Biomedical Engineering

The Joint Department of Biomedical Engineering Graduate Program is administered by the combined biomedical engineering graduate faculty from both North Carolina State University and University of North Carolina at Chapel Hill. The joint program also has close working relations with the Research Triangle Institute and industry within the Research Triangle area. These associations enable students to obtain research training in a wide variety of fields and facilitate the selection and performance of dissertation research. Thus, the department, thus, provides students with excellent opportunities to realize the goal of enhancing medical care through the application of modern technology.

Biomedical engineering is a dynamic field stressing the application of engineering techniques and mathematical analysis to biomedical problems. Faculty research programs are key to the program, and they include five primary research directions: rehabilitation engineering, regenerative medicine, biomedical imaging, biomedical microdevices, and pharmacoengineering. The department offers graduate education in biomedical engineering leading to the master of science (MS) and doctor of philosophy (PhD) degrees.

Students typically enter this program with backgrounds in engineering, physical science, mathematics or biological science. Curricula are tailored to fit the needs and develop the potential of individual students. In addition, courses in statistics, mathematics, life sciences and engineering provide a well-rounded background of knowledge and skills.

Doctoral Degree Requirements

A minimum of 52 semester hours of graduate work is required (beyond the Bachelor's degree). Degree candidates in this program are expected to obtain experience working in a research laboratory and to demonstrate proficiency in research. The PhD dissertation should be judged by the graduate committee to be of publishable quality. The student must meet the Graduate School’s residency requirement at UNC-CH or NC State as appropriate. Further information on the BME PhD program can be found on the department website.

Required and Highly Recommended Courses

Students must complete six credits of graduate engineering topics, six credits of graduate life science topics, three credits of engineering mathematics, and three credits of statistics. Nine credits of technical electives are also required. Students may choose from a number of courses to meet these requirements. Such choices are made in consultation with the student's academic advisor and the Director of Graduate Programs/Studies.

Students are required to take a BME Seminar each semester which is offered at both UNC-CH and NC State. Students must also complete a Mentored Teaching Experience and a Professional Development Seminar.

Comprehensive and Qualifying Examinations

Doctoral students qualify for the PhD degree by meeting grade requirements in their core courses, completing qualifying exams in their first year, and then advancing on to written and oral preliminary exams before admission to candidacy. Details can be found on the department website.

Biomedical Engineering Program Website (https://bme.unc.edu/graduate/why-choose-bme/)

Admission Requirements

Students must satisfy all entrance requirements for The Graduate School of the University of North Carolina at Chapel Hill or the Graduate School at North Carolina State University, and must demonstrate interest and capability commensurate with the quality of the biomedical engineering program. Prospective students may apply to the graduate school through either UNC–Chapel Hill or NC State. All applicants are considered together as a group. Generally, applications should be submitted by the second Tuesday of December for consideration for admission in the coming fall semester. Students are no longer required to submit their GRE scores. Admitted students are expected to maintain an overall GPA of at least 3.00 and are encouraged to have undergraduate research experience. The program requires that a personal statement (1-3 pages) about research interest and background be submitted.

Students should have a good working knowledge of mathematics at least through differential equations, plus two years of physical science or engineering and basic courses in biological science. Deficiencies in preparation can be made up in the first year of graduate training.

Applicant Information

- Delivery Method: On Campus
- Entrance Exam: None
- Interview Required: None

Degrees

- Biomedical Engineering (p. 1)
- Biomedical Engineering (Minor) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-minor/)
- Biomedical Engineering (MS) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-ms/)
- Biomedical Engineering (MS): MedTech Innovation and Entrepreneurship Concentration (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-ms-translation-innovation-entrepreneurship-concentration/)
- Biomedical Engineering (MS): Traditional Concentration (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-ms-traditional-concentration/)
- Biomedical Engineering (PhD) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-phd/)
- Nanobiotechnology (Certificate) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/nanobiotechnology-certificate/)

Faculty

Department Chair
Paul Dayton

Associate Chairs
Lianne Cartee, Associate Chair for Education
Shawn Gomez, Associate Chair for Research

---

**Directors**

Lianne Cartee, Director of Undergraduate Studies
Matthew Fisher, Director of Graduate Studies

---

**Associate Director**

Naji Husseini, Associate Director of Undergraduate Studies

---

**Distinguished Professors**

Lianne Cartee, Alumni Distinguished Undergraduate Professor
Paul Dayton, William R. Kenan Jr. Distinguished Professor
He (Helen) Huang, Jackson Family Distinguished Professor
H. Troy Nagle
Roger Narayan
Koji Sode, William R. Kenan Jr. Distinguished Professor

---

**Professors**

Lianne Cartee
Paul A. Dayton
Caterina M. Gallippi
Shawn Gomez
Leaf Huang
H. Troy Nagle Jr.
Weili Lin
J. Michael Ramsey
George (Rick) Stouffer

---

**Assistant Professors**

Amy Adkins
Pritha Agarwalla
Wen Yih Aw
Rahima Benhabbour
Joseph Burclaff
Melissa Caughey
Silvia Ceballos
Brian Diekman
Alon Greenbaum
Michael Jay
Kennita Johnson
Jinwook Kim
Wesley Legant
Ming Liu

---

**Associate Professors**

Ashley Brown
Yevgeny Brudno
Jacqueline Cole
Michael Daniele
Bob Dennis
Kenneth Donnelly

---

Oleg Favorov
Matthew Fisher
Jason Franz
Donald Freytes
Michael Gamcsik
David Hill
Devin Hubbard
Naji Husseini
Derek Kamper
David Lalush
Jeffrey Macdonald
Scott Magness
Matthew Penny
Gianmarco Pinton
Nitin Sharma
Mark Tommerdahl
Anka Veleva
Bruce Wiggin
David Zaharoff
Virginie Papadopoulou
Ross Petrella
William Polacheck
Imran Rizvi
Francisco Santibanez
Sarah Shelton
James Tsuruta

**Lecturers**

Sidhartha Jandhyala
Nick Jardine