

BIOMEDICAL ENGINEERING (MS)

Graduate School

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

CIP: 14.0501 | HEGIS: 0905.00 | NYSED: 20856

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 (BME). 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 Weill Cornell Medicine.

It is anticipated that students entering into the field of biomedical engineering will have received formal training in a recognized subdiscipline of engineering. Students obtain thorough training in biomedical engineering research. They also master the Ph.D. coursework 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, Ph.D. students are expected to complete a six week immersion experience in medical research and clinical practice at Weill Cornell Medicine, 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 12 departments in the Colleges of Agriculture and Life Sciences, Engineering, Human Ecology, Veterinary Medicine, and Weill Cornell Medicine. Currently biomedical engineering is a program, but a process to form a distinct department is underway.

Concentrations

- Biomedical engineering

Program Information

- Program Mode of Delivery: In Person
- Program Location: Ithaca, NY

Program Requirements 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 (Summer)

- BME 7160 Immersion Experience in Medical Research and Clinical Practice

Year 1 (Fall)

- BME 7010 Biomedical Engineering Ph.D Seminar

Year 1 (Spring)

- BME 7130 Biomedical Engineering Methods: From Biological Discovery to Clinical Practice

Additional Requirements

- BME 7900 Biomedical Engineering Graduate Colloquium - total of 6 semesters
- BME 7020 Biomedical Engineering Research Seminar - total of 6 semesters; students present annually from 3rd year onward
- Four graduate elective courses at the 6000–7000 level, with two courses in each of two minor concentration areas, selected in consultation with the student's special committee
- Additional course requirements may be set by the student's special committee.

Graduate School Enrollment Requirements

Course Requirements

- Course requirements are determined by the student's Special Committee.
- Enrollment in a GRAD research course or the equivalent field specific research course is expected of all students each semester through graduation. These courses include:
 - GRAD 8000 In Absentia
 - GRAD 9010 Graduate-Level Research
 - GRAD 9011 Doctoral Dissertation Research
 - GRAD 9012 Master's Thesis Research

- GRAD 9016 Summer Graduate-Level Research
- GRAD 9050 Global Hubs: Research Partnerships
- GRAD 9060 National Science Foundation Graduate Research Fellowship Program

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

- 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.

Admissions

Application Requirements and Deadlines

Application Deadlines

Fall, December 1

Requirements Summary

Applicants are expected to have a bachelor's degree in a recognized subdiscipline of engineering. However, exceptional students with a B.S. in the sciences and demonstrated knowledge of advanced mathematics, calculus-based physics, and introductory computer science will also be considered.

- all Graduate School requirements (<http://www.gradschool.cornell.edu/academics/admissions/applying>), including the English language proficiency requirement (<https://gradschool.cornell.edu/admissions/prepare/english-language-proficiency-requirement/>) for all applicants
- three recommendations
- GRE scores are not required or accepted.

Admissions Contact Information

Email: bh42@cornell.edu

Phone: 607-255-2573

Campus Address: Weill Hall 121A

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