WELCOME TO THE

Sophomore Open House
April 4, 2019
We are a diverse group of undergraduate and graduate students, postdoctoral fellows, and faculty who are united in our desire to understand the biology of life at the level of molecules, cells, and animals.

Each year ~55 sophomores sign into the Molecular Biology department.
Our interests are broad

- Biochemistry
- Biophysics
- Cancer
- Cell Biology
- Chemical Biology
- Computation & Modeling
- Development
- Evolution
- Genetics
- Genomics
- Global Health
- Microbiology & Virology
- Neurobiology
- Structural Biology
Information about the undergraduate program
http://molbio.princeton.edu/
Specific information about the major

Molecular Biology Major

The Molecular Biology major is one of the larger concentrations at Princeton, with 60 to 70 sophomores joining the department each spring. Our introductory Cell and Molecular Biology courses, together with courses in chemistry, physics, and statistics, prepare students for three upper level core courses covering fundamentals of modern experimental biology – genetics, biochemistry, and cell and developmental biology – and an intensive project laboratory course. A diverse set of elective courses allow students to delve into more specialized topics like immunology, cancer biology, genomics, and drug discovery. Students with interdisciplinary interests can combine the Molecular Biology major with certificates such as biophysics, neuroscience, global health and health policy, and quantitative and computational biology.

From classes you will learn how science is applied in research and medical advancements. In the junior and senior independent work, you will solidify your skills and apply them first hand by performing your own original research. During the junior year, you will learn to critically analyze the research literature and formulate a detailed research plan in preparation for embarking on your senior thesis. Many students choose a hands-on laboratory experience for their senior thesis research, although non-laboratory projects are also possible. A unique program for rising seniors to conduct laboratory thesis research during the summer maximizes the educational experience of our majors.
Required curriculum

Prerequisites

• MOL 214 Introduction to Cellular and Molecular Biology
  OR
  MOL 215 Quantitative Principles in Cell and Molecular Biology
  (must be taken at Princeton and completed with a grade of C or better)

• CHM 201/207 and CHM 202 General Chemistry
  (can be fulfilled with Chemistry AP credit or an approved course at another institution)

General requirements:

• Organic Chemistry  CHM 301/303 & 302/304/304B or CHM 337 or ISC 335

• Quantitative  SML 201 (recommended), or ORF 245 and either COS 126 (recommended),
  or MAT 103 (without AP credit), or a higher level math course (with AP credit)

• Physics  PHY 108 (recommended), or PHY 103 & 104, or PHY 101 & 102

All prerequisite, required or departmental courses must be taken for a letter grade (no P/D/F).
Departmental core courses

The following core courses are required and except under very special circumstances, must be taken before senior year:

- MOL 342 *Genetics*
- MOL 345 *Biochemistry* (fall or spring, can be taken with CHM 304/304B)
- MOL 348 *Cell & Developmental Biology* (recommended sophomore year)
- MOL 350 *Laboratory in Molecular Biology*

Sample schedules: [http://molbio.princeton.edu/undergraduate/major/typical-paths](http://molbio.princeton.edu/undergraduate/major/typical-paths)
At least eight departmentals are required.

In addition to the four departmental core courses (MOL 342, 345, 348, 350), students must take at least one 300, 400, or 500-level course with MOL as the primary listing.

The remaining three departmental courses can be chosen from among all 300-or-higher-level MOL, MOL-crosslisted, or other approved courses. Only Princeton courses count as departmentals; there are no exceptions to this rule.

CHM 301/303 & 302/304/304B can count toward the total.
Many options for upper level study

Upper level courses cover a wide variety of topics and research areas. Some examples are:

- MOL 340 Molecular and Cellular Immunology
- MOL 380 Modern Microbiology
- MOL 423 Molecular Basis of Cancer
- MOL 415 Modern Biophysics and Systems Biology NEW
- MOL 425/WWS 425 Infection: Biology, Burden, Policy
- MOL 431 Regulatory Mechanisms in Development
- MOL 433 Biotechnology
- MOL 459 Viruses: Strategy and Tactics
- MOL 460 Diseases in Children: Causes, Costs, Choice
- MOL 475 Light Microscopy and Biological Imaging
- EEB 327/MOL 327 Immune Systems: Molecules to Populations
- ISC 326/MOL 326 Human Genomics: The Past, Present and Future of the Human Genome
- QCB 455/MOL 455 Genomics and Computational Molecular Biology
- QCB 490/MOL 490 Molecular Mechanisms of Longevity
- NEU 408/MOL 408 Cellular and Systems Neuroscience
- NEU 437/MOL 437 Computational Neuroscience

Many upper-level math and science courses in other departments are approved as departmentals:
http://molbio.princeton.edu/undergraduate/major/departmentals
Molecular Biology majors can combine different but related disciplines in course work and in at least part of the independent work. Requirements for relevant certificate programs can be found at:

**Biophysics:** [http://www.princeton.edu/ua/departmentsprograms/bph/](http://www.princeton.edu/ua/departmentsprograms/bph/)

**Engineering Biology:** [http://www.princeton.edu/engbio/](http://www.princeton.edu/engbio/)

**Global Health and Public Policy:** [http://www.princeton.edu/ghp/](http://www.princeton.edu/ghp/)


**Quantitative and Computational Biology:** [http://www.princeton.edu/integratedscience/certificate/](http://www.princeton.edu/integratedscience/certificate/)
Research and independent work: Junior year

Fall semester:

Students participate in small group tutorials with postdoctoral instructors, read original research papers, and prepare two short papers on assigned topics.

Spring semester:

Students carry out independent research with a faculty advisor with whom they will do their senior thesis. This may include experimental work. A written grant proposal on the senior thesis topic constitutes the JP.

http://molbio.princeton.edu/undergraduate/research
Students perform original research and write a formal thesis in either of two settings:

Experimental (laboratory) thesis research – Student works independently but under supervision to plan and conduct experiments to advance scientific knowledge. Students learn to analyze and interpret critically the results of experiments, to use their results to guide subsequent experiments, and to integrate knowledge from various sources.

Non-laboratory thesis research – similarly, hypotheses are examined by original research. Original research does not merely consist of a literature review. Rather, students are expected to analyse new or existing data in order to test their hypotheses. Sources of data could include (but are not limited to): online databases chosen in consultation with the thesis adviser, existing experimental data perhaps from the adviser's lab, or new student-initiated surveys or ethnographic studies.
Learn about faculty research programs
http://molbio.princeton.edu/faculty

Mol Bio Faculty
http://molbio.princeton.edu/faculty/molbio-faculty

Mol Bio Associated Faculty
http://molbio.princeton.edu/faculty/associated-faculty

Note that Associated Faculty may not have space for Mol Bio students

Other Princeton Faculty
With permission of DUS

Also see individual faculty websites

and many more......
Summer research program
For seniors doing lab-based thesis research

9-week summer program that includes:

- Research
- Faculty seminars
- Discussion groups

The program culminates in a poster session where students present their research to faculty and other students.

Students receive a stipend for living expenses.
Examples of what recent grads have done in science and beyond:

**Full-Time Employment**
Clinical Research Associate - OpenBiome, Massachusetts
Research Technician - Memorial Sloan-Kettering, NYC
Teacher - Teach For America, Oakland, CA
Finance Associate - Amgen, California

**1-2 Year Post-Grad Options**
Research Fellow - National Institute of Health, Framingham, MA
Research Fulbright - Spain
Teacher (Princeton in Africa) - Project Mercy, Ethiopia
Clinical Research Intern (Princeton Project 55) - UCSF Breast Care Center

**Graduate and Professional School**
M.Phil., Neuroscience - University of Cambridge
M.D. - Johns Hopkins University
M.D./Ph.D. - University of Pennsylvania
Ph.D., Linguistics - Cornell University
Process for declaring the Molecular Biology concentration

Two steps - can be done in either order:

1) Declare Molecular Biology as your concentration in Tigerhub

2) Fill out online form using link posted on the Molecular Biology Undergraduate website:

[link]

After you submit the form, you will receive an email from Katie Pyott assigning you to a Departmental Representative.

This person will be your academic adviser until you graduate. You will meet with your Dep Rep in advance of each semester for course selection and as needed for other course-related issues.
Make an appointment with your assigned Departmental Representative

Dr. Rebecca Burdine
433 Moffett Lab, 8-7515
rburdine@princeton.edu

Dr. Fred Hughson
215 Schultz Lab, 8-4982
hughson@princeton.edu

Dr. Tom Silhavy
310 Lewis Thomas Lab, 8-5899
tsilhavy@princeton.edu

Dr. Jared Toettcher
140 Lewis Thomas Lab, 8-8466
toettcher@princeton.edu

Use WASE to make appointment
Bring worksheets, course summaries…
Additional contact information

Administration

Ms. Katie Pyott
Undergraduate Program Administrator
119 Lewis Thomas Lab, 8-2803
kpyott@princeton.edu

Director of Undergraduate Studies

Dr. Liz Gavis
416 Schultz Lab, 8-3857
gavis@princeton.edu

Department Chair

Dr. Bonnie Bassler
329 Lewis Thomas Lab, 8-2857
bbassler@princeton.edu

Health Professions Advising

Ms. Kate Fukawa-Connelly
36 University Place, 8-3144
katef@princeton.edu

Study Abroad Advisor

Dr. Fred Hughson
215 Schultz Lab, 8-4982
hughson@princeton.edu

Advisor for Fall Junior Independent Work & Graduate School Advisor

Dr. Tom Silhavy
310 Lewis Thomas Lab, 8-5899
tsilhavy@princeton.edu

Medical Career Advisor

Dr. Dan Notterman
205 Lewis Thomas Lab, 8-2933
dan1@princeton.edu
The Undergraduate Student Committee

• Liaison between MOL majors and the faculty

• Meets ~2x/semester with the Director of Undergraduate Studies to discuss student concerns regarding courses, professors, TAs, workloads, etc.

• Assists with the Freshman Expo, Princeton Preview, and other events