

### **Spring 2013**

Meeting Dates: June 24, 26, 28, July 1, 3, 5, 8, 10, 12, 15, 17, 19

Time: 12:30-5:00pm or 12:30-7:00pm

First Meeting: Monday, June 24, 2013

Final Meeting: Friday, July 19, 2013

Location: TMEC Bldg., 447

Class Size: 10

Course Head: Gerald Greenhouse, [gerald\\_greenhouse@hms.harvard.edu](mailto:gerald_greenhouse@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Cell Biology 307qc. Molecular Aspects of Chromatin Dynamics**

Catalog Number: 91774 Enrollment: Limited to 25.

*Raul Mostoslavsky (Medical School), Danesh Moazed (Medical School), Johnathan Whetstine (Medical School), and Lee Zou (Medical School), and members of the Department*

*Quarter course (spring term). Tu. and some Th., 3 – 5.*

*Total: 18 hrs (12 sessions, 1.5 hr each session; 8 regular Sessions, 4 Discussion Sessions).*

This course will discuss the role of chromatin dynamics in modulating molecular and cellular processes. The genetic information encoded in our DNA is organized in a defined set of chromosomes, which are condensed about 10,000 fold in order to fit in the cell nucleus. This compaction occurs through packaging of the DNA around histone proteins, a structure known as chromatin. In what was thought to be a rigid structure, today we know that chromatin is an amazingly dynamic folding that plays a crucial role in controlling accessibility of factors to the DNA, and as such, it regulates a vast number of critical biological functions, including gene transcription, DNA replication, DNA repair and cellular identity. In this course we will attempt to cover some of the basic molecular mechanisms that play a role in regulating chromatin dynamics, and in turn how chromatin itself modulate biological processes, including basic mechanisms of inheritance. We will specifically discuss the role of DNA methylation, histone modifications, nucleosome dynamics and novel epigenetic modulators in the context of different biological processes for which chromatin accessibility appears to play a crucial role.

**Guest Lecturers** (Discussion Sessions): Yang Shi, Bob Kingston, Yi Zhang and a special participation of David Allis, Rockefeller University. In these sessions students should come prepared to discuss a pre-selected recent paper from the lecturer's lab.

**Session Topics:**

**Session 1.** General overview on chromatin dynamics and mechanisms of inheritance (JW). **March 19th**

**Session 2.** Basic concepts on epigenetic mechanisms of inheritance (DM). **March 26th**

**Session 3.** The chemistry of DNA methylation. Establishment, maintenance and erasure of DNA methylation. The function of DNA methyl-transferases and methyl-binding proteins. The new kid on the block: cytosine 5-hydroxymethylation (RM). **April 2nd**

**Session 4.** Discussion Session: Yi Zhang. Tet proteins are regulators of 5-OH-MeC. **April 4th**

**Session 5.** Histone modifications and histone variants. Translating epigenetic marks into function: the code, the writers and the readers. (JW). **April 9th**

**Session 6.** Discussion Session. Yang Shi: specificity of histone demethylases. **April 11th**

**Session 7.** Nucleosome remodeling and the transcriptional silencing/activation switch. The role of ATP-remodelling complexes, Polycomb Group Proteins and Trithorax Group Proteins (LZ). **April 16th**

**Session 8.** Discussion Session. Bob Kingston: PGC and Trx complexes in epigenetics. **April 18th**

**Session 9.** The RNA world. Roles of RNAi in heterochromatin Assembly. Non-coding RNAs in epigenetic mechanisms of inheritance **(DM). April 23rd**

**Session 10.** Discussion Session. Special Invited Speaker, David Allis, Rockefeller University: Writers, Erasers and Readers of the Histone Code. **April 25th**

**Session 11.** Beyond transcription: chromatin regulation of DNA replication and DNA repair **(LZ). April 30th**

**Session 12.** Epigenetics and human disease: chromatin determinants in cancer and neurodegenerative disorders. Emerging roles for chromatin in other diseases **(RM). May 2<sup>nd</sup>**

### **Spring 2013**

Meeting Dates: Tuesdays, March 19, 26, April 2, 9, 16, 23, 25, 30, May 2, 3:00-5:00pm

Discussion sessions: Thursdays, April 4, 11, 18, 25, 3:00-5:00pm

First Meeting: Tuesday, March 19, 2013

Final Meeting: Thursday, May 2, 2013

Location: TMEC Bldg., 447

Class size: up to 25 students

Course Heads: Raul Mostoslavsky, [rmostoslavsky@mgh.harvard.edu](mailto:rmostoslavsky@mgh.harvard.edu), Danesh Moazed, [danesh\\_moazed@hms.harvard.edu](mailto:danesh_moazed@hms.harvard.edu), Lee Zou, [lzou1@partners.org](mailto:lzou1@partners.org), Johnathan Whetstine, [johnathan\\_whetstine@hms.harvard.edu](mailto:johnathan_whetstine@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Cell Biology 308qc. Introduction to Histology**

Catalog Number: 38084 Enrollment: Limited to 11

*Adrian Salic (Medical School), Stephen Daniel Liberles (Medical School), Gerald Greenhouse (Medical School)*

*Quarter course (spring semester). M., W., F., 1-5.*

This class is recommended for graduate students whose thesis work will benefit from a strong working knowledge of cell structure and tissue architecture. If there is room postdoctoral fellows may also attend.

Class size is limited to 11. To receive credit students must attend all sessions and participate enthusiastically. All sessions will be held in the TMEC Building on the Longwood Medical Campus.

Histology—the study of structure and how structure relates to function, in cells and tissues. The class will include a session on each of the major tissue types—epithelium, connective, muscle, and nerve. This will be followed by three sessions during which organ systems will be studied. Each session will include an introductory lecture followed by shared observation of slides using a 12-headed light microscope. Pathology correlates will be included when possible. In the last two sessions, students will have hands on training in tissue staining with recently developed compounds in the lab of Adrian Salic and learn frozen section technique on brain tissue from Stephen Liberles.

RECOMMENDED TEXT: *Histology: A Text and Atlas with Correlated Cell and Molecular Biology* by Michael R Ross and Wojciech Pawlina.

Session 1 (June 3, 2013) Epithelia & Glands (Greenhouse)

Session 2 (June 5, 2013) Connective Tissue (Greenhouse)

Session 3 (June 7, 2013) Muscle (Greenhouse)

Session 4 (June 10, 2013) Nerves (Greenhouse)

Session 5 (June 12, 2013) Alimentary system & Respiratory System (Greenhouse)

Session 6 (June 14, 2013) Urinary Tract (Greenhouse)

Session 7 (June 17, 2013) Male and Female Reproductive Systems (Greenhouse)

Session 8 (June 19, 2013) How is tissue prepared for histological study? Wet lab with Adrian Salic

Session 9 (June 21, 2013) wet lab with Stephen Liberles—frozen sections of brain

**Spring 2013**

Meeting Dates: June 3, 5, 7, 10, 12, 14, 17, 19, 21

First Meeting: Monday, June 3, 2013

Final Meeting: Friday, June 21, 2013

Location: TMEC Bldg., 126

Course heads: Adrian Salic [adrian\\_salic@hms.harvard.edu](mailto:adrian_salic@hms.harvard.edu), Stephen Liberles

[stephen\\_liberles@hms.harvard.edu](mailto:stephen_liberles@hms.harvard.edu), Gerald Greenhouse

[gerald\\_greenhouse@hms.harvard.edu](mailto:gerald_greenhouse@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****



**\*Cell Biology 309qc. Advanced Topics in Cell Biology**

Catalog Number: 14797

*David Van Vactor (Medical School) and members of the Department  
Quarter course (spring term). Th., 6-7:30.*

Dinner Seminar Theme: Controlling Cellular Behavior and Metabolism through Cell Interaction and Signaling.

Review articles assigned each week to prepare students for discussion.

January 24	Stephen Liberles
January 31	John Blenis
February 7	David Pellman
February 14	Adrian Salic
February 21	Bjorn Olsen
February 28	Pere Puigserver
March 7	Fred Goldberg
March 14	David Van Vactor
March 21	John Flanagan
March 28	Joan Brugge

**Spring 2013**

Meeting Dates: January 24, 31, February 7, 14, 21, 28, March 7, 14, 21, 28

Meeting Time: Thursdays, 6:00-7:30pm. Dinner provided.

First Meeting: Thursday, January 24, 2013

Final Meeting: Thursday, March 28, 2013

Location: SGMB 502

Course Instructor: David Van Vactor, [davie\\_vanvactor@hms.harvard.edu](mailto:davie_vanvactor@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card \*\****

**\*Genetics 302qc. Teaching 101: Bringing Effective Teaching Practices to your Classroom**

Catalog Number: 91159 Enrollment: Limited to 15.

*Fred Winston (Medical School) and Johanna Gutlerner  
Quarter course (spring term). Th., 1-3:30.*

Are you interested in a career in teaching and would like to learn more about how to design a syllabus and a lesson? Are you planning on being a TA for a course, but have no idea about how to run a discussion session? Would you like to learn how to give engaging and effective lectures?

As the interest in education and teaching careers continues to grow in the scientific community, so does the need to arm our educators with the tools and strategies to create a successful classroom environment. This course will survey the basics of effective teaching practices, focusing on practical application and real-life examples. Topics to be discussed will include effective lecturing techniques, using goals and learning styles to inform lesson planning and design, assessing student understanding, and facilitating discussions. The course will emphasize in-class learning activities that will allow students the opportunity to practice their teaching skills and receive feedback and suggestions from peers and instructors.

Sessions led by Johanna Gutlerner.

**Spring 2013**

Meeting Dates: March 21, 28, April 4, 11, 26, May 2, 9

*Note: there will be no class on April 18.*

First Meeting: Thursday, March 21, 2013

Final Meeting: Thursday, April 9, 2013

Location: TMEC Bldg., 104

Curriculum Fellow and Course Instructor: Johanna Gutlerner,

[johanna\\_gutlerner@hms.harvard.edu](mailto:johanna_gutlerner@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

## **\*Genetics 304qc. A Short Course on Inheritance and Weird Stuff**

Catalog Number: 75405

*Chao-Ting Wu (Medical School)*

*Quarter course (spring term). Tu., 10-1.*

What does 'inheritance' mean? How do we recognize inheritance and, when we do recognize it, what is the entity that is being inherited and by what mechanism does the inheritance occur? Given the surprising forms of inheritance that have been discovered in recent years, these questions are gaining import even as their answers are growing more complex. In this course, we will explore inheritance, keeping in mind the many ramifications for medical research and human health. We will begin with a quick review of the better known principles of genetics and then delve into observations and phenomena of a variety of organisms, including humans, mice, nematodes, fungi, and plants. The format of the course will be a mix of lectures, discussion, and in class group problem-solving.

*Prerequisite:* Primarily for first-year graduate students, but is open to medical students and advanced undergraduates. A basic understanding of genetics recommended.

*Note:* This course is a short version of Genetics 219 and so is not recommended for students who have taken Genetics 219. Genetics 219 may be moved from the fall to the spring in future years and will likely be limited to first-year students.

*Grading:* Grading will rest entirely on class participation (i.e., no tests, problem sets, or papers).

### **Course Outline**

January 31 - A little history, paths less traveled, chromosomes, and a genetic puzzle

February 7 - Perils of segregation, clarity of mating type, and the question of randomness

February 14 - Handedness, schizophrenia, and homology (or not!)

February 21 - Duplication, mutation, and the genetic code

February 28 - (no class)

March 7 - Human pedigrees, transgenerational inheritance, & immortality

March 14 - Politics in the genome: pitting conservation against radical change

March 21 - TBD

### **Spring 2013**

Meeting Dates: January 31, February 7, 14, 21, March 7, 14, 21

First Meeting: Thursday, January 31, 2013

Final Meeting: Thursday, March 21, 2013

Location: TMEC Bldg., 446

Course Director: Chao-Ting Wu, [twu@genetics.med.harvard.edu](mailto:twu@genetics.med.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*HBTM 304qc. Drug Development: From Concept to Commercialization - (New Course)**

Catalog Number: 83871 Enrollment: Limited to 50.

Michael Goldberg (Medical School)

Quarter course (spring term). Various days and times.

This course is intended to provide graduate students with exposure to the diverse aspects of the drug development process. The proteasomal inhibitor Velcade will be used as an exemplar, though the themes of discovery, development, manufacturing, business development, commercialization, and growth are relevant across most therapeutics. Each class will include a lecture by a person involved in that particular aspect of Velcade development followed by a group discussion of the associated case study.

**Outline of Sessions:**

April 23: Overview of Velcade: From basic science to drug commercialization (6-8pm)

April 29: Proteasome Research: Potential as a therapeutic target (4-6pm)

May 9: Drug Discovery: Timelines, organization, assays, screens, chemistry, and pharmacology

May 14: Drug Development: Clinical trial design and regulatory approval

May 21: Manufacturing: Scaling, cGMP, and outsourcing (4-6pm)

May 30: Commercialization: Pricing, reimbursement, launch

June 3: Business Development: strategy, negotiation (4-6pm)

June 10: Growth: Sales, marketing, competition, partnerships (4-6pm)

June 20: Patient Panel: Participation in a clinical trial, patient experience

June 25: Summary (3-5pm)

**Assignments:** In addition to contributing to active class participation, students will be asked to prepare a two-page analysis of a subject matter of choice that is relevant to the course. This assignment is intended to provide each student with an opportunity to explore a personal interest in a thoughtful manner that extrapolates beyond the specific content of the course.

**Spring 2013**

Meeting Dates: April 23, 29, May 9, 14, 21, 30, June 3, 10, 20, 25

First Meeting: Tuesday, April 23, 2013

Final Meeting: Tuesday, June 25, 2013

Location: TMEC Bldg., 227

Course Head: Michael Goldberg, [michael\\_goldberg1@dfci.harvard.edu](mailto:michael_goldberg1@dfci.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Immunology 302qc. Clinical Sessions**

Catalog Number: 40428

*Rachael Ann Clark (Medical School)*

*Quarter course (spring term). Tu., 12-1.*

Exposure to patients with immunologically mediated diseases. What is known about human immunologic diseases what critical questions remain unanswered. Formulate grant proposals that address critical questions for understanding or treatment of human immunologic disease.

***\*\*Required for, and limited to, all Immunology GI's***

**Spring 2013**

Meeting Dates: March 12, 26, April 2, 9, 16, 23, 30

First Meeting: Tuesday, March 12, 2013

Final Meeting: Tuesday, April 30, 2013

Location: Jeffrey Modell Immunology Center, Room 258

Course Director: Rachael Ann Clark, [rclark1@partners.org](mailto:rclark1@partners.org)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Immunology 303qc. The Warring Genomes: Innate Immunity and Host Defense**

Catalog Number: 55535

Jonathan C. Kagan (Medical School)

Quarter course (spring term). M., 4-6.

This course will focus on basic cellular and molecular aspects of innate immunity, with an emphasis on recent advances in the field. Each class will cover a specific topic, and supporting literature will be provided by the instructor. Students are expected to have already taken IMM 201.

**January 28:** Principles of Innate Immunity (Alan Ezekowitz)

**February 4:** Genetics of Innate Immune signaling pathways (Jon Kagan)

**February 11:** Cell biology of Innate Immune signaling pathways (Jon Kagan)

**February 18:** No class

**February 25:** Inflammasomes and phagosomes (Lynda Stuart)

**March 4:** Structures of innate immune signaling complexes (Hao Wu)

**March 11:** Non-infectious triggers of innate immunity (Nir Hacohen)

**March 18:** Jeopardy Wrap up (Alan Ezekowitz)

**Spring 2013**

Meeting Dates: January 28, February 4, 11, 25, March 4, 11, 18

First Meeting: Monday, January 28, 2013

Final Meeting: Monday, March 18, 2013

Location: Jeffrey Modell Immunology Center, Room 258

iSite: <http://isites.harvard.edu/icb/icb.do?keyword=k78728&pageid=icb.page404114>

Course Head: Jonathan Kagan, [jonathan.kagan@childrens.harvard.edu](mailto:jonathan.kagan@childrens.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Immunology 305qc. Neuro-immunology in development, regeneration and disease**  
**– (New Course)**

Catalog Number: 98545

*Beth Stevens (Medical School) and Clifford Woolf (Medical School)*

*Quarter course (spring term). Th., 5–7.*

It is increasingly clear that the nervous system and immune system share parallel molecular pathways, and communication between neurons and immune cells play significant roles in homeostasis and disease. This course will investigate current topics in neuro-immunology: CNS development, chronic pain, neuro-degeneration, aging, axon regeneration, auto-immunity and infection. We will focus our discussions on molecular mechanisms shared by the immune and nervous systems and the molecular cross-talk between these two systems.

Each class will cover a specific topic in neuro-immunology. Students should be prepared to lead discussions on pre-selected papers for each session.

**Potential Lectures:**

April 11 - Course Introduction/overview: ‘Neuroimmunology’ Redefined

April 18 - Neural-Immune Interactions in Pain: Clifford Woolf

April 25 - Neural-Immune Signaling During Brain Wiring/Development: Beth Stevens

May 2 - Inflammation and Axon Regeneration: Larry Benowitz

May 9 - Immune Activation in Amyotrophic Lateral Sclerosis: Mike Carroll/Isaac Chiu

May 16 - Role of Macrophage Lineage Cells in Neurodegenerative Diseases (AD):  
Joseph El Khoury

May 23 - Autoimmunity in the CNS / Immune Mechanisms of MS: Vijay Kuchroo

May 30 - Neuro-immune Mechanisms of Infectious Diseases: Ulrich Von Andrian

**Spring 2013**

Meeting Dates: Thursdays; April 11, 18, 25; May 2, 9, 16, 23, 30

First Meeting: Thursday, April 11, 2013

Final Meeting: Thursday, May 30, 2013

Location: Jeffrey Modell Immunology Center, Room 258

Class size: 20 students

Course Heads: Beth Stevens, [beth.stevens@childrens.harvard.edu](mailto:beth.stevens@childrens.harvard.edu), Clifford Woolf,  
[clifford.woolf@childrens.harvard.edu](mailto:clifford.woolf@childrens.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Immunology 306qc. Systems Immunology – (New Course)**

Catalog Number: 87129

*Nir Hacohen (Medical School), Nick Haining (Medical School), Christophe Benoist (Medical School) and visiting speakers*  
*Quarter course (spring term). Fr., 9-11.*

Our focus in this course is on the emerging field of systems immunology. Each session will review a class of experimental approaches, followed by a critical discussion of illustrative papers. Hands-on workshops will introduce students to computational tools for analyzing large-scale datasets, focusing on gene expression.

**Schedule**

February 22: Session 1 Overview of systems immunology

March 1: Session 2 Profiling molecular states: DNA

March 8: Session 3 Profiling molecular states: RNA

March 15: Session 4 Profiling molecular states: proteins (and others)

March 22: Session 5 Perturbation (deliberate and natural) functional screens: cells and mice

March 29: Session 6 Reconstructing genetic and physical networks

April 12: Session 7 Inferring genotype-phenotype maps in humans: monogenic and polygenic inheritance

April 26: Session 8 Quantitative modeling

May 3: Session 9 Systems medicine: disease states, mechanisms and therapeutics

Hands-on workshops (dates TBD for 5 x 1.5 hour workshops): basic computational tools for the analysis of large-scale expression and other data.

**Spring 2013**

Meeting Dates: Fridays, February 22, March 1, 8, 15, 22, 29, April 12, 26, May 3

First Meeting: Friday, February 22, 2013

Final Meeting: Friday, May 3, 2013

Location: Jeffrey Modell Immunology Center, Room 100A

Course Heads: Nir Hacohen, [nhacohen@partners.org](mailto:nhacohen@partners.org), Nick Haining,

[Nicholas\\_Haining@dfci.harvard.edu](mailto:Nicholas_Haining@dfci.harvard.edu), Christophe Benoist,

[Christophe\\_Benoist@hms.harvard.edu](mailto:Christophe_Benoist@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****



**\*Microbiology 301qc. Molecular Mechanisms of Microbial Pathogenesis**

Catalog Number: 76052 Enrollment: Limited to 15.

Marcia Goldberg (Medical School) and Simon L. Dove (Medical School)

Quarter course (spring term). W., 1-2:30.

During infection, microbial pathogens employ sophisticated mechanisms to enhance infection or dissemination. These mechanisms frequently involve signaling or activation of host pathways. Recent investigations in the field have provided insight into aspects of the genetic regulation of some of these systems and the characterization of the molecules and interactions involved in signaling in some of these pathways.

This course will focus on the recent literature on molecular mechanisms involved in microbial pathogenesis during host-pathogen interactions. The pathogens that will be discussed include *Salmonella*, *Shigella*, *Pseudomonas aeruginosa*, *Yersinia*, *Listeria monocytogenes*, and *Mycobacteria*. The specific topics that will be covered in the course include:

1. Bacterial delivery of proteins directly into host cells
2. Regulation of protein secretion in pathogenic bacteria
3. Bacterial modulation of host protein degradation pathways
4. Acute versus chronic infection of the host
5. Bacterial signaling that alters the host cytoskeleton
6. Bacterial response to host signals
7. Bacterial alteration of host chromosome dynamics

**Spring 2013**

Meeting Dates: January 30, February 6, 13, 20, 27, March 6, 13

First meeting: Wednesday, January 30, 2013

Final Meeting: Wednesday, March 13, 2013

Location: New Research Bldg., 833

Course size: 15

Course Directors: Marcia Goldberg, [mgoldberg1@partners.org](mailto:mgoldberg1@partners.org), and Simon Dove, [simon.dove@childrens.harvard.edu](mailto:simon.dove@childrens.harvard.edu)

**\*\*If you plan to take a quarter course you must register for it on your study card\*\***

**\*Neurobiology 303qc. Tools for Statistical Inference in Experimental Science**

Catalog Number: 65564 Enrollment: Limited to 35.

Gary I. Yellen (*Medical School*) and David A. Harmin (*Medical School*)

*Quarter course (spring term). M., W., F., 3-5.*

This expanded quarter course will provide an introduction to the statistical treatment of experimental data, with particular reference to problems in neuroscience. It will cover basic topics in statistics, including probability distributions, sampling, hypothesis testing, Bayes's Theorem, t tests, confidence intervals, and ANOVA and related tests. We will discuss the appropriate choice of statistical tests, the underlying assumptions, and how to draw appropriate inferences from the test results. There will also be some treatment of correlation, regression, nonparametric tests, and numerical simulations. Other topics may be included according to student feedback, which is encouraged.

Class meetings will start at 3:00 PM with a 15-30-minute discussion/problem-review session followed by lectures. Illustrative statistical exercises and problems will be regularly assigned for homework and collected the following class, but not graded. There will be no quizzes or exams. We will suggest optional reading assignments.

The online statistics literature is extensive, as are tools for performing statistical tests. MATLAB® will be used in this course as our standard tool for numerical work, with instruction and suggestions for alternative programs as needed.

**Spring 2013**

Meeting Dates: March 25, 27, 29, April 1, 3, 5, 8, 10, 12, 15, 17, 19, 22, 24, 26, 29

First Meeting: Monday, March 25, 2013

Final Meeting: Monday, April 29, 2013

Location: Goldenson, 122

Class Limit: 35

Course Head: Gary Yellen, [gary\\_yellen@hms.harvard.edu](mailto:gary_yellen@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Neurobiology 306qc. Quantitative Methods for Biologists – (Incoming Students Bootcamp Course)**

Catalog Number: 8531 Enrollment: Limited to 80. Prior approval from course instructor needed.

*Michael Springer, Richard T. Born (Medical School)*

*Quarter course (fall term; repeated spring term). Hours to be arranged.*

*Refresher course (spring term). Hours to be arranged.*

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:* More details can be found by going to the [Division of Medical Sciences website](#), then clicking Current Students and selecting Quarter Courses.

**Bootcamp**

Meeting Dates: May 23, 24, 28, 29, 30, June 3

First Meeting: Thursday, May 23, 2013

Final Meeting: Monday, June 3, 2013

Location: TBD

Course Website: <http://springerlab.org/qmbc/>

Class Limit: 80

Course Director: Michael Springer, [michael\\_springer@hms.harvard.edu](mailto:michael_springer@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Neurobiology 307qc. Molecular Causes of Congenital Defects of the CNS**

Catalog Number: 93018 Enrollment: Limited to 12.

Mary R. Loeken (Medical School)

Quarter course (spring term). Tu., 2–5.

Congenital defects can be caused by inheritance of a defective gene, maternal infection, or prenatal exposure to environmental teratogens. Use of mutant mouse strains and genomic sequencing have been particularly useful in the rapid proliferation of our understanding of the cellular and molecular mechanisms by which congenital defects of the brain or nervous system arise, and how they lead to functional consequences that range from biochemical abnormalities to gross structural defects. This course will examine the current literature, using examples of inherited and extrinsic causes of neurological congenital defects, to understand how molecular disturbances during development lead to abnormal neurological function.

**Outline:**

January 29: Introduction, Neural tube defects I-folic acid

February 5: Neural tube defects II-genes and cellular processes

February 12: Intellectual disabilities

February 19: Learning disabilities-dyslexia, etc.

February 26: Neurobehavioral disorders-ADHD, autism spectrum

March 5: Student choice

March 12: Student choice

**Spring 2013**

Meeting Dates: Jan 29, Feb 5, 12, 19, 26, March 5, 12

First Meeting: Tuesday, January 29, 2013

Final Meeting: Tuesday, March 12, 2013

Location: TMEC Bldg., 425

Class size: Minimum of 4, limited to 12

Course Head: Mary R. Loeken, [mary.loeken@joslin.harvard.edu](mailto:mary.loeken@joslin.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card***

## **\*Pathology 301qc. The Molecular Bases of Eye Disease**

Catalog Number: 85085

*Darlene Dartt (Medical School), Dimitris Karamichos, Magali Saint-Geniez,*

*Course Coordinator: Matylda Bylinska, 617-912-2586,*

*matylda.bylinska@schepens.harvard.edu*

*Quarter course (spring term). M., 3-5pm*

In this course, we will strive for an understanding of the molecular bases for diseases that target the eye. The goals of the course are: (i) to explore the structural and functional aspects of the eye relevant to understanding the pathology, (ii) to review the manifestations of the disease and its effects on vision, (iii) to discuss current views and research in the pathophysiology, and strategies for therapeutic intervention. For most sessions, the basic science and clinical topics will be presented by two faculty lecturers.

### **Topics**

**Monday, January 7** – The Basic Structure of the Eye: Dr. Elio Raviola; Anatomy of Accessory Glands: Dr. Pablo Argüeso

**Monday, January 14** – Overview of Ocular Disease: Front of the eye - Dr. Joseph Ciolino, Back of the eye – Dr. Leo Kim

**Monday, February 4** – Development of the Retina: Dr. Connie Cepko; Anatomy and Physiology of the Retina: Dr. Richard Masland

**Monday, February 11** – Dry Eye and Ocular Surface: Drs. Ilene Gipson and Deborah Jacobs

**Tuesday, February 19** – Ocular Tissue Regeneration and Remodeling: Drs. James Zieske and Dong Feng Chen

**Monday, February 25** – Ocular Tumors: Drs. Bruce Ksander and Shizuo Mukai

**Monday, March 4** – Lens/Cataract: Drs. Sheldon Rowan and Scott Greenstein

**Monday, March 11** – Molecular Basis of Complex (and Common) Strabismus: Drs. Elizabeth Engle and David Hunter

**Tuesday, March 19** – Age-related Macular Degeneration (AMD): Drs. Ivana Kim and Kip Connor

**Monday, March 25** – Glaucoma and Optic Nerve: Drs. Janey Wiggs and Larry Benowitz

**Monday, April 1** – Diabetic Retinopathy and Retinal Neovascularization: Drs. Joseph Arboleda-Velasquez and Magali Saint-Geniez

**Monday, April 8** – Genetics of Inherited Diseases: Drs. Neena Haider and Eric Pierce

**Tuesday, April 16** – Ocular Inflammation and Infection: Drs. Balaraj Menon and Pedram Hamrah

### **Spring 2013**

Meeting Dates: January 7, 14, 28, February 4, 11, 25, March 4, 11, 19, 25, April 1, 8, 16

Meeting Time: Mondays, 3:00-5:00pm (**with the exception of Tuesday, March 19<sup>th</sup> and Tuesday, April 16<sup>th</sup>**)

First Meeting: Monday, January 7, 2013

Location: 2<sup>nd</sup> Floor Conference Room, Schepens Eye Research Institute

Course Heads: Magali Saint-Geniez, 617-912-2580,  
[magali.saintgeniez@schepens.harvard.edu](mailto:magali.saintgeniez@schepens.harvard.edu), Dimitris Karamichos, 617- 912-0280,  
[dimitris\\_karamichos@meei.harvard.edu](mailto:dimitris_karamichos@meei.harvard.edu), Darlene Dartt, 617-912-0272 ,  
[darlene.dartt@schepens.harvard.edu](mailto:darlene.dartt@schepens.harvard.edu)  
Course Coordinator: Matylda Bylinska, 617-912-2586,  
[matylda\\_bylinska@meei.harvard.edu](mailto:matylda_bylinska@meei.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*SHBT 301qc. Speech and Hearing Laboratory Visits - (New Course)**

Catalog Number: 14124

*Bertrand Delgutte (Medical School)*

Meeting Time, Dates, and Location: Contact Instructor

Course Director: Bertrand Delgutte, [bertrand\\_delgutte@meei.harvard.edu](mailto:bertrand_delgutte@meei.harvard.edu)

**\*\*If you plan to take a quarter course you must register for it on your study card\*\***

**Other Quarter Courses of Interest**

**\*SCRB 300qc. Current Research in Stem Cell and Regenerative Biology**

Catalog Number: 95856

*Lee L. Rubin and members of the Department*

*Quarter course (spring term). Tu., 6–8 p.m.*

This survey course provides contemporary approaches to the study of stem cell and regenerative biology.

Meeting Dates: Tuesdays, January 29 – April 30, 2013

First Meeting: Tuesday, January 29, 2013

Course Location: Sherman Fairchild, Room 268 (7 Divinity Avenue, Cambridge)

Course Director: Lee Rubin, [lee\\_rubin@harvard.edu](mailto:lee_rubin@harvard.edu)

**\*\*If you plan to take a quarter course you must register for it on your study card\*\***

**JANUARY**

**QUARTER COURSES**



**\*BCMP 301qc. Translational Pharmacology**

Catalog Number: 97487 Enrollment: Enrollment may be limited.

*Donald M. Coen (Medical School) and David E. Golan (Medical School)*

*Quarter course (spring term).*

This is an intensive course held during the first two full weeks of **January** (ten days) covering basic principles of pharmacology and how they are translated into the development of new drugs. Students participate actively in project groups composed of both graduate students and post-graduate M.D.'s to propose a strategy for drug development from target choice through clinical trials. There are two hours of lectures each of the first eight mornings; in the afternoons, there are case studies discussed by guest faculty from the pharmaceutical and biotechnology industries, a research paper discussion, or time to work on the group project. Evaluation is based on the project and class participation. Enrollment may be limited.

**Tentative Outline:**

Jan. 7: Unmet clinical needs and finding new drug targets (lecture and case study)

Jan. 8: Drug receptor interactions (lecture) and work on group projects

Jan. 9: Drug discovery approaches (lecture and case study)

Jan. 10: Pharmacokinetics (lecture) and drug delivery (case study)

Jan. 11: Pharmacogenetics, -genomics, and drug resistance (lecture), drug mechanisms (case study) and work on group projects

Jan. 14: Preclinical assessment and toxicology (lecture and case study)

Jan. 15: Clinical assessment (lecture and case study)

Jan. 16: Pharmaco-epidemiology, -economics, and -vigilance (lecture and case study)

Jan. 17: Work on group projects

Jan. 18: Presentations of group projects.

Meeting Dates: January 7 – January 18

Time: 9:30am – 4pm daily except Friday, January 18 (9am – 1pm)

First Meeting: Monday, January 7 - 9:30am

Location: Modell Immunology Center, Fred S. Rosen Lecture Hall, Room 100A

Course Heads: Don Coen [don\\_coen@hms.harvard.edu](mailto:don_coen@hms.harvard.edu), and David Golan

[david\\_golan@hms.harvard.edu](mailto:david_golan@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Cell Biology 310qc. Current Topics in Cancer Biology Research Course**

*Charles Stiles (Medical School), Karen Cichowski (Medical School), and Andrea McClatchey (Medical School)*

*Curriculum Fellow: Narveen Jandu, PhD, [narveen\\_jandu@hms.harvard.edu](mailto:narveen_jandu@hms.harvard.edu)*

*Quarter course (spring term), M., W., F., 2:30-4*

This course is designed for mid- to upper-year graduate students that are interested in Current Topics in Cancer Biology research. The course is designed to cover leading and cutting edge technologies in Cancer Biology Research. Each day of the course will cover a different major topic. The topics will include: Cancer Cell Signaling, Metastasis and EMT, Cancer Genomics, Cancer and microRNAs and Cancer Stem Cells. These topics will be explored in-depth using recent papers of high profile. The course format will be round-table discussions. The goal of the discussion will be to focus on a chosen paper related to a current topic. Students will address the techniques employed and how the results in the current paper will impact Cancer Biology Research in the future. Students are required to read and come prepared to discuss the assigned papers.

**Student Assignment**

Each student will be asked to prepare discussion questions for one of the papers on one of the topic days. These questions should be written with details and depth. These questions should be thoughtful and aimed at stimulating an insightful discussion. Students may choose to prepare very direct questions, open-ended questions or questions around unresolved issues within the field and literature. Students will be assessed on participation, attendance and assignment completion.

**Schedule**

Day 1 - Fri Jan 11 – Course Opening, Intro to Hallmarks& Signaling in Cancer Cells

Day 2 - Mon Jan 14 - p53 -Tumor Suppressor Genes and Cancer – Dr. Pablo Hollstein

Day 3 - Wed Jan 16 - Genome Instability and Cancer - Dr. Esther Baena

Day 4 - Fri Jan 18 - microRNAs and Cancer – Dr. John Powers

Day 5 - Mon Jan 21 - Metastasis, EMT& Cancer - Dr. Christin Chaffer

Day 6 - Wed Jan 23 - Cancer Stem Cells and Cancer - Dr. Christine Fillmore

Day 7 - Fri Jan 25 - Tumor Microenvironment - Dr. Zafira Castano

**Spring 2013**

Meeting Dates: January 11, 14, 16, 18, 21, 23, 25

Meeting Time: 2:30-4:30pm

First Meeting: Friday, January 11, 2013

Location: DFCI, Room TBA

Curriculum Fellow & Course Contact: Narveen Jandu, [narveen\\_jandu@hms.harvard.edu](mailto:narveen_jandu@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Developmental & Regenerative Biology 330qc. (formerly \*Developmental & Regenerative Biology 330.) Advanced Experimental Methods: Experimental Approaches to Developmental Biology**

Catalog Number: 6590 Enrollment: Limited to 16.

Paola Arlotta, David L. Van Vactor (Medical School), and members of the Department  
Quarter course (spring term). Th, January 3, through Fr., January 18, 9am-5pm

\* Course begins with a dinner and lecture on Wed, January 2 from 6-8pm at SGMB 502  
Longwood

Provides a rapid survey of major topics and themes in developmental biology in parallel with hands-on exposure to a variety of experimental approaches, technologies and model systems.

*Note:* Open to first-year and second-year BBS students; permission of instructor required.  
Not repeatable for credit.

First Meeting: January 2, 2013

Location: Variable, schedule below

Course Head: Paola Arlotta, [paola\\_arlotta@hms.harvard.edu](mailto:paola_arlotta@hms.harvard.edu)

Curriculum Fellow: Abha Ahuja, [abha\\_ahuja@hms.harvard.edu](mailto:abha_ahuja@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

<b><u>Date</u></b>	<b><u>Faculty</u></b>	<b><u>Location</u></b>	<b><u>Topic</u></b>
1/2	Van Vactor & Wagers	HMS	Dinner & Lecture: Overview of Course and history of the field of Developmental and Regenerative Biology
1/3	Davie Van Vactor	HMS	Formation of Neural Connections in Drosophila
1/4	Jennifer Waters	HMS	Imaging Theory and Practice
1/5	North & Goessling	HMS	Vessel Development in Zebrafish
1/6	Fernando Camargo	HMS	Organ size regulation in mice
1/8	Jay Rajagopal	MGH	Lung regeneration
1/9	Hanno Hock	MGH	Analysis of hematopoietic stem cells and progenitors
1/10	Amy Wagers	FAS	Degeneration and Regeneration of skeletal muscle in mice
1/11	Amar Sahay	MGH	Behavioral analysis of neural alterations in mice
1/14	Cowan & Rubin	FAS	Stem Cells, Reprogramming, and Regenerative Medicine
1/15	John Rinn	FAS	What RNA seq can do for you
1/16	Adam Cohen	FAS	Imaging of voltage and Ca <sup>2+</sup> in cells
1/17	Jeffrey Macklis	FAS	Neurogenesis in Mammalian Central Nervous System
1/18	Kiran Musunuru	FAS	Human genetic studies

*\* Topics subject to change.*

**\*Genetics 390qc. (formerly \*Genetics 390.) Advanced Experimental Methods:  
Experimental Approaches in Genetic Analysis**

Catalog Number: 8039 Enrollment: Limited to 8.

*Fred Winston (Medical School) and members of the Department*

*Quarter course (spring term). M. through Fr., 8:30-4 pm.*

*Curriculum fellow: Leah Brault*

A survey of major themes in genetics combined with exposure to various experimental techniques, technologies, and model systems. Combines lectures and hands-on laboratory activities emphasizing experimental methods, hypothesis generation and testing, and data analysis.

*Note:* Limited to 8 students. Priority will be given to first year graduate students. Students must first contact the faculty for enrollment approval prior to registration for the course.

*Meeting Dates/Times:* Approximately 8:30 am-4:00 pm each day for 10 days in January.

Not repeatable for credit.

*Prerequisite:* Students must also enroll in, or have taken Genetics 201.

First Meeting: Monday, January 7, 2013

Location: Contact the instructor.

Course Head: Fred Winston, [winston@genetics.med.harvard.edu](mailto:winston@genetics.med.harvard.edu)

Curriculum Fellow: Leah Brault, [lbrault@genetics.med.harvard.edu](mailto:lbrault@genetics.med.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Human Biology and Translational Medicine 301qc. Case Studies in Human Biology and Translational Medicine**

Catalog Number: 95905 Enrollment: Will be limited.

*Caren Grossbard Solomon and Mary Elizabeth Hamel*

*Quarter course (spring term). M.-F., 9-11.*

HBTM 301QC consists of lectures and small group discussions that focus on papers selected from the basic science and clinical literature, and which culminated in the publication of seminal papers in the New England Journal of Medicine. These papers serve as a platform for the analysis of research methods in human biology as well as providing examples of recent advances in human biology that have provided new insights into the diagnosis, prevention, and treatment of human disease. These same papers serve as a basis for teaching LHB students the fundamentals of experimental design and biostatistics in basic and clinical research. Professor Jeffrey Drazen, editor-in-chief of the New England Journal of Medicine, will serve as course director, and is joined by two NEJM associate editors and members of the HMS faculty, Drs. Caren Solomon and Mary Beth Hamel. Each of the three weeks will focus on a different case study. The first week will explore how basic discoveries in the enzymology of leukotrienes led to the development of new therapeutic agents used to treat asthma. The second week uses the example of imatinib, in which fundamental studies on tyrosine kinase signal transduction led to the development of a novel chemotherapeutic agent, Gleevec. The final week of the course explores how an understanding of the physiology of blood pressure control led to the development of the angiotensin-converting enzyme inhibitors and their validation as effective drugs for the treatment of heart failure. This course provides an essential component of the educational process for obtaining the statistical power of experimental observations in both basic and clinical investigations, for assessing the outcomes of novel therapies, and for dissecting the complexities of genetic and environmental effects.

Meeting Dates: Two week course running from Monday, January 7, 2013 – Friday, January 18, 2013

Time: 9 – 11am

First Meeting: Monday, January 7, 2013

Location: Countway Library, 6th Floor, NEJM Offices, Large Conference Room

Course Heads: Caren Solomon, [cgsolomon@bics.bwh.harvard.edu](mailto:cgsolomon@bics.bwh.harvard.edu) and Mary-Beth Hamel, [mhamel@bidmc.harvard.edu](mailto:mhamel@bidmc.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Microbiology 302qc. Introduction to Infectious Disease Research: Infectious Diseases Consortium Boot Camp**

Catalog Number: 96439

*Eric Rubin (Medical School) and members of the Department*

*Curriculum Fellow: Zofia Gajdos*

*Quarter course (spring term), M.-F., 9-5.*

The Infectious Diseases Consortium (IDC) bootcamp will provide an introduction to the breadth of infectious disease research carried out at Harvard. Students will learn techniques for studying infectious diseases, more about different types of infectious diseases, and meet faculty, students, and postdocs in infectious diseases labs at Harvard. Students will be expected to come prepared to discuss several papers on each day of the course and will be expected to actively participate in the lecture portion of the course.

*Note:* The bootcamp is being run by the Infectious Diseases Consortium, which is HILS-wide

**Schedule**

**Monday, January 7**

A Brief Introduction to Infectious Diseases (Eric Rubin)

Introduction to the Microbiome from a Computational Perspective (Curtis Huttenhower)

Paper discussion (TA: Marina Santiago)

**Tuesday, January 8**

How to Recognize the Outbreak of a New Disease: Lessons from Lyme Disease (Allen Steere)

Disease outbreak game, paper discussion, and lunch (TA: Laura Ellis)

Infectious Diseases from an International Perspective (Ed Ryan)

Discussion and lab tour of the clinical microbiology labs at Children's Hospital (Alex McAdam)

**Wednesday, January 9**

Modeling in Infectious Diseases (Ted Cohen)

Activity/discussion – Disease Modeling (TA-led)

Introduction to Electron Microscopy (Maria Ericsson)

**Thursday, January 10**

Host-pathogen interactions part I (Tiffany Horng)

Host-pathogen interactions part II (Michael Starnbach)

Broad Institute Genomic Sequencing Center for Infectious Diseases Tour

<http://www.broadinstitute.org/scientific-community/science/projects/gscid/genomic-sequencing-center-infectious-diseases>)

**Friday, January 11**

Introduction to Parasitology and Malaria (Matt Marti)

TBA – Clinical HIV

Paper discussion (TA: Alissa Rothchild)

Meeting Dates: January 7, 8, 9, 10, 11

Time: 9am - 5pm

Location: 1/7, TMEC 340; 1/8, TMEC 109; 1/9 TMEC 109; 1/10, TMEC 340; 1/11,  
TMEC 340 (9am-11am), TMEC, 109 (12pm-5pm)

Course Head: Eric Rubin, [erubin@hsph.harvard.edu](mailto:erubin@hsph.harvard.edu)

Curriculum Fellow: Zofia Gajdos, [zofia\\_gajdos@hms.harvard.edu](mailto:zofia_gajdos@hms.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****

**\*Virology 301qc. Advanced Topics in Virology**

Catalog Number: 33563

Alan N. Engelman (Medical School)

Quarter course (spring term). Tu., Th., 4:30–6:00.

Critical evaluation of virology-related papers reporting a seminal contribution, strong methodological approaches or, in some cases, due to errors in methodology or author interpretation. Requirements include written critiques and class participation.

Note: Offered in the month of January.

Meeting Dates: January 3, 8, 10, 15, 17, 22, 24, 2013

Time: 4:30 - 6pm

First Meeting: Thursday, January 3, 2013

Last Meeting: Thursday January 24, 2013

Location: Center for Life Science room 1033

Course Head: Alan Engelman, [alan\\_engelman@dfci.harvard.edu](mailto:alan_engelman@dfci.harvard.edu)

***\*\*If you plan to take a quarter course you must register for it on your study card\*\****



**Other Quarter Courses of Interest**

**\*Systems Biology 305qc. Practical Synthetic Biology - (New Course)**

Catalog Number: 22318

*Pamela A. Silver (Medical School) and Jeffrey Way (Wyss Institute)*

*Quarter course (spring term).*

Synthetic biology is a new discipline that seeks to enable the predictable engineering of biological systems. According to one conception of synthetic biology, proteins and genetic regulatory elements are modular and can be combined in a predictable manner. In practice however, assembled genetic devices do not function as expected. The purpose of the course is to go beyond the textbook, first-pass description of molecular mechanisms and focus on details that are specifically relevant to engineering biological systems.

Meeting Dates: January 14, 2013 - January 25, 2013 (No class Monday, January 21)

Location: Warren Alpert RM 563

*Note:* To register for this course, please contact the Systems Biology Department at SysBio.Courses@hms.harvard.edu and include the following:

Year (G1, G1, postdoc, etc)

Credit/Audit

Harvard Email Address (if emailing from a personal account)

**\*Systems Biology 301qc. Studying Evolution through Models and Experiments**

Catalog Number: 31854

*Roy Kishony (Medical School) and Johan Paulsson (Medical School)*

*Quarter course (spring term). M.- F., 10am-12pm*

Intensive January course covering theoretical foundations in population genetics, genetic drift versus selection, identifying selection in genomes, advances in laboratory evolution experiments, with applications to key questions in systems biology and evolution. For more information, please visit the course website.

Meeting Dates: January 14-January 25, 2013 (No class Monday, January 21)

*Note:* To register please email SysBio\_Courses@hms.harvard.edu and indicate the following:

Year (G1, G1, postdoc, etc)

Credit/Audit

Harvard Email Address (if emailing from a personal account)