

Michigan Technological University
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Graduate School
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Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

PHD IN BIOMEDICAL ENGINEERING

Research that Makes a Difference

Doctoral students research the monitoring, treating, and prevention of a variety of medical conditions, including cardiovascular disease, osteoporosis, spinal cord injuries, and tumor growth. Projects involve developing novel biomaterials for tissue regeneration and drug release, wireless implantable biosensors for monitoring internal organs, and new pharmaceuticals.

Osteoporosis drugs are being developed in our labs based on the biomolecular regulation of bone metabolism in hibernating bears, as are biomedical devices such as grafts, extracorporeal circuitry, and oxygenation membranes. Researchers are studying the biology and physiology of the lymphatic and blood vascular systems, including vascular regeneration, remodeling, and pathology. The physical and chemical mechanisms guiding bio-mineralization in vasculature and bone are also under investigation. Faculty and students are working to develop biomedical sensors and instrumentation for use in rural healthcare; new materials for application in blood and tissue are under development.

About Michigan Tech

Michigan Technological University is a leading public research university of international stature, conducting research, developing new technologies, and preparing students to create the future for a prosperous and sustainable world. Michigan Tech offers more than 120 undergraduate and graduate degree programs in engineering, forestry and environmental sciences, computer sciences, technology, business and economics, natural sciences, arts, humanities, and social sciences.

How to Apply

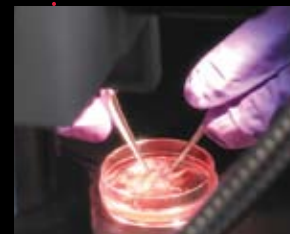
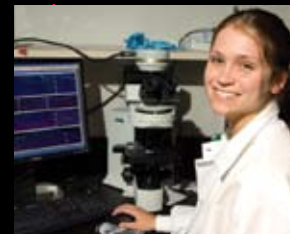
1. Download an application form from the Graduate School webpage.
2. Submit the completed application online, or mail or fax it to the Graduate School.
3. Track the status of your application online.

Visit the Graduate School webpage for complete details about admissions and program requirements.

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Michigan Tech

Create the Future . . .
Change the World.



MichiganTech

Houghton, Michigan



PHD IN BIOMEDICAL ENGINEERING

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Biomedical engineering advances knowledge and develops new devices at the interface of engineering, biology, and medicine. It improves human health through cross-disciplinary activities that integrate the engineering sciences with the biomedical sciences and clinical practice. The integration of biology with engineering is of increasing importance in all engineering disciplines.

Our program emphasizes research and education in tissue regeneration, biomaterials, tissue engineering, and physiological measurements. Our PhD graduates are prepared to undertake postdoctoral research; to succeed in academia, government, and industry; and to grow into positions of leadership.



Biomedical Engineering at Michigan Tech: Research and Partnerships

Michigan Tech students working toward the PhD in Biomedical Engineering participate in internationally recognized research projects funded by agencies such as the National Institutes of Health and the National Science Foundation. Many faculty and students collaborate with industrial and clinical partners. In addition, some are developing small businesses with the novel technologies developed through their research.

The program focuses on developing research skills, supplemented in the classroom by courses in advanced math, science, and engineering. Students serve on departmental and interdepartmental research teams; their leadership qualities grow as they gain responsibility and experience.

Graduate students can work with major analytical facilities throughout campus, including electron microscopy, surface analysis instrumentation, nanoindenters, X-ray analysis, and rheometry instrumentation. Collaboration with staff at Portage Health, Marquette General Hospital, and the Upper Peninsula Health Education Corporation allows our students to explore the rural health-care applications of biomedical engineering.

Faculty Research Funding

- The National Institutes of Health
- National Science Foundation
- The Whitaker Foundation
- Michigan Space Grant Consortium
- Biomedical device industry

Graduate Student Funding

- National Science Foundation Graduate Fellowship

PHD IN BIOMEDICAL ENGINEERING

Campus-Wide Facilities

Our laboratories house equipment to isolate and culture nerve, vascular, and musculoskeletal cells. These cells are used in basic science, tissue regeneration, and tissue engineering research and development. Cellular and molecular biology facilities are used to quantify outcomes such as gene and protein expression and drug release from biomaterials. Special facilities are available for in vivo and in vitro studies. Biomaterials such as hydrogels, polymers, and bioglass are also produced in our labs.

Departmental microscopy facilities include equipment for quantitative digital 2-D and 3-D fluorescence and light microscopy—as well as the development of physical and chemical biomedical sensors and instrumentation systems.

In addition, research is conducted in conjunction with the University's microfabrication facility, including thin- and thick-film deposition, chemical vapor deposition photolithography, and characterization instrumentation.



Research Areas

- applications of biomedical engineering in rural healthcare
- microfabricated biomedical sensors
- wireless implantable biosensors
- polymer biomaterials
- wound healing
- tissue angiogenesis and lymphangiogenesis
- neural tissue engineering
- cellular mechanotransduction
- bone mechanics, metabolism, and tissue engineering
- vascular biomaterials and tissue engineering
- bioactive vibrational coating materials

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Professional Associations

- American Society of Biomechanics
- American Physiological Society
- Biomedical Engineering Society
- IEEE—Engineering in Medicine and Biology Society
- Society for Neuroscience
- Institute for Physics and Engineering in Medicine
- International Society on Biotelemetry

Industrial and Clinical Relationships

- Apjohn Medical Ventures
- Biophage Pharma

- Cleveland Medical Devices
- Imclone
- KMG2 Sensors
- Marquette General Hospital
- Portage Health
- Upper Peninsula Health Education Corporation

Patents

- hydrogels for nerve regeneration
- infant monitoring
- osteoporosis drugs
- tissue engineering bioreactor
- wireless sensor technology
- blood chemistry sensors