

BIOMEDICAL ENGINEERING (PHD)

Graduate School

Program Website (<https://www.bme.cornell.edu/bme/programs/graduate-programs/phd-program/>)

CIP: 14.0501 | HEGIS: 0905.00 | NYSED: 20855

Graduate Field

Biomedical Engineering (<https://catalog.cornell.edu/graduate-school/biomedical-engineering/>)

Program Description

The field provides rich, interdisciplinary opportunities in research and education leading to the Ph.D. degree in Biomedical Engineering. It integrates engineering and the life sciences to prepare students for diverse careers in academe, industry, and government.

The field focuses on both the molecular and macroscopic aspects of biomedical engineering and comprises five research areas: biomedical instrumentation; drug delivery, design and metabolism; biomaterials; computational and systems biology; and medical biomechanics. Facilities commonly used include the Cornell Nanofabrication Facility, the NSF STC in Nanobiotechnology, the Cornell High-Energy Synchrotron Source (CHESS), the Cornell Theory Center, the Cornell Center for Advanced Technology in Biotechnology, and the programs in the Department of Biomechanics and Biomaterials at the Hospital for Special Surgery, the Orthopedic Affiliate of the Cornell Medical College.

It is anticipated that students entering into the field of Biomedical Engineering will have received formal training in a recognized sub-discipline of engineering. Students obtain thorough training in biomedical engineering research. They also master the Ph.D. course work for a minor in a traditional engineering discipline and another minor in an area of the life sciences. Formal course work in the major includes a two-semester course in the Foundations of Biomedical Engineering, advanced BME analysis of biological systems, at least one other advanced course in bioengineering, and required seminars. Further, PhD students are expected to complete a six week immersion experience in medical research and clinical practice at Weill Medical College, as well as completing a graduate student teaching experience. M.S. students complete the Foundations in Biomedical Engineering course, two semesters of seminars, and typically four to five additional courses in engineering and the life sciences. These requirements are subject to revision.

Students are supervised by a core of faculty members who represent twelve departments in the Colleges of Agriculture and Life Sciences, Engineering, Human Ecology, Veterinary Medicine, and the Weill Medical College. Currently biomedical engineering is a program, but a process to form a distinct department is underway.

Concentrations

- Biomedical engineering

Program Information

- Instruction Mode: In Person
- Location: Ithaca, NY
- Minimum Credits for Degree: 165

Program Requirements

- Minimum Semesters for Degree: 10

Graduate School Milestones

- Responsible Conduct of Research Training: Required
- Open Researcher and Contributor ID (ORCID): Required
- Student Progress Reviews (SPR) begin: First Year
- Examination for admission to candidacy (A Exam): Spring of third year
- Defense of Dissertation (B Exam): Spring of fifth year

Field Specific Milestones

- One semester of teaching assistantship required.

Course Requirements

Additional course requirements may be set by the student's Special Committee. Program specific requirements that apply to all students are included below.

Year 1 (Fall)

- BME 7010 Biomedical Engineering Ph.D Seminar

Year 1 (Spring)

- BME 7130 Core Concepts in Disease

University Graduation Requirements Requirements for All Students

In order to receive a Cornell degree, a student must satisfy academic and non-academic requirements.

Academic Requirements

A student's college determines degree requirements such as residency, number of credits, distribution of credits, and grade averages. It is the student's responsibility to be aware of the specific major, degree, distribution, college, and graduation requirements for completing their chosen program of study. See the individual requirements listed by each college or school or contact the college registrar's office (<https://registrar.cornell.edu/service-resources/college-registrar-directory/>) for more information.

Non-academic Requirements

Conduct Matters. Students must satisfy any outstanding sanctions, penalties or remedies imposed or agreed to under the Student Code of Conduct (Code) or Policy 6.4. Where a formal complaint under the Code or Policy 6.4 is pending, the University will withhold awarding a degree otherwise earned until the adjudication process set forth in those procedures is complete, including the satisfaction of any sanctions, penalties or remedies imposed.

Financial Obligations. Outstanding financial obligations will not impact the awarding of a degree otherwise earned or a student's ability to access their official transcript. However, the University may withhold

issuing a diploma until any outstanding financial obligations owing to the University are satisfied.

Learning Outcomes

Each candidate must demonstrate the following proficiencies:

- Make an original and substantial contribution to the discipline of BME:
 - Demonstrate creative and independent thinking.
 - Identify new research opportunities in field of BME.
- Demonstrate advanced research skills:
 - Identify existing knowledge and resources.
 - Integrate a variety of existing knowledge and resources to address a new problem.
- Evaluate the candidate's results and those of others in the context of this integrated knowledge.
 - Master and/or innovate research methodologies and techniques.
 - Master and/or innovate communication methods for oral and written information exchange.
- Demonstrate a commitment to advancing scholarship:
 - Maintain familiarity with advances in the field.
 - Engage with other investigators in the field and communicate findings via professional publications, participation in professional societies and research seminars, and other modes of communication.
- Support learning through teaching, collaborative inquiry, and mentoring.
- Demonstrate professional skills
 - Display high ethical standards and expect high ethical standards of others.
 - Listen, give, and receive feedback effectively.
- Progress through the degree program in an appropriate timeframe.