FALL 2026
HARVARD
DIVISION OF MEDICAL SCIENCES

Fall 2026
Full Term Courses

ENROLLMENT DEADLINES

Returning Student Crimson Carts Open	Mar 18
Returning Student (G2+) Reg. Opens	April 1
Returning Student (G2+) Reg. Closes	April 15
Check-In Opens (ALL students)	Aug. 17
Incoming Student (G1) Reg. Opens	Aug. 17
Incoming Student (G1) Reg. Closes	Aug. 28
ADD/DROP Period (ALL students)	Aug. 24 – Sept. 9
Check-in Deadline (ALL students)	Sept. 2
Full Term	Sept. 2 – Dec. 4

ACADEMIC CALENDAR

https://registrar.fas.harvard.edu/calendars#upcoming

REMINDERS

You **cannot register** for courses until all the holds have been lifted from your account. Information about registration holds and how to remove them can be found here: https://registrar.fas.harvard.edu/enrollment#holds.

Incoming Students: meet with your advisor or speak with your Program Admin regarding your course load so that advisors can lift the "Advising Hold" from your cart.

Check-In opens August 17
FAS Registrar Info: https://registrar.fas.harvard.edu/check-in
GSAS Info: https://gsas.harvard.edu/policy/check-and-registration-resident-students

Register for **16 credits is required** for full-time student status and health insurance eligibility **by the beginning of the term, Sept. 2**. Register by going to **https://my.harvard.edu/**

For questions, contact: **OGEPHD_Courses@hms.harvard.edu**

Revised 7/31/2026

BBS 230 Analysis of Biological Literature and Experimental Design
Davie Van Vactor, Mo Motamedi

BCMP 200 Principles of Molecular Biology
Joseph Loparo

BCMP 218 Molecular Medicine
Srinivas Viswanathan, Sagar Koduri

BCMP 230 Principles & Practice of Drug Development
Stan Neil Finkelstein, Peter Sorger

BMIF 201 Concepts in Genome Analysis
Shamil Sunyaev

BMIF 202 Artificial Intelligence in Medicine I
Arjun Manrai

BMIF 204 Foundations of Clinical Data and its Applications
Sebastian Schneeweiss

BMIF 302 AI in Medicine Clinical Experience II
Gabriel Brat

GENETIC 201 Principles of Genetics
Fred Winston, Maxwell Heiman

HBTM 201 Tumor Microenvironment and Immuno-Oncology: A Systems Biology Approach
Rakesh Jain, Lance Munn

HBTM 235 Principles of Human Disease: Physiology & Pathology
Jonathan Carlson, Miao Cui

IMMUN 201 Advanced Topics in Immunology
Thorsten Mempel, Dan Dwyer

IMMUN 301 Immunology Seminar
Shiv Pillai, Peter Sage

MICROBI 202 Mechanisms of Bacterial Pathogenesis & Host Immune Response
Marcia Goldberg, Amy Barczak, Sophie Helaine, Alex Kostic, Jacob Lemieux, Michael Starnbach, Deepali Ravel

NEUROBIO 215A The Discipline of Neuroscience
Mark Andermann

SHBT 261 Artificial Intelligence in Medicine
Mengyu Wang, Tobias Elze

VIROLOGY 200 Introduction to Virology
Aaron Schmidt, Benjamin Gewurz

VIROLOGY 202 Proposal Writing
Silvi Rouskin

Biological & Biomedical Sciences

BBS 230 Analysis of Biological Literature and Experimental Design

David Van Vactor, Mo Motamedi

4 units. Enrollment limited 60. Instructor consent required.

T/TH, 10:00am – 12:00pm
Meeting Dates: September 3 – December 3
Meeting Locations: Longwood campus - instructor to provide location

BBS 230 is a research skills core course required for all BBS first-year graduate students that is designed to build (a) familiarity with the scientific peer review process, (b) a deeper understanding of rigorous experimental design, data presentation, data analysis and data interpretation in the literature, and (c) increasing competency in applying effective experimental design principles to future project planning. Our training in literature analysis is comprised of two related components: (1) eight weekly seminar-style, small group paper discussions with pairs of Harvard faculty instructors that will focus on understanding, dissecting, and evaluating roughly a dozen seminal research papers; and (2) parallel weekly sections led by teaching fellows that focus on the process of peer review and revision of three scientific manuscripts. In separate sessions, you will engage groups of faculty authors or professional journal editors in panel discussions guided by your questions to explore the process of peer review and publishing from different perspectives. Then, in the last half of the course, you will plan and outline your own study design for a current or future project (e.g. current or future rotation), thus applying many of the elements that you have considered in the various section discussions.

Course Notes: BBS 230 is open for enrollment only to BBS and BIG students. This course is required for first-year BBS students.

Course Heads: David Van Vactor, davie_vanvactor@hms.harvard.edu, Mo Motamedi, mo_motamedi@hms.harvard.edu
Additional Instructors: TBD

Biological Chemistry & Molecular Pharmacology

BCMP 200 Principles of Molecular Biology

Joseph Loparo

4 units. Enrollment limited to 75. Instructor consent required.

M/W/F, 11:00am – 12:00pm
Meeting Dates: September 2 – December 4
Meeting Location: Longwood campus - instructor to provide location

Principles of Molecular Biology is a course organized around the Central Dogma of Biology with presentations covering fundamental aspects of DNA and RNA structure, their function, and their interactions with proteins. The course opens with a discussion of the physical and chemical properties that drive the interactions of proteins with nucleic acids. This is used as a basis for understanding the material presented in the subsequent six modules, which cover DNA replication, DNA repair, gene regulation, transcription, RNA processing, and translation. Throughout this course, an emphasis will be placed on how the structure of small molecular machines (proteins) define their function in the processes and pathways that are introduced.

Recommended Prep: Intended primarily for graduate students familiar with basic molecular biology or with strong biology/chemistry background.

Course Note: Enrollment for G1 and G2 students in graduate programs that require this course, such as BBS and BIG, is prioritized. Petitions will be reviewed, prioritized and approved primarily during August enrollment.

Course Head: Joseph Loparo, joseph_loparo@hms.harvard.edu
Other Instructors: Johannes Walter, Karen Adelman, Stirling Churchman, Frank Slack, Alan Brown

BCMP 218 Molecular Medicine

Srinivas Viswanathan, Sagar Koduri

4 units. Enrollment limited to 28. Instructor consent required.

T, 1:00pm - 3:00pm
Meeting Dates: September 2 – December 4
Meeting Location: Longwood campus - instructor to provide location

A seminar on various human diseases and their underlying genetic or biochemical bases. Primary scientific papers discussed. Lectures by faculty and seminars conducted by students, faculty supervision.

Course Notes: Faculty mentors will guide student-led discussions of the papers.
Prerequisites: College-level mastery of principles of cellular and molecular biology and genetics.

Course Head: Srinivas Viswanathan, Srinivas.viswanathan@dfci.harvard.edu, Sagar Koduri, VKODURI1@mgh.harvard.edu

BCMP 230 Principles & Practice of Drug Development

Stan Neil Finkelstein, Peter Sorger

4 units

W, 3:00pm - 6:00pm
Meeting Dates: September 3 – December 10
Meeting Location: MIT Building 4, Room 237

Introduction to and critical assessment of the concepts, technologies and practical challenges of developing new medicines and bringing them to market. Pharmacology fundamentals, preclinical drug discovery, clinical trials, manufacturing and regulatory issues, as well as financing and marketing are discussed for small molecule, biologic and cellular therapies.

Course Notes: Suitable for individuals with a wide variety of backgrounds and interests from biology to engineering, business and medicine (undergraduate, graduates in MBA, MD and PhD programs). Taught by MIT and HMS faculty and by industry experts. Emphasizes a high level of student engagement via weekly news updates and projects involving collaboration across interdisciplinary teams.

Prerequisites: No particular course is required. Knowledge of basic biology, biomedicine or bioengineering, and familiarity with basic economic principles will be helpful but not necessary for the course.
Website: https://www.principlespracticedrugdevelopment.org/

Course Heads: Stan Finkelstein, finkelst@hcp.med.harvard.edu, Peter Sorger, peter_sorger@hms.harvard.edu
Other Instructors: Ariel Stern, GK Raju, Eliott Antman and leading industry experts

Biomedical Informatics

BMIF 201 Concepts in Genome Analysis

Shamil Sunyaev

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

M/W, 2:30pm - 4:00pm
M, 4:00pm – 5:00pm (discussion component)
Meeting Dates: September 2 – December 2
Meeting Location: Longwood campus - instructor to provide location

This course focuses on quantitative aspects of genetics and genomics, including computational and statistical methods of genomic analysis. We will introduce basic concepts and discuss recent progress in population and evolutionary genetics and cover principles of statistical genetics of Mendelian and complex traits. We will then introduce current genomic technologies and key algorithms in computational biology and bioinformatics. We will discuss applications of these algorithms to genome annotation and analysis of epigenomics, cancer genomics and metagenomics data. Proficiency in programming and basic knowledge of genetics and statistics will be assumed.

Course Note: This course includes a discussion component on Mondays, from 4:00pm-5:00pm. Any additional details about this component will be provided by the course faculty.

Course Head: Shamil Sunyaev, ssunyaev@hms.harvard.edu
Other Instructors: Heng Li, Heng_Li@hms.harvard.edu, Cheng-Zhong Zhang, cheng-zhong_zhang@dfci.harvard.edu, Luke J O'Connor, loconnor@hms.harvard.edu

BMIF 202 Artificial Intelligence in Medicine I

Arjun Manrai

4 units. Enrollment limited to 12. Instructor consent required.

W, 2:00pm – 5:00pm
Meeting Dates: September 9 – December 2
Meeting Location: Longwood campus - instructor to provide location

AI in Medicine I is a graduate-level seminar course at Harvard Medical School that explores the rapidly-growing applications of artificial intelligence in medicine. The goal of this course is to equip students with the skills to appraise both the clinical relevance and methodological novelty of scholarship at the intersection of artificial intelligence and medicine. This discussion-oriented course promotes active engagement through student-led presentations of seminal papers spanning multiple decades, from early efforts to apply decision analysis and rule-based systems to the powerful deep learning and generative AI models being deployed in medicine today. Students will engage with faculty at HMS and the HMS-affiliated hospitals, editors at leading general medical and medical AI journals, and clinicians driving change at the point of care. Our aim is to bridge the gap between the technical aspects of artificial intelligence and its impact on medicine.

Course Note: Course enrollment is capped at 12 students and requires instructor permission.

Course Head: Arjun Manrai, Arjun_Manrai@hms.harvard.edu
Other Instructors: Chirag Patel Chirag_Patel@hms.harvard.edu; Isaac Kohane Isaac_Kohane@hms.harvard.edu

BMIF 204 Foundations of Clinical Data and its Applications

Sebastian Schneeweiss

4 units. Instructor consent required.

T, 1:00pm – 4:00pm (lecture)
F, 10:00am – 11:00am (labs)

Meeting Dates: September 4 – December 4
Meeting Location: Longwood – instructor to provide location

Foundations of Clinical Data and Its Applications is a hands-on course exploring how clinical data drives healthcare and bioinformatics. Students study data sources (EHRs, claims, ICU records), interoperability standards (HL7/FHIR), and data engineering (normalization, validation, storage). Core topics include disease and treatment-outcome prediction, causal inference and target-trial emulation, and real-world evidence generation. The course addresses high-dimensional data, time-related biases, temporal drift, and regulatory/ethical issues such as privacy, fairness, and historical bias. Through team labs using real EHR and claims data, students gain practical skills in preprocessing, feature selection, longitudinal analysis, causal study design, and communicating ethical implications—preparing them to design robust, data-driven solutions for clinical challenges.

Course Note: Enrollment limited to PhD students in the Biomedical Informatics – AI in Medicine track

Course Head: Sebastian Schneeweiss, sschneew@hsph.harvard.edu

BMIF 302 AI in Medicine Clinical Experience II

Gabriel Brat

4 units. Instructor consent required.

F, 2:00pm – 5:00pm
Meeting Dates: September 4 – November 20
Meeting Location: Longwood – instructor to provide location

AI in Medicine Clinical Experience II (ACE II) is a graduate-level seminar course that builds on the foundation established in BMIF 301- ACE I. This course deepens students' understanding of healthcare data by expanding their clinical shadowing to a specialty of their choice and exposing them to the broader hospital data ecosystem. Students will shadow physicians in specialized fields and will engage with non-clinical professionals—including nurses, medical coders, billers, IT specialists, and data managers—to explore how hospital data is generated, stored, processed, and utilized in decision-making and AI applications. By the end of the course, students will gain a holistic understanding of healthcare data pipelines, from bedside patient interactions to backend data processing systems, critical for AI research in medicine.

Recommended Preparation: Successful completion of BMIF 301 is recommended before taking this course. Exceptions will be made based on instructor consent.

Course Note: Enrollment limited to PhD students in the Biomedical Informatics – AI in Medicine track

Course Head: Gabriel Brat, Gabriel_Brat@hms.harvard.edu

Genetics

GENETIC 201 Principles of Genetics

Fred Winston, Maxwell Heiman

4 units

M/W/F, 9:10am – 10:40am
Meeting Dates: September 2 – December 4 (Final Date December 11)
Meeting Location: Longwood campus - instructor to provide location

An in-depth survey of genetics that covers basic principles and modern approaches. We will draw on examples from various systems, including bacteria, yeast, *Drosophila, C. elegans*, zebrafish, mouse, and human.

Course Notes: Intended for first-year graduate students.

Course Heads: Fred Winston, winston@genetics.med.harvard.edu, Max Heiman, heiman@genetics.med.harvard.edu
Other Instructors: Thomas Bernhardt, Jenna L. Galloway, Matthew L. Warman

Human Biology & Translational Medicine

HBTM 201 Tumor Microenvironment and Immuno-Oncology: A Systems Biology Approach

Rakesh Jain, Lance Munn

4 units

M, 5:00pm - 7:00pm
Meeting Dates: September 14 – December 7
Meeting Location: MIT E25-111

Provides theoretical background to analyze and synthesize the most up-to-date findings from both laboratory and clinical investigations into solid tumor pathophysiology. Covers different topics centered on the critical role that the tumor microenvironment plays in the growth, invasion, metastasis and treatment of solid tumors. Develops a systems-level, quantitative understanding of angiogenesis, extracellular matrix, metastatic process, delivery of drugs and immune cells, and response to conventional and novel therapies, including immunotherapies. Discussions provide critical comments on the challenges and the future opportunities in research on cancer and in establishment of novel therapeutic approaches and biomarkers to guide treatment.

Course Notes: Given in alternate years. This course is taught as course in consort with HST.525J/10.548J at the Massachusetts Institute of Technology.

Course Heads: Rakesh Jain, rjain@mgh.harvard.edu Lance Munn, lmunn@mgh.harvard.edu

HBTM 235 Principles of Human Disease: Physiology & Pathology

Jonathan Carlson, Miao Cui

4 units. Enrollment limited to 32. Instructor consent required.

M/W/F, 9:00am – 10:30am
Breakdown (subject to change): M/F – lectures, W – tutorials
Meeting Dates: September 2 – December 4

Meeting Location:
Lectures: Veritas Science Ctr. 350
Tutorials: Longwood campus - instructor to provide location

This course covers the normal physiology and pathophysiology of selected organs, through lectures, readings, tutorials based on clinical cases, and patient presentations. Human biology is emphasized, with some examples also drawn from model organisms. Using a combination of lectures and case-based small group tutorials, the course will survey key areas of human physiology: covering the cardiovascular, pulmonary, renal, and gastrointestinal systems, as well as neurobiology, endocrinology, cancer and immunology. Molecular and cellular approaches to drug discovery and therapeutics will also be presented where appropriate, with a particular emphasis on the current state-of-the-art in our scientific and clinical understanding, including stem cell engineering, gene therapy/gene editing, and chemical biology.

Course Note: Course enrollment is open to graduate students from any program as well as undergraduates.
Prerequisites: Knowledge of introductory biochemistry, molecular biology, and cell biology required (MCB52 and MCB54 or equivalent for undergraduates).

Course Head: Jonathan Carlson, Carlson.Jonathan@mgh.harvard.edu, Miao Cui, Miao.Cui@childrens.harvard.edu

Immunology

IMMUN 201 Advanced Topics in Immunology

Thorsten Mempel, Dan Dwyer

4 units. Enrollment limited to 40. Instructor consent required

T/Th, 1:30pm – 4:00pm
Meeting Dates: September 2 – December 4
Meeting Location: Longwood campus - instructor to provide location

This course provides an intensive and in-depth examination of a selection of fundamental concepts in immunology. It takes advantage of the unique expertise of members of our

Immunology faculty to illustrate how these concepts have been established and continue to be developed based on seminal work in the field including contributions from their own laboratories.

Course Notes: Intended for students who have had prior exposure to immunology on the undergraduate level. In the absence of such exposure, students must obtain the permission of the Course Director.

Prerequisites: A background in genetics and biochemistry is strongly recommended.

Course Heads: Thorsten Mempel, tmempel@mgh.harvard.edu, Dan Dwyer, dfdwyer@bwh.harvard.edu
Other Instructors: Jonathan Kagan, Nir Hacohen, Amy Wagers, Frederick Alt, Kai Wucherpfennig, Facundo Batista, Michael Carroll, Ulrich von Andrian, Arlene Sharpe, Andrew Luster, Judy Lieberman, Wilfredo Garcia-Beltran, Vijay Kuchroo, Duane Wesemann

IMMUN 301 Immunology Seminar

Shiv Pillai, Peter Sage

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

W.
Speaker Meet and Greet: 12:00pm - 1:00pm
Discussion Class: 2:00pm - 3:30pm
301 Seminars: 4:00pm – 5:15pm
Reception: 5:15pm – 6:15pm
Meeting Dates: September 2 – December 3

Meeting Location:
Meet and Greet/Discussion Class: Longwood campus - instructor to provide location
301 Seminars: Longwood campus - instructor to provide location

Gives students exposure to research topics in immunology. Students prepare for the weekly seminar through readings, discussions, and preparing brief write-ups. These discussions are facilitated by members of the Committee on Immunology.

Course Note: Required for, and limited to, first-year Immunology graduate students. All others will be evaluated for enrollment on a case-by-case basis. Attendance is required at both the

speaker Meet and Greets and the seminars. Meet and Greet timing can be found in class notes in my.harvard.

Course Heads: Shiv Pillai, pillai@helix.mgh.harvard.edu, Peter Sage, peter_sage@hms.harvard.edu

Microbiology & Immunobiology

MICROBI 202 Mechanisms of Bacterial Pathogenesis & Host Immune Response

Marcia Goldberg, Amy Barczak, Sophie Helaine, Alex Kostic, Jacob Lemieux, Michael Starnbach, Deepali Ravel

4 units. Enrollment limited to 25. Instructor consent required.

T/ Th, 3:00pm – 5:00pm
Meeting Dates: September 3 – December 3
Meeting Location: Longwood campus – Veritas Science Ctr (formerly NRB), Room 833

This course focuses on molecular mechanisms of bacterial pathogenesis and the host response to infection. The class consists of lectures and group discussions emphasizing themes of pathogenesis, methods, results, and interpretations of classic and contemporary literature.

Subjects including bacterial secretion systems, mechanisms of entry into host cells, biofilm formation, and motility are viewed primarily from the pathogen's perspective, whereas topics including inflammasome activation, TLR signaling, and adaptive immune responses provide a host-centric view. Additional sessions are spent examining current methods of antibiotic discovery, vaccine development, and the microbiome.

The course also introduces students to the wide diversity of pathogenic bacteria. Organisms discussed include pathogenic *E. coli, Shigella species, Vibrio cholerae, Listeria monocytogenes, Chlamydia trachomatis, Pseudomonas aeruginosa* and *Staphylococcus aureus*, as well as a discussion of the challenges presented by currently unculturable species. Where relevant, connections will also be made with pathogenesis and immune responses to viruses, parasites, and fungi.

Course Notes: Designed to complement Microbiology 201; however, students who have not taken Microbiology 201 previously are welcome. Designed for graduate students in their first year or beyond, however undergraduates with specific interest in the field may also enroll.

Course Head: Marcia Goldberg, marcia.goldberg@mgh.harvard.edu
Other Instructors: Amy Barczak, Sophie Helaine, Alex Kostic, Jacob Lemieux, Michael Starnbach, Deepali Ravel

Neurobiology

NEUROBIO 215A The Discipline of Neuroscience

Mark Andermann

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

T/Th, 9:00am – 12:00pm
Meeting Dates: September 3 – December 3
Meeting Location: WAB 236

This course will endow students with the broad conceptual fluency in the discipline of neuroscience required to relate genes to circuit function, metabolism to neurological disease, and cell biology to neural computations. Through a combination of asynchronous instructional materials and synchronous in-class activities, students will learn to design, quantitatively analyze, and interpret experiments that address a variety of questions spanning molecular to systems neuroscience. During the first semester, students will think critically about the fundamental units of the nervous system within the context of cellular function, electrical conduction, and chemical signaling. The second half of the course builds upon this foundation to focus on broadly defined “networks of neural function”; as related to coordinated neural activity, the concerted execution of genetic programs, and anatomically defined structural networks. The course culminates with students writing an experimental proposal. Part one of a two-part series. The curriculum for this course builds throughout the academic year. Students are strongly encouraged to enroll in both the fall and spring course within the same academic year.

Course Notes: Please note that Program in Neuroscience (PiN) students must take both semesters to fulfill the requirement. Non-PiN students may enroll in just the fall semester with instructor approval. Students must complete the fall semester (NB215A) to enroll in the spring semester (NB215B).

Course Head: Mark Andermann, manderma@bidmc.harvard.edu
Other Instructors: TBD

Speech & Hearing Bioscience and Technology

SHBT 261 Artificial Intelligence in Medicine

Mengyu Wang, Tobias Elze

4 units

T., 1:00pm – 3:30pm
Meeting Dates: September 8 – December 1
Meeting Location: Longwood campus – instructor to provide location

This course will serve as an introduction to artificial intelligence (AI), with an emphasis on its applications in medicine. It will begin with classical linear and nonlinear regression models, then progress to traditional machine learning methods, including matrix decomposition techniques, random forests, support vector machines, and multilayer perceptron-based neural networks. The course will then cover key AI topics, including convolutional neural networks, explainable AI, self-supervised foundation models, generative AI for computer vision, recurrent neural networks and transformers, multimodal large language models, and techniques for visual segmentation, understanding, and grounding. Finally, there will be three special sessions covering: (1) learning with limited data and trustworthy AI; (2) AI for science, genomics, and proteomics; (3) AI for robotics and self-driving: 4D spatial intelligence, Gaussian splatting, and world models. Course assignments will include two coding mini-projects and one final coding project.

Course Notes: Students should be familiar with Python. The course will include a discussion component, with additional details to be provided by the course faculty.

Course Heads: Mengyu Wang, Mengyu_Wang@meei.harvard.edu, Tobias Elze, Tobias_Elze@MEEI.HARVARD.EDU
Other Instructors: Jie Yang, Mohammad Eslami, Yan Luo, Minghan Li, Kaichen Zhou, Mousa Moradi, Jooyang Chang, Rubbert Struyven, and Milen Raytchev

Virology

VIROLOGY 200 Introduction to Virology

Aaron Schmidt, Benjamin Gewurz

4 units. Enrollment limited to 20. Instructor consent required.

M/W, 1:45pm - 3:45pm
Meeting Dates: September 9 – December 4
Meeting Location: Longwood campus - instructor to provide location

Introduction to virology. The lecture component reviews the basic principles of virology and introduces the major groups of human viruses. Weekly discussion groups critically analyze selected papers from the literature.

Course Notes: There will be final projects consisting of proposals based on laboratory rotations.
Course Website: http://www.courses.fas.harvard.edu/6075
Prerequisites: Current Virology PhD student, or upon special consent

Course Heads: Aaron Schmidt, aaron_schmidt@hms.harvard.edu; Benjamin Gewurz, bgewurz@bwh.harvard.edu

VIROLOGY 202 Proposal Writing

Silvi Rouskin

4 units. Enrollment limited to 12. Instructor consent required.

T, 1:00pm – 3:00pm
Meeting Dates and Times: September 8 – November 3
Meeting Location: Longwood campus - instructor to provide location

Students will write, present, and evaluate research proposals in the areas of virus replication, viral pathogenesis and treatment and prevention of viral infections.

Prerequisites: General background in biochemistry and virology.

Course Head: Silvi Rouskin, silvi@hms.harvard.edu
Additional Instructors: Sizun Jiang, sjiang@fas.harvard.edu, Michael Farzan, michael.farzan@childrens.harvard.edu, Alan Engelman, alan_engelman@dfci.harvard.edu, Shira Weingarten-Gabbay, Shira_weingarten@hms.harvard.edu