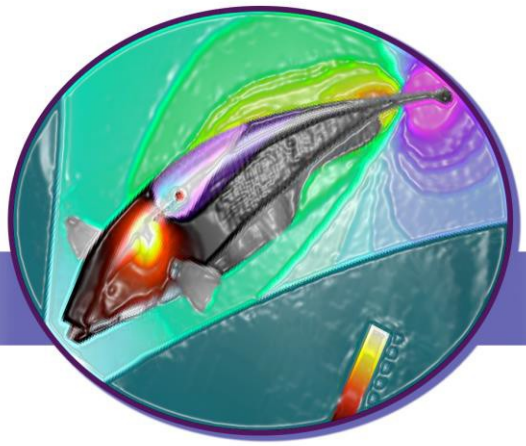
McCormick

Northwestern Engineering

MS Degree Programs in Mechanical Engineering

MS degree specializing in Biology and Bio-inspired Engineering

Enhance your resume with a Northwestern MS degree specializing in Biology and Bio-inspired Engineering.



This research area reflects the increasingly tight relationship between engineering and the study of biological systems. Techniques from engineering often provide substantial insight into biological problems, while biology simultaneously inspires new engineering developments. Faculty in this research area work on both sides of this duality. For example, several labs are developing artificial sensors that model vertebrate hair-cells, whiskers, and electrosensors. These sensors are then used to study basic biological questions and to advance engineering capabilities.

There are several possible themes within the biological and bio-inspired engineering speciality: Neurobiology, Biomechanics, Biomaterials, Robotics for Rehabilitation and Surgical Assistance, Nanoscale Biotic-Abiotic Systems., Biologically-inspired sensors and sensing.

- **Hands-on courses and projects**
- **State-of-the-art labs**
- **Focused advanced study in Biological Applications**
- **3-quarter course only, or 5-quarter with project programs**
- **Optional “mini-MBA” certificate Program**
- **Starting salaries with MS $10k higher than with BS** (2007, National Association of Colleges and Employers)

Faculty active in Biological and Bio-inspired Engineering:

Neural engineering: M. MacIver and M. Hartmann

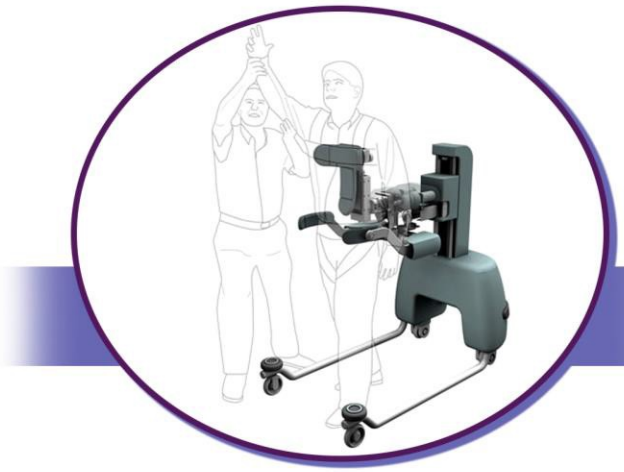
Human Movement and Neurorehabilitation: J. Patton

Nanomedicine, Bionanotechnology, Drug Delivery, Biosensing:
D. Ho, S. Ghosal and N. Pantankar

Rehabilitation and Surgical Robotics: J. E. Colgate, K. M. Lynch, and M. Peshkin.

Implant Materials: C. Brinson

Bio-inspired Materials: H. Espinoza



For the thesis option, all nine of the required courses must be 300-level or above, at least five must be ME courses, and at least five must be 400-level. For the course-only option, 11 courses are required of which at least seven must be ME courses. To satisfy the breadth requirement, one course must be taken from three of the following six areas: Solids, Fluids, Biomedical/Biology, Design/Manufacturing/Tribology, Robotics/Controls, and Mathematics/Sciences.

Biological and Bio-inspired Engineering ME courses:

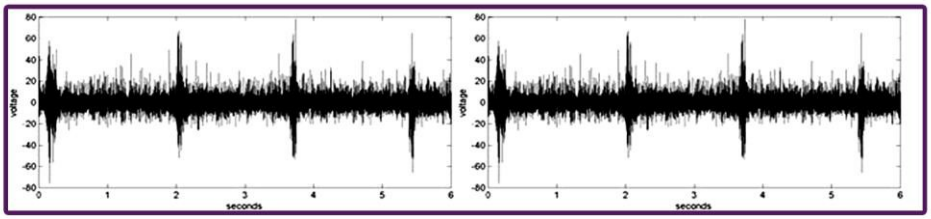
ME 389 Molecular Machines in Biology
ME 420 Micro and Nano Scale Fluid Dynamics
ME 462 Sensory Acquisition
ME 489 Selected Topics in Cellular-Level Transport
ME 495 Neuromechatronics
ME 495 Computational neuromechanics and neuroethology

Selected Nanotechnology courses in other departments:

BME 317	Biochemical Sensors
BME 380	Biomedical Transducers and Instrumentation
CEE 411	Micromechanics
CHEM 448	Computational Chemistry
ChBE 367	Fabrication of Microelectronic Devices
ChBE 379	Intro to Computational Biology
EECS 388	Microelectronic Technology
EECS 381	Electronic Properties of Materials
EECS 384	Solid State Electronic Devices
EECS 401	Fundamentals of Electronic Devices
ESAM 495	Interdisciplinary Nonlinear Dynamics
ESAM 346	Modeling and Computation in Science and Engineering
MSc 340	Ceramic Processing
MSc 355	Electronic Materials
MSc 361	Crystallography and Diffraction
MSc 376	Nanomaterials
MSc 380	Surface Science
MSc 415	Fundamentals of Thin Film Materials
MSc 434	Fracture of Materials
MSc 455	Solid State Physics of Nanomaterials
PHYS 422-1,2,3	Solid-State Physics

Additional course information available at these webpages:

ME courses: http://www.mech.northwestern.edu/web/courses/index.php
BME courses: http://www.bme.northwestern.edu/current/graduate/course_descriptions.html
ChBE courses: http://www.chem-biol-eng.northwestern.edu/gradpgm/courses/
EECS courses: http://www.eecs.northwestern.edu/academics/course/
ESAM courses: http://www.esam.northwestern.edu/courses/course_listing.html



In addition to Biology and Bio-inspired Engineering, MS degrees with other specialization options are available.

For more information contact:

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