



# HARVARD

DIVISION OF MEDICAL SCIENCES

## PhD Programs at Harvard Medical School

# Spring 2021 Quarter Courses

### Enrollment Deadlines

Check-in	Jan 6 – Jan 13
Registration	Jan 13 – Jan 21
Last day to add/drop (no fee)	Feb 8
Last day to add	Mar 8
Last day to drop	Mar 22

### [GSAS Academic Calendar](#)



[2020-21](#)

### Wellness Days

Spring Break 2021 is replaced by individual wellness days on **Feb. 5, Mar. 1, Mar. 16, Mar. 31, and Apr. 15**. Courses and related course meetings will not meet on these days. Please note that these dates are tentative and subject to change. For more information, visit <https://registrar.fas.harvard.edu/spring-2021-calendar>

### Reminders

Register for **16 credits** for full-time student status and health insurance eligibility

Register by going to <https://my.harvard.edu/>

For questions, contact: [dms\\_courses@hms.harvard.edu](mailto:dms_courses@hms.harvard.edu)

**BCMP 305QC Seminars in Molecular and Mechanistic Biology**

Madhvi Venkatesh

**CELLBIO302QC Advanced Experimental Design for Biologists**

David Glass, Randall King

**CELLBIO312QC Deep Learning for Biomedical Image Analysis**

Faisal Mahmood

**GENETIC 302QC Teaching 101: Bringing Effective Teaching Practices to your Classroom**

Saoirse McSharry, Bradley Coleman

**HBTM 305QC Molecular Bases of Eye Disease**

Darlene Dartt, Magali Saint-Geniez

**IMMUN 301QC Autoimmunity**

Francisco Quintana

**IMMUN 305QC Neuro-Immunology Development, Regeneration & Disease**

Isaac Chiu, Beth Stevens, Michael Carroll

**IMMUN 318QC Innate immunity and viral infection of the lung - coronaviruses, flu and lung superinfections**

Ivan Zanoni

**MED-SCI 312QC Graduate TA Training in the Biomedical Sciences**

Brad Coleman

**MED-SCI 316QC PhD Pathfinder**

Joseph Arboleda

**MICROBI 360QC The Human Microbiome: Comprehensive Experimental Design & Methodologies**

Aleksandar Kostic, Abigail Sloan Devlin

**NEUROBIO 320QC Neuroendocrine pathways: Brain, Hormones and Behavior**

Victor Navarro

## Biological Chemistry & Molecular Pharmacology

### **BCMP 305QC Seminars in Molecular and Mechanistic Biology**

Madhvi Venkatesh

2 units. Enrollment limited to 30. Instructor consent required.

M/W, 5:00p - 6:00p

**Meeting Dates:** Feb 8 – May 5

**Meeting Location:** Students will be contacted directly with Zoom details

Seminars in Molecular Mechanistic Biology is a series of student work-in-progress talks that meets once a month during the academic year. Students who are presenting will receive feedback from both the faculty and the other students in the Molecular Mechanistic Biology (MMB) program. The peer-to-peer structure of this course (which is only open to students in MMB) should build community and a sense of belonging to the program. It will also help students develop a deeper understanding of the study of molecular mechanisms outside of their own labs and build relationships with faculty.

**Course Notes:** Registration for this class is limited to students who are a part of the Molecular Mechanistic Biology program. Students should contact Madhvi Venkatesh regarding enrollment.

**Course Head:** Madhvi Venkatesh, [madhvi\\_venkatesh@hms.harvard.edu](mailto:madhvi_venkatesh@hms.harvard.edu)

## Cell Biology

### **CELLBIO 302QC Advanced Experimental Design for Biologists**

David Glass, Randall King

2 units. Enrollment limited to 24. Instructor consent required.

Mon., 6:30pm – 8:30pm

**Meeting dates:** Jan 25 – Mar 8

**Meeting Location:** Online information to be provided on course page or by instructor

This course will focus on both the theory and practice of experimental design. The emphasis is on project planning and vetting, individual experimental design, and trouble-shooting. Special focus will be placed on methods to avoid experimental bias, and potential sources of inappropriate interpretation. Also the importance of system validation is especially emphasized.

**Course Note:** Special consent required - preference given to Therapeutics Certificate Program

students.

**Course Head:** David Glass, [david\\_glass@hms.harvard.edu](mailto:david_glass@hms.harvard.edu)

**Other Instructors:** Randy King, [randy\\_king@hms.harvard.edu](mailto:randy_king@hms.harvard.edu)

## **CELLBIO312QC Deep Learning for Biomedical Image Analysis**

Faisal Mahmood

2 units. Enrollment limited to 40. Instructor consent required.

Wed, 2:00pm – 4:00pm

**Meeting Dates:** Feb 10 – Mar 31

**Location:** Online information to be provided on course page or by instructor

Biomedical image analysis is undergoing a paradigm shift due to artificial intelligence and deep learning. This course will cover basic concepts of deep learning and convolutional neural networks for biomedical image analysis as well as current challenges and opportunities. The lectures will include fundamentals of classification, characterization, detection, segmentation and enhancement in biomedical images. Using a variety of different microscopy and pathology datasets the course will follow a ‘learning-by-doing’ model where each lecture will be accompanied by hand on training in using these methods in practice. The course assumes no prior knowledge of deep learning or image analysis.

**Course Notes:** Basic knowledge of python is recommended but not required.

**Course Head:** Faisal Mahmood, [FaisalMahmood@bwh.harvard.edu](mailto:FaisalMahmood@bwh.harvard.edu)

## **Genetics**

### **GENETIC 302QC Teaching 101: Bringing Effective Teaching Practices to your Classroom**

Saoirse McSharry, Bradley Coleman

2 units. Enrollment limited to 16. Instructor consent required.

Thurs., 8:30am – 10:30am (**Synchronous Live Sessions**)

**Meeting Dates:** Feb 4 – Mar 25

**Location:** Online information to be provided on course page or by instructor

A course for development of practical skills for effective teaching. Primary focus is hands-on experience with objective-oriented lesson planning and execution, with emphasis on active learning techniques and how they can be applied in both large and small enrollment classes.

**Course learning objectives:**

By the end of this course, participants will be able to:

- Describe strategies for cultivating course climates that are student-centered and inclusive
- Create assessments, in-class activities, and instructional methods that align with course objectives
- Facilitate discussions and other learning activities in small- and large-group contexts
- Collect and apply constructive feedback from students and colleagues to improve teaching effectiveness

**Class Note:** In addition to the live sessions, each week will require 1-2 hours of asynchronous classwork which may include written or recorded work to be submitted on Canvas prior to the live session.

**Recommend Prep:** This course is complementary to CELLBIO 306qc: Teaching 100, but neither course is a prerequisite for the other. Postdocs and other Harvard affiliates who are not current students may be allowed to audit as space allows. Please contact the instructors to request permission to audit.

**Course Heads:** Saoirse McSharry, [Saoirse\\_McSharry@hms.harvard.edu](mailto:Saoirse_McSharry@hms.harvard.edu), Bradley Coleman, [Bradley\\_Coleman@hms.harvard.edu](mailto:Bradley_Coleman@hms.harvard.edu)

## Human Biology & Translational Medicine

### **HBTM 305QC Molecular Bases of Eye Disease**

Darlene Dartt, Magali Saint-Geniez

2 units.

Mon, 3:00pm - 5:00p

**Meeting Dates:** Jan 25 – May 10

**Location:** Online information to be provided on course page or by instructor

This course provides an overview of the pathogenic processes of prevalent ocular diseases. The goals of the course are: (i) to explore the structural and functional aspects of the eye relevant to understanding its pathology, (ii) to review the manifestations of common eye diseases and their 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.

**Course Heads:** Darlene Dartt, [Darlene\\_Dartt@meei.harvard.edu](mailto:Darlene_Dartt@meei.harvard.edu), Magali Saint-Geniez, [Magali\\_Saintgeniez@MEEI.HARVARD.EDU](mailto:Magali_Saintgeniez@MEEI.HARVARD.EDU)

**Course Coordinator:** Kelly Williamson, [kelly\\_williamson@meei.harvard.edu](mailto:kelly_williamson@meei.harvard.edu)

## Immunology

### **IMMUN 301QC Autoimmunity**

Francisco Quintana

2 units.

Mon, 4:00p - 6:00p

**Meeting Dates:** Mar 1 – Apr 12

**Meeting Location:** Online information to be provided on course page or by instructor

This course will focus on basic immunological mechanisms of autoimmune diseases, with an emphasis on recent advances in the field. At each session, we will focus on a particular topic and discuss three important publications.

**Course Head:** Francisco Quintana, [franquin@broadinstitute.org](mailto:franquin@broadinstitute.org)

**Other Instructors:** Michael Wheeler, [mwheeler0@partners.org](mailto:mwheeler0@partners.org)

### **IMMUN 305QC Neuro-Immunology in Development, Regeneration & Disease**

Isaac Chiu, Beth Stevens, Jun Huh, Michael Carroll

2 units.

Wed, 1:00pm - 3:00pm

**Meeting Dates:** Mar 17 – May 5

**Meeting Location:** Online information to be provided on course page or by instructor

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.

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

**Course Heads:** Isaac Chiu, [isaac\\_chiu@hms.harvard.edu](mailto:isaac_chiu@hms.harvard.edu), Beth Stevens,

[beth.stevens@childrens.harvard.edu](mailto:beth.stevens@childrens.harvard.edu), Michael Carroll, [michael.carroll@childrens.harvard.edu](mailto:michael.carroll@childrens.harvard.edu), Jun Huh, [jun\\_huh@hms.harvard.edu](mailto:jun_huh@hms.harvard.edu)

**IMMUN 318QC Innate immunity and viral infection of the lung - coronaviruses, flu and lung superinfections**

Ivan Zanoni

2 units.

Tues., 11:00am – 12:30pm

**Meeting Dates:** Mar 23 – Apr 27**Meeting Location:** Online information to be provided on course page or by instructor

The course will focus on the innate immune response elicited in the lung in response to viral infections. Particular focus will be given to RNA viral infections such as coronaviruses and influenza viruses. The role of innate immune cells, interferons, and other immune mediators in resolving and/or aggravating the viral infection will be discussed. Also, how an initial response against the virus facilitates the development of secondary bacterial superinfections will be analyzed. Basic knowledge of immunology is expected in order to follow the content of this course.

**Course Heads:** Ivan Zanoni, [Ivan.Zanoni@childrens.harvard.edu](mailto:Ivan.Zanoni@childrens.harvard.edu)

## Medical Sciences

**MED-SCI 312QC Graduate TA Training in the Biomedical Sciences**

Bradley Coleman, Taralyn Tan, Mara Laslo

2 units. Enrollment limited to 50. Instructor consent required.

**Meeting Dates:** TBD**Meeting Location:** TBD

MED-SCI 312QC is designed to be an ‘on the ground’ training for Longwood-based teaching assistants. The course instructs graduate student teaching assistants in the pedagogy and course management skills required to be an effective TA. The course begins with three two-hour class sessions that focus on the basics of evidence-based teaching practice and practical strategies for working with students. As the semester progresses, students use their work as TAs as the basis for continued instruction and reflection on teaching best practices and the challenges of their application in real-world settings.

**Course Notes:** Open to any HILS graduate student serving as a Teaching Assistant, pending approval of the Curriculum Fellow working in their course (or by special arrangement approved by the Director of the Curriculum Fellows Program).

All students interested in registering for MED-SCI 312QC should also register for the Graduate TA Training in the Biomedical Sciences nanocourse. Any interested student may attend the first three

sessions of MED-SCI 312QC and receive nanocourse credit, regardless of whether they are a current TA.

**Course Director:** Bradley Coleman, [bradley\\_coleman@hms.harvard.edu](mailto:bradley_coleman@hms.harvard.edu)

### **MED-SCI 316QC PhD Pathfinder**

Joseph Arboleda, Jane Riccardi

M - F, 5:00pm - 7:00pm (with an additional hour afterwards for networking)

**Meeting Dates:** Mar 22 – Mar 26

**Meeting Location:** Online information to be provided on course page or by instructor

In this course, *PhD Pathfinder*, students will learn about the many career paths available to people with advanced degrees in biomedical research including academia, biotech, patent law, science writing/publishing, consulting/business, education, and science policy/regulation. Students will also learn how to find opportunities on and off campus to take the next step in their career plans.

A PhD education provides students with fundamental knowledge about the principles and practice of the scientific method and promotes development of problem-solving skills in ways that are quite useful for many different professions. Students will have the opportunity to learn from experienced professionals representing each of these paths, to learn about strategies for career development, curriculum enrichment, and networking opportunities that will make them competitive for their career of choice.

The course is open to all PhD students interested in learning about the range of career options available to biomedical PhDs. The course includes talks, didactic sessions, workshops and networking events to promote interactions between students and invited speakers. There will be a special emphasis on helping students with their own skill self-assessment to assist in career and professional development. After each session there will be a small networking reception for both the students and lecturers.

**Course Note:** Students are required to attend all five sessions for course credit.

**Course Co-Director:** Joseph Arboleda, [joseph\\_arboleda@meei.harvard.edu](mailto:joseph_arboleda@meei.harvard.edu)

**Course Manager:** Jane Riccardi, [jane\\_riccardi@hms.harvard.edu](mailto:jane_riccardi@hms.harvard.edu)

## **Microbiology & Immunobiology**

### **MICROBI 360QC The Human Microbiome: Comprehensive Experimental Design and Methodologies**

Aleksandar Kostic, Abigail Sloan Devlin



2 units. Enrollment limited to 15. Instructor consent required.

M/W, 1:00pm - 2:30pm

**Meeting Dates:** Jan 27 - Mar 15

**Meeting Location:** Online information to be provided on course page or by instructor

This is a comprehensive introduction to the study of human microbial communities and their functions relevant to human physiology. Topics covered include metagenomics, mechanistic interactions of the microbiome with metabolism, the immune system, and the gut-brain axis. Rather than lectures, this course is primarily a critical discussion of the literature

**Course Heads:** Aleksandar Kostic, [aleksandar.kostic@joslin.harvard.edu](mailto:aleksandar.kostic@joslin.harvard.edu), Sloan Devlin, [sloan\\_devlin@hms.harvard.edu](mailto:sloan_devlin@hms.harvard.edu)

## Neurobiology

### **NEUROBIO 320QC Neuroendocrine pathways: Brain, Hormones and Behavior**

Victor Navarro

2 units.

Thur., 1:30pm – 3:00pm

**Meeting Dates:** Feb 4 – Mar 25

**Meeting Location:** Online information to be provided on course page or by instructor

This course focuses on the study of the neuro-endocrine interactions that determine the organizational and functional effects of hormones in the brain throughout development. The course will address a) the role of hormones in the differentiation of the brain; b) the role of the brain in the maintenance of the body homeostasis through the regulation of the different endocrine axes; c) central control of sexual maturation (puberty); d) regulation of the hypothalamic neuronal networks by peripheral factors (e.g. metabolism, stress, environment, endocrine disruptors); e) effect of hormonal cues on behavior (interaction between amygdala and the hypothalamus); f) senescence of the neuroendocrine systems (e.g the hypothalamus after menopause). At the end of the course, the students will gain basic knowledge of the interactions between the brain and the endocrine system, which is essential for the full understanding of neurobiological processes

**Recommended Preparation:** Familiar with basic neurobiological concepts

**Course Head:** Victor Navarro, [VNAVARRO@BWH.HARVARD.EDU](mailto:VNAVARRO@BWH.HARVARD.EDU)