Biomedical Engineering

The Joint 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. 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, microsystems engineering, and pharmacoengineering. The department offers graduate education in biomedical engineering leading to the master of science and doctor of philosophy degrees.

Students 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 sciences provide a well-rounded background of knowledge and skills.

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 at either UNC–Chapel Hill or NC State. All applicants are considered together as a group. Generally, applications should be submitted by December 11 for consideration for admission in the coming fall semester. Applicants are expected to present Graduate Record Examination (GRE) scores; verbal scores should be at or above the 50th percentile and quantitative scores should be at or above the 70th percentile to be competitive. Admitted students are expected to have an average grade of B (cumulative GPA 3.30) or better and are encouraged to have undergraduate research experience. The program requires that a one-to-three page personal statement 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 or engineering science and basic courses in biological science. Deficiencies in preparation can be made up in the first year of graduate training.

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 during their residence and to demonstrate proficiency in research. The Ph.D. 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 Ph.D. program can be found on the department website.

Required and highly recommended courses

Students are required to take a BME Seminar each semester which is offered at both UNC-CH and NC State. Students must also complete six credits of graduate engineering topics, six credits of graduate life science topics, three credits of engineering mathematics, and three credits of statistics. 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.

Comprehensive and Qualifying Examinations

Doctoral students qualify for the Ph.D. degree by meeting grade requirements in their core courses, and then advance on to written and oral preliminary exams before admission to candidacy. Details can be found on the department website.

Degrees

- 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 (PhD) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-phd/)
- Biomedical Engineering (Minor) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/biomedical-engineering-minor/)
- Nanobiotechnology (Certificate) (http://catalog.ncsu.edu/graduate/engineering/biomedical-engineering/nanobiotechnology-certificate/)

Faculty

Full Professors

Ke Cheng
Paul A. Dayton
Caterina M. Gallippi
Shawn Gomez
Edward Grant
He (Helen) Huang
Cristina Lanzas
Frances Smith Ligler
H. Troy Nagle Jr.
Roger Jagdish Narayan
J. Michael Ramsey
Koji Sode
**Associate Professors**

Ted Bateman  
Jacqueline Heather Cole-Husseini  
Michael Daniele  
Robert G. Dennis  
Matthew Bruce Fisher  
Michael Gamcsik  
Derek Gary Kamper  
David S. Lalush  
Jeffrey M. Macdonald  
Scott Magness  
Gianmarco Francesco Pinton  
Nitin Sharma  
Mark A. Tommerdahl  
David Alexander Zaharoff

**Practice/Research/Teaching Professors**

Ilya Arakelyan  
Lianne A. Cartee  
Kenneth Donnelly  
Oleg V. Favorov  
Devin Hubbard  
Naji Hussein  
George Todd Ligler  
Ross Petrella  
Anka Veleva

---

**Assistant Professors**

Imran Rizvi  
Soumya Rahima Benhabbour  
Ashley Carson Brown  
Yevgeny Brudno  
Brian Diekman  
Jason Franz  
Donald (Danny) Freytes  
Andrea Giovannucci  
Xiaogang Hu  
Alon Greenbaum  
Kennita Adrian Johnson  
Wesley Legant  
Ming Liu  
William Polacheck  
Imran Rizvi  
Michael Sano