The Department of Biomedical Engineering (BME) integrates the disciplines of engineering, basic biomedical science and clinical science. Our graduate educational program is designed to provide a broad education across these disciplines as well as knowledge and in-depth research training in a specialty field.

**Research Areas**

**Neurobehavioral Engineering**
This unique program is focused on the development of innovative computational methods for behavioral diagnosis and intervention.

The OHSU School of Medicine Biomedical Engineering Department is currently applying neurobehavioral engineering methods to a wide range of conditions including Alzheimer’s disease, dysarthria and Parkinson’s disease. This work focuses not only on diagnosis and monitoring, but also on new remediation technologies, assistive and augmentative communication devices, assistive cognition devices and tele-rehabilitation.

**Biomedical Optics**
BME’s biomedical optics and imaging researchers are developing ways to see the invisible. In one application of tools they have invented, OHSU’s surgeons are now able to image the precise cellular boundary between healthy and diseased tissue in cancerous skin lesions; in another, scientists at OHSU are using lasers to manipulate single cells, leading to new discoveries about response to shear forces in the body.

BME’s core group of biomedical optics researchers are surrounded by image processing and pattern recognition experts, working together to develop a vast array of new means for diagnosis and treatment.

With current projects that run the gamut from vascular lesions to photo-activated drug therapies, the future is limited only by the kinds of problems that physicians need BME researchers to help them solve.

---

A biomedical engineering graduate student at work in the laboratory

BME faculty and students at a meeting in the Center for Health & Healing
Research

Cardiovascular Systems Engineering
Cardiovascular disease – the leading cause of death in the Western world – produces blood vessel occlusion (e.g., heart attack and stroke) that results from abnormalities in blood flow phenomena, blood chemistry, or the blood vessel wall. To address this multi-disciplinary problem, a highly collaborative cardiovascular group has been assembled with expertise in areas of blood biochemistry, vascular tissue engineering, biofluid mechanics, biomaterials, imaging and medicine.

In ongoing basic research, thrombosis and vascular healing responses are being evaluated using well-engineered in vitro systems and animal models to identify key hemostatic mechanisms, blood component interactions with natural and synthetic surfaces, and the effects of hemodynamic variables. The ultimate goals of the group are to develop more effective anti-thrombotic and anti-arteriosclerotic drug therapies, and to improve the performance of prosthetic cardiovascular devices. Their high impact work includes both basic and clinical research, and complements OHSU’s strengths in cardiovascular research and medicine.

Nanobiotechnology
Future possibilities for nanobiotechnology are as big as its materials are small. Our researchers have already developed a technique for using nano-sized iron particles to remove contaminants from water; others are working with OHSU physicians on ways to use tiny particles—just a few atoms in diameter—to deliver pharmaceuticals at precise locations throughout the body. Other studies explore the movements of specific proteins within single brain neurons during neurite growth. With truly interdisciplinary approaches combining both engineering and science, this group is forging new ground in research and collaborations.

Want to Know More?

www.ohsu.edu/bme
E-mail: bmeinfo@ohsu.edu
phone: 503 748-1137

Department of Biomedical Engineering
Mail Code: CH13B
Oregon Health & Science University
3303 S.W. Bond Ave.
Portland, OR 97239