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## Biomedical Engineering

COLLEGE OF ENGINEERING



***Our mission is "to promote learning and discovery that integrate engineering and life sciences for the advancement of human health"***

Welcome to the on-line home of the Department of Biomedical Engineering at the Ohio State University!

### History and Introduction

Biomedical Engineering at the Ohio State University has a long and distinguished history. First started as a Center in 1971 with a focus upon interdisciplinary research and graduate education, the new Department of Biomedical Engineering has begun strategic planning for a new era. We began our undergraduate program in January of 2008. We have close ties to other Departments in Engineering, and to the College of Mathematical and Physical Sciences, the College of Biological Sciences, the College of Medicine, the College of Dentistry, and the College of Veterinary Medicine. The potential for integrating engineering and life sciences for the advancement of human health is unlimited, and it's an exciting time for Biomedical Engineering at Ohio State.

### Vision

The Department of Biomedical Engineering at the Ohio State University will be nationally and internationally recognized for excellence in:

- The distinctive educational opportunities for its students and the outstanding achievements of its alumni
- Faculty and staff excellence and opportunities for continuing professional development
- Collaborative research with global impact on improving human health
- Service to the field of biomedical engineering and the community

### The Field

Biomedical engineering (BME) combines engineering principles and methodology with physical, chemical, and mathematical sciences to solve problems in biology, medicine, behavior, and health. Biomedical engineers are employed by pharmaceutical industries, government agencies, biomedical product companies, universities, medical center labs, and emerging high-tech industries. Due to their multidisciplinary backgrounds, biomedical engineers have diverse research interests, often acting as liaisons between technological and clinical communities. For further information on the field, check out the The Whitaker Foundation website at <http://bmes.seas.wustl.edu/WhitakerArchives/>.

### Degrees Offered

At The Ohio State University, the Department of Biomedical Engineering Graduate Program offers Master of Science (MS) and Doctorate of Philosophy (PhD) degrees with over 70 faculty mentors to choose from within the Colleges of Biological Sciences, Dentistry, Engineering, Medicine, and Veterinary Medicine. Students also may pursue an MD/PhD degree administered jointly through the College of Medicine and the Graduate School. A mature graduate program, Biomedical Engineering has granted over 350 graduate degrees since 1971. Undergraduate students interested in career or graduate school preparation can minor in Biomedical Engineering while majoring in another area of study.

### Research

Research opportunities abound in the areas of biomicroelectromechanical systems (bioMEMS), imaging, and cell and tissue engineering toward cardiovascular, orthopedic, and vision applications. Breakthroughs in nanotechnology for cell transplants; microfabrication of biodegradable polymers for drug delivery; design of virtual bone dissection simulations; biomechanics of tissue (bone, eye, breast); magnetic resonance imaging and spectroscopy; corneal topography; understanding mechanoregulation / mechanosignaling in vascular cells / tissues; and biocompatibility of novel implant materials name only a few of the areas under investigation within The Department of Biomedical Engineering. Currently, we have 15 departmental faculty in biomedical engineering plus over 60 participating faculty researchers collaborate through the Department, providing extensive resources for research. Among these are the Dorothy M. Davis Heart and Lung Research Institute and the Nanotech West Lab, dedicated to bioMEMS. In addition to the technical and clinical research facilities across campus and at The Ohio State University Medical Center, research also is conducted at Children's Hospital of Columbus.

### Diversity

The Department of Biomedical Engineering is home to students from around the world. Of nearly 50 graduate students, 14% are members of underrepresented groups, and 29% are women. The Department's small but diverse community of students is a source of comfort within the vast Ohio State University campus.

## Academic Excellence

Of roughly 125 applicants to the Biomedical Engineering Graduate Program, only 19 were admitted in 2008. Admitted students earned a mean GPA of 3.63 on a 4.0 scale and an average total GRE percentile of 81% (73% verbal and 89% quantitative). International GPAs averaged 88/100.

We post no required minimums and honor considerations of experience, diversity, background, and recommendations. However, minimum cuts for the University Fellowship Competition include a 3.6 GPA and an average verbal/quantitative GRE percentile of 75%.

### **The GRE is required of ALL applicants to the MS, PhD, and MD/PhD programs.**

The Ohio State University Graduate School requires a minimum of 3.0 in all undergraduate work and a minimum 550 on the TOEFL (213 for CBT).

Most applicants to the BME graduate program have majored in a traditional branch of engineering (e.g., ChE, EE, ME, etc.), in the life sciences, or in BME. Those with non-engineering backgrounds typically are required to complete some additional coursework to develop competence in engineering. Preparation in biology or physiology can be helpful to those with engineering backgrounds. Please see suggested background [ideas](#) ([Word Document](#)).

## Competitive Funding Opportunities

**University Fellowship Opportunities:** In order to be considered for nomination in the University Fellowship competition, the following minimum criteria apply: grades must be equal to 88% or 3.6/4.0, and GRE scores must average in the 75th percentile. (Professionals will evaluate all international transcripts using different grading scales.)

**External Fellowship Opportunities:** Applicants also should seek fellowship funding from agencies such as National Science Foundation (NSF), American Association of University Women, United Negro College Fund-Merck Science Initiative, National Aeronautics and Space Administration (NASA) or National Institutes of Health (NIH) to name only a few. Applicants are encouraged to consult undergraduate academic advisors or research mentors for information on graduate school funding opportunities. At <http://www.cos.com/>, there are many good leads for upper-level undergraduates and/or first-year graduate students, along with application deadlines. If a subscription is required to use this comprehensive database of research areas and funding sources, your undergraduate academic advisor, or someone working in the sciences at your university, will gladly assist you.

**Graduate Associate Appointments:** Other forms of financial aid include Graduate Research Assistantships (GRA), Graduate Teaching Assistantships (GTA), and Graduate Administrative Assistantships (GAA). These types of appointments cover tuition and fees while offering a monthly stipend. All admitted students are considered for opportunities of these types.

Nearly 60% of current BME students have obtained GRAs with members of our departmental and affiliated faculty. Over 20% have earned funding in the form of Fellowship awards from sources such as Ohio Lions, NSF, and NIH National Research Service. Others have found GTAs outside of the Department in University departments such as chemistry, math or in the College's first-year engineering program. GAAs often can be found at the university libraries and student service offices.

## Alumni Achievement

Alumni are pursuing doctoral degrees, completing medical residencies at places such as Iowa State or Harvard Medical School, conducting post-doctoral research at the University of Utah or Colorado, holding faculty positions at the University of Puerto Rico or Houston, working in research and development for companies such as General Electric, and supervising research at institutions such as the Cleveland Clinic Foundation. Graduates of Ohio State's Biomedical Engineering Center hold titles ranging from orthopedic or vascular surgeon to research scientist; chief information officer to anesthesiologist; and assistant professor to senior project engineer.