

## SCHOOL OF SCIENCE

The School of Science (<http://science.mit.edu>) is an amazing enterprise with approximately 275 faculty members, 1,200 graduate students, 800 undergraduate majors, and comparable numbers of postdoctoral researchers and research staff, the school is large enough to carry out research at the frontiers in every field of science. Our faculty members have won 16 Nobel Prizes and our alumni have won another 16, most of which have been awarded in the past 20 years. The six departments in the school are consistently rated among the best in the world.

The School of Science is a prolific generator of new knowledge. Some members of our community study deep philosophical questions: What is the nature of dark matter and dark energy, which make up 95% of the content of our universe? How does our brain, a complex system of interconnected neurons, give rise to our mind—our consciousness and ability to learn? Other faculty members study problems that have obvious practical implications: How does global warming increase the intensity of hurricanes? Can we make adult stem cells capable of generating any cells in the body, replacing cells damaged by disease without using embryos?

However, the deep commitment to education found in the School of Science makes MIT unique among the great research universities. MIT provides each of its undergraduates with an understanding of the basic elements of biology, chemistry, mathematics, and physics, and our Science faculty are devoted to doing this well. Some of our most famous faculty members, even a few with Nobel Prizes, are some of the best teachers of our first-year undergraduate subjects.

Our science majors are given the very best introduction to their chosen fields and the opportunity to participate in leading-edge research. Whether our undergrads choose to start careers in the private or public sector or go on to graduate studies in science or a professional school in an area such as medicine, law, business, or engineering, they will be superbly prepared for their careers after MIT.

Many of our graduate students have pursued distinguished careers in research and education; however, others enjoy equally satisfying careers in business, industry, and government. Often combining their PhD degrees in science with medical, law, or business degrees, our graduate students are uniquely capable of making creative contributions to the modern world.

### History

Science has been at the core of an MIT education since the Institute's founding in 1861 by the distinguished natural scientist, William Barton Rogers. The earliest offerings in chemistry, geology, and general science were expanded to include physics, mathematics, and biology, and then consolidated as the School of Science under the leadership of Karl Taylor Compton in 1932. During Compton's tenure

and into the postwar years, the Institute saw vast growth in the physical sciences as federal funding for basic research increased.

In 1969, the Geology Department became the Department of Earth and Planetary Sciences, and when it merged with the Department of Meteorology and Physical Oceanography in 1983, it evolved into the present-day Department of Earth, Atmospheric and Planetary Sciences.

As the life sciences attained new prominence in the 1970s and 1980s, the Department of Biology grew with the additions of the Center for Cancer Research (now the Koch Institute for Integrative Cancer Research) and the Whitehead Institute for Biomedical Research. In 1994, the Department of Brain and Cognitive Sciences (BCS) moved from the Whitaker College of Health Sciences and Technology to the School of Science. More recently, BCS was expanded by the creation of the McGovern Institute for Brain Research and the Picower Institute for Learning and Memory, broadening the school-wide resources for research in the neurosciences.

### Science Laboratories and Centers

Much of our research in science is carried out in large research laboratories and centers like the Whitehead and Picower institutes, where the kinds of facilities necessary for research are available and collaboration among research groups is encouraged. Laboratories and centers with strong participation by school members include:

- Broad Institute of MIT and Harvard (<http://catalog.mit.edu/mit/research/broad-institute>)
- Center for Global Change Science (<http://catalog.mit.edu/mit/research/center-global-change-science>)
- Koch Institute for Integrative Cancer Research (<http://catalog.mit.edu/mit/research/koch-institute-integrative-cancer-research>)
- Laboratory for Nuclear Science (<http://catalog.mit.edu/mit/research/laboratory-nuclear-science>)
- McGovern Institute for Brain Research (<http://catalog.mit.edu/mit/research/mcgovern-institute-brain-research>)
- MIT Kavli Institute for Astrophysics and Space Research (<http://catalog.mit.edu/mit/research/mit-kavli-institute-astrophysics-space-research>)
- The Picower Institute for Learning and Memory (<http://catalog.mit.edu/mit/research/picower-institute-learning-memory>)
- Research Laboratory for Electronics (<http://catalog.mit.edu/mit/research/research-laboratory-electronics>)
- Simons Center for the Social Brain (<http://catalog.mit.edu/mit/research/simons-center-social-brain>)
- Whitehead Institute for Biomedical Research (<http://catalog.mit.edu/mit/research/whitehead-institute-biomedical-research>)

## Interdepartmental Educational Programs

MIT is exceptional among major research institutions for its dedication to undergraduate education. Committed to providing undergraduates with a strong science base for studies in their major, the school and its departments participate in and support a variety of programs designed to create more active, student-centered learning environments inside the classroom. For instance, the Undergraduate Research-Inspired Experimental Chemistry Alternatives curriculum integrates cutting-edge research with core chemistry concepts.

Over the past several years, the School of Science has expanded educational and training opportunities for graduate students as well, collaborating with the School of Engineering to create innovative graduate programs in fields in which MIT shows great strength. These programs allow MIT to attract the most talented students in their respective fields and to build cross-disciplinary connections among the Institute's faculty members, departments, and schools.

- **Biophysics** (<http://biophysics.mit.edu>). Students in the Biophysics program are trained to work at the intersection of the physical sciences, engineering, and the biology of molecules, cells, and systems. Students participate in MIT's biophysics research, ranging from molecular-level spectroscopy and imaging to cell and population-level systems biology.
- **Computational and Systems Biology** (<https://csbphd.mit.edu/welcome-mit-computational-and-systems-biology-phd-program-csb>). Students analyze complex biological phenomena with molecular detail to pursue applications in medicine and biotechnology.
- **Microbiology** (<http://web.mit.edu/microbiology>). With access to a vibrant community of more than 50 faculty members across several departments and divisions, Microbiology students receive broad training and in-depth research experience in modern microbial research and engineering.
- **Molecular and Cellular Neuroscience** (<https://mcn.mit.edu>). MCN students work at the forefront of molecular and cellular neuroscience research, with access to a distinguished research community as it strives to understand the biological basis of brain function and neurological disease.
- **Statistics** (<https://stat.mit.edu/academics/idps>). Students in the interdisciplinary doctoral program in statistics use concepts of computation and data analysis, as well as elements of classical statistics and probability, for applications in aeronautics, astronautics, brain and cognitive sciences, economics, mathematics, political science, and social and engineering systems.

## Degrees Offered in the School of Science

### **Biology (Course 7)**

|     |   |
|-----|---|
| SB  | Biology   |
| PhD | Biology   |
| PhD | Biochemistry  |
| PhD | Biological Oceanography (jointly offered with WHOI) |
| PhD | Biophysical Chemistry and Molecular Structure       |
| PhD | Cell Biology  |
| PhD | Computational and Systems Biology                   |
| PhD | Developmental Biology                               |
| PhD | Genetics  |
| PhD | Immunology  |
| PhD | Microbiology  |
| PhD | Molecular Biology                                   |
| PhD | Neurobiology  |

### **Brain and Cognitive Sciences (Course 9)**

|     |   |
|-----|---|
| SB  | Brain and Cognitive Sciences                  |
| PhD | Cognitive Science                             |
| PhD | Cognitive Science and Statistics <sup>1</sup> |
| PhD | Neuroscience                                  |
| PhD | Neuroscience and Statistics <sup>1</sup>      |

### **Chemistry (Course 5)**

|          |           |
|----------|-----------|
| SB       | Chemistry |
| PhD, ScD | Chemistry |

### **Chemistry and Biology (Course 5-7)**

|    |                                    |
|----|------------------------------------|
| SB | Chemistry and Biology <sup>1</sup> |
|----|------------------------------------|

### **Climate System Science and Engineering (Course 1-12)**

|    |   |
|----|---|
| SB | Climate System Science and Engineering <sup>1</sup> |
|----|---|

### **Computation and Cognition (Course 6-9)**

|      |  |
|------|--|
| SB   | Computation and Cognition <sup>1</sup> |
| MEng | Computation and Cognition <sup>1</sup> |

### **Computational and Systems Biology**

|     |  |
|-----|--|
| PhD | Computational and Systems Biology <sup>1</sup> |
|-----|--|

### **Computational Science and Engineering**

|          |  |
|----------|--|
| SM       | Computational Science and Engineering <sup>1</sup>               |
| PhD, ScD | Aerospace Engineering and Computational Science <sup>1 2</sup>   |
| PhD, ScD | Chemical Engineering and Computation <sup>1</sup>                |
| PhD, ScD | Civil Engineering and Computation <sup>1</sup>                   |
| PhD, ScD | Computational Earth, Science and Planetary Sciences <sup>1</sup> |

|          |  |
|----------|--|
| PhD, ScD | Computational Materials Science and Engineering <sup>1</sup> |
| PhD, ScD | Computational Nuclear Science and Engineering <sup>1</sup>   |
| PhD, ScD | Environmental Engineering and Computation <sup>1</sup>       |
| PhD, ScD | Mathematics and Computational Science <sup>1</sup>           |
| PhD, ScD | Mechanical Engineering and Computation <sup>1</sup>          |
| PhD, ScD | Nuclear Engineering and Computation <sup>1</sup>             |

### **Computer Science and Molecular Biology (Course 6-7P)**

|      |   |
|------|---|
| MEng | Computer Science and Molecular Biology <sup>1</sup> |
|------|---|

### **Earth, Atmospheric, and Planetary Sciences (Course 12)**

|          |  |
|----------|--|
| SB       | Earth, Atmospheric, and Planetary Sciences                           |
| SM       | Atmospheric Science  |
| SM       | Chemical Oceanography (jointly offered with WHOI)                    |
| SM       | Climate Science  |
| SM       | Earth and Planetary Sciences   |
| SM       | Marine Geology and Geophysics (jointly offered with WHOI)            |
| SM       | Physical Oceanography (jointly offered with WHOI)                    |
| PhD, ScD | Atmospheric Chemistry  |
| PhD, ScD | Atmospheric Science  |
| PhD, ScD | Biological Oceanography (jointly offered with WHOI)                  |
| PhD, ScD | Chemical Oceanography (jointly offered with WHOI)                    |
| PhD, ScD | Climate Science  |
| PhD, ScD | Computational Earth, Atmospheric and Planetary Sciences <sup>1</sup> |
| PhD, ScD | Geochemistry   |
| PhD, ScD | Geology  |
| PhD, ScD | Geophysics   |
| PhD, ScD | Marine Geology and Geophysics (jointly offered with WHOI)            |
| PhD, ScD | Physical Oceanography (jointly offered with WHOI)                    |
| PhD, ScD | Planetary Sciences   |

### **Mathematics (Course 18)**

|          |  |
|----------|--|
| SB       | Mathematics  |
| SB       | Mathematics with Computer Science                  |
| PhD, ScD | Mathematics  |
| PhD, ScD | Mathematics and Computational Science <sup>1</sup> |
| PhD      | Mathematics and Statistics <sup>1</sup>            |

### **Microbiology**

|     |                           |
|-----|---------------------------|
| PhD | Microbiology <sup>1</sup> |
|-----|---------------------------|

### **Physics (Course 8)**

|          |                                       |
|----------|---------------------------------------|
| SB       | Physics                               |
| SM       | Physics                               |
| PhD, ScD | Physics                               |
| PhD      | Physics, Statistics, and Data Science |

### **Notes**

Many departments make it possible for a graduate student to pursue a simultaneous master's degree.

Several departments also offer undesignated degrees, which lead to the Bachelor of Science without departmental designation. The curricula for these programs offer students opportunities to pursue broader programs of study than can be accommodated within a four-year departmental program.

<sup>1</sup> See *Interdisciplinary Programs* (<http://catalog.mit.edu/interdisciplinary>).

<sup>2</sup> Students who matriculated in the Department of Aeronautics and Astronautics doctoral program and the Computational Science and Engineering (CSE) doctoral program in academic year 2023–2024 or earlier can choose either PhD/ScD in Computational Science and Engineering or the PhD/ScD in Aerospace Engineering and Computational Science. AeroAstro/CSE students who matriculate in academic year 2024–2025 or later will receive the PhD/ScD in Aerospace Engineering and Computational Science.

### **Admissions**

The selection process at MIT is holistic and student centered; each application is evaluated within its unique context. Selection is based on outstanding academic achievement as well as a strong match between the applicant and the Institute.

Undergraduate applicants do not apply to a particular school, department, or program. Although the application asks about a preferred field of study, admitted undergraduates are not required to choose a major until their sophomore year. Admissions information for regular and transfer applicants (<http://catalog.mit.edu/mit/undergraduate-education/admissions>) is provided in the Undergraduate section (<http://catalog.mit.edu/mit/undergraduate-education>), as well as on the undergraduate admissions website (<https://mitadmissions.org>).

Applicants for graduate study apply directly to their particular department or program of interest. See the individual department and program descriptions for specific requirements.

### **Office of the Dean**

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