UB DEPARTMENT OF BIOMEDICAL ENGINEERING
BS in Biomedical Engineering

Facts About BME@UB

- Full-time faculty: 11
- Adjunct faculty: 18
- Small class size
- Research and internship opportunities
- Joint department between the School of Medicine and Biomedical Sciences and School of Engineering and Applied Sciences
- Degrees offered: BS, MS, PhD
- Average annual salary: $91,760

Curriculum Overview

Freshman-Sophomore
The first two years build the basic engineering foundation in which students take science, math and required general education courses. While these courses are common to most engineering majors, students in BME also take BE 201 (Principles of Biomedical Engineering), and BE 202 (Applied Medical and Engineering Biology).

Junior
The junior year offers the core courses in Biomedical Engineering. Students get hands on experience in their BME laboratory classes, where they learn the essentials of biosignal acquisition among other topics. They also acquire knowledge in the areas of imaging, biomedical circuits, biomaterials, and biofluid mechanics.

Senior
The senior year is where students expand their vision of Biomedical Engineering by choosing technical electives in areas of interest to them. The program requires that all students work on a senior design project as part of a team; this is an invaluable experience that exposes students to the challenges of seeing a project from conception to realization. Students can also work with faculty on research projects as part of an undergraduate research course.

What is a Biomedical Engineer?
A Biomedical Engineer uses traditional engineering expertise to analyze and solve problems in biology and medicine, providing an overall enhancement of health care. Students choose Biomedical Engineering to be of service to people and to partake in the excitement of working with living systems. Biomedical Engineers work closely with traditional engineers, basic scientists, and health care professionals including physicians, nurses and technicians, and may be called upon in a wide range of capacities: to design instruments and devices, to provide knowledge for developing new procedures or advancing scientific research, or to conduct research needed to solve clinical problems.

Where do Biomedical Engineers Work?
Biomedical Engineers are employed at universities, in industry, in hospitals, in research facilities of educational and medical institutions, and in government regulatory agencies. They often serve a coordinating or interfacing function, using their background in both the engineering and biomedical fields. In industry they may create designs where an in-depth understanding of both living systems and technology is essential. They may be involved in performance testing of new or proposed products. Government positions often involve product testing and establishing safety standards for devices. In the hospital, Biomedical Engineers may provide advice on the selection and use of medical equipment, as well as supervising its performance testing and maintenance. They may also build customized devices for special health care or research needs. In research institutions, Biomedical Engineers supervise laboratories and equipment, and participate in or direct research activities in collaboration with other researchers with diverse backgrounds in medicine, nursing, biology and chemistry. Biomedical Engineers often have advanced training in other fields as well. For example, many Biomedical Engineers also have an M.D. degree, thereby combining an understanding of advanced technology with patient care or clinical research.

Areas of Biomedical Engineering
Some of the well established specialty areas within the field of Biomedical Engineering are as follows.

- Bioinstrumentation
Bioinstrumentation is the application of electronics and measurement principles and techniques to develop devices used in diagnosis and treatment of disease.

- Biomechanics
Biomechanics is mechanics applied to biological or medical problems. Efforts in biomechanics have developed the artificial heart and replacement heart valves, the artificial kidney, the artificial hip, as well as built a better understanding of the functions of organs and musculoskeletal systems.

- Biomaterials
Biomaterials describe both living tissue and materials used for implantation. Understanding the properties of the living material is vital in the design of implant materials. The selection of an appropriate material to place in the human body may be one of the most difficult tasks faced by the Biomedical Engineer.

- Systems Physiology
Systems Physiology is the term used to describe the aspect of Biomedical Engineering in which engineering strategies, techniques, and tools are used to gain a comprehensive and integrated understanding of the function of living organisms ranging from bacteria to humans.

- Clinical Engineering
Clinical Engineering is the application of technology for health care in hospitals. Clinical Engineers are responsible for developing and maintaining computer databases of medical instrumentation and equipment records, and for the purchase and use of sophisticated medical instruments.

- Rehabilitation Engineering
Rehabilitation Engineering is a new and growing specialty area of Biomedical Engineering. Rehabilitation Engineers expand capabilities and improve the quality of life for individuals with physical impairments.
Biomedical Engineering

About the Program

Biomedical Engineering at UB is a vibrant, growing department that spans the School of Engineering & Applied Sciences and the School of Medicine & Biomedical Sciences. Our students gain the skills and knowledge needed to solve problems that directly affect the quality of life of all humans. This is accomplished through coursework taught by our outstanding faculty and through hands-on research experiences. Whether you are looking for an exciting career, thinking about graduate school, or planning to start your own biomedical company, a degree in Biomedical Engineering from UB will help you reach your goal.

Opportunities for Students

Several teaching and research opportunities are available for undergraduates through on-campus programs including the Center for Undergraduate Research & Creative Activities (CURCA).

What will the future demand be for Biological Engineers?

Biomedical Engineering is the future. The United States Bureau of Labor Statistics reports that “Employment of biomedical engineers is expected to grow by 62 percent from 2010 to 2020, much faster than the average for all occupations. Demand will be strong because an aging population is likely to need more medical care and because of increased public awareness of biomedical engineering advances and their benefits.” This growth is much faster than average. Specific growth areas cited in the report included computer-assisted surgery, cellular and tissue engineering, rehabilitation, and orthopedic engineering. Clearly the demand for Biomedical Engineers will continue to grow, which increases the value of a Biomedical Engineering degree from UB.

How should a student prepare for a career in Biomedical Engineering?

The best path to a career in Biomedical Engineering starts in high school with a strong preparation in math and science. This includes physics, chemistry and biology and as much math as possible. Becoming familiar with a computer programming language can also help. Advanced Placement courses in these areas can be beneficial as well. The path continues by majoring in Biomedical Engineering in college. At the college level, a student would take calculus and science courses similar to other engineering students in the first two years, and then focus on biomedical engineering-specific courses in their final two years. Obtaining good communication skills are also important, because Biomedical Engineers often provide a vital link among professionals with medical, technical, scientific, or other engineering backgrounds. Students may continue their education in graduate school where they can gain more in-depth knowledge at the Masters (MS) level, or become involved in cutting edge biomedical research at the Doctoral (PhD) level. Other students may enter medical school to work toward an M.D. degree. Regardless of the level of preparation, those hiring graduates from a Biomedical Engineering program can expect the graduates to have traditional engineering skills with the ability to apply them to the biomedical field.

To apply, please visit admissions.buffalo.edu

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