

Biomedical Engineering at U.Va.

Biomedical engineering is one of the most important disciplines of the new millennium, with an impact on health, prosperity and daily life. Still a young field, biomedical engineering stands at the threshold of an **explosion of knowledge** in the biological sciences and bioengineering. Biomedical engineers are continually discovering new fundamental knowledge, requiring **great creativity and ingenuity**, while also applying knowledge in innovative ways to improve human health.

In the Department of Biomedical Engineering (BME) at the University of Virginia, we strive to maintain an environment that is conducive to such advancements by providing integrative student training that fosters personal growth and ideas. Faculty and students work together to build **collaborative research excellence** in areas where we can make the greatest impact in this growing field. Ranked nationally as a "Top 20" program, the BME Department is U.Va.'s highest-ranking science or engineering program. The department is jointly administered by the School of Engineering and Applied Science and School of Medicine and offers Bachelor of Science, Master of Science, Master of Engineering and Ph.D. degrees in biomedical engineering as well as a biomedical engineering minor, available to all U.Va. undergraduates.

Snapshot

The U.Va. Department of Biomedical Engineering ...

- Graduates 60 undergraduates each year
- Fully funds 90 doctoral students
- Offers a 10:1 undergraduate student:faculty ratio, with 18 faculty members involved in teaching and research
- Is ranked among the top 20 BME programs nationally in average annual research funding per faculty member
- Is conducting innovative and meaningful research – U.Va. BME faculty and student research publications are among the most highly cited in the world



UNIVERSITY of VIRGINIA
ENGINEERING

Department of Biomedical Engineering
School of Engineering and Applied Science | School of Medicine
University of Virginia
P.O. Box 800759
Charlottesville, VA 22908

<http://bme.virginia.edu>
www.seas.virginia.edu
434.924.5101
bme-dept@virginia.edu

Department of
Biomedical Engineering
at the U.Va. School of Engineering and Applied Science



Educating
Leaders



At U.Va., biomedical engineering students discover new biological knowledge, invent new medical devices and develop solutions to clinical problems, all with a global perspective.

Our Students

At the undergraduate level, student training begins with an in-depth focus in the life sciences and an early experience in bioengineering project design, leadership and management, followed by a core of bioengineering coursework. All courses are taught by BME faculty and comprise an **integrative curriculum based on fundamental knowledge and real-life applications**. The central experience of the third year is the IDEAS Lab, where students synthesize prior knowledge as they learn the methods and techniques of biomedical engineering — molecular biology, cellular microscopy, cell and tissue mechanics, biomaterials, physiological measurements, signal processing and medical imaging. The BME major culminates in a fourth-year capstone design project. Each year, our students' capstone projects lead to journal publications, patent disclosures and presentations at national meetings.

Graduate students from around the world come to study and perform **research with leading BME scholars** and practitioners. All doctoral students are fully funded, and one in five is supported by a national fellowship or training grant. Our graduate students' research training is complemented by new **lab-to-classroom Immersion Learning experiences** in systems bioengineering, mechanobiology, molecular imaging and reparative medicine. BME's spectacular research and educational building (built in 2002) is located within the U.Va. Medical Center and is just a short walk to the Engineering School.



Undergraduate Research and Internships

Outside the classroom, undergraduates gain real-world experience through undergraduate research, industry internships and global health projects. As early as their first year, students begin to explore BME research labs, and by their fourth year, they are performing the cutting-edge and often publishable work that is critical for graduate school admission.

For students interested in the private sector, BME's Industrial Internship Program offers paid, 10-week summer internships for BME majors. Rising third- and fourth-year students work on-site in a variety of cities, with corporate partners ranging from local high-tech startups to international corporations.

Premedical students and those interested in public health have traveled the globe to engage in service learning projects, thanks to U.Va.'s Center for Global Health.

Our Research

BME has a long record of **leadership and innovation** in cardiovascular bioengineering and medical imaging. Faculty and students are rapidly accelerating fundamental discovery in the emerging fields of systems bioengineering, nanobiology, mechanobiology and reparative medicine. Collaboration is a core value for our department and drives our recent advances in:

medical ultrasound,
cardiac mechanics,
inflammation, cell adhesion,
molecular biomechanics,
tissue engineering,
drug and gene delivery,
stem cell therapeutics,
real-time cardiac MRI,
non-peptide drugs,
vascular mechanobiology,
nanoscale imaging of living cells, in vitro diagnostics,
bionanotechnology, molecular imaging,
systems bioengineering, musculoskeletal engineering,
and regenerative medicine

Several recent awards highlight our **interdisciplinary collaborations** across various programs, departments and schools. A series of four National Institutes of Health (NIH) Bioengineering Research Partnership awards and roles on two NIH Program Project grants enhance our program's **highly interactive approach**. Our department is also home to a Coulter Translational Research Partnership Award, a \$4.5 million award that draws on the joint strengths of U.Va.'s School of Engineering and Applied Science, School of Medicine, Darden Graduate School of Business and Health Sciences Center. In addition, U.Va. has been awarded a prestigious National Science Foundation "Partnerships for Innovation" award to set in motion a **global bioengineering network** spanning 20 universities, 18 corporations and six continents.

