McCormick

Northwestern Engineering

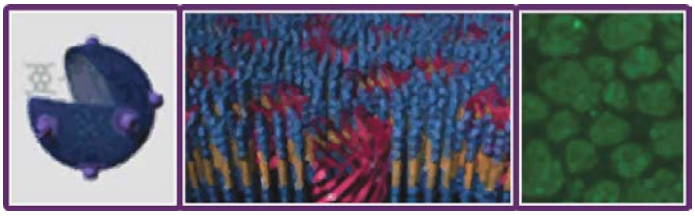
# MS Degree Programs in Mechanical Engineering

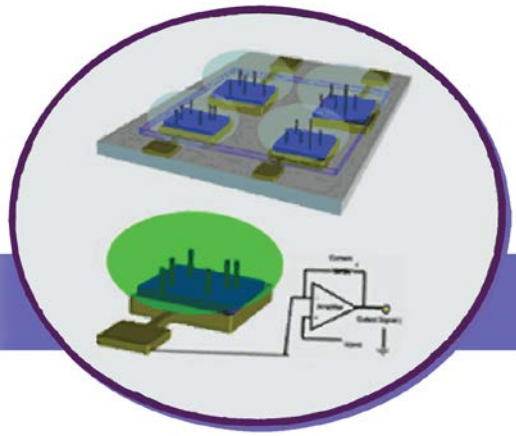
## MS Degree Specializing in Nanotechnology

**Enhance your resume with a Northwestern MS degree specializing in Nanotechnology.**

This program is for students finishing a BS in engineering or related field with a desire to move into the hot new field of nanotechnology. Dedicated, intensive and hands-on courses provide thorough training and preparation for exciting jobs. Fast-paced course-only MS option in as short at 9-months or course plus thesis option. Optional certificate in engineering management can be earned concurrently with study in an MS degree program.

Nano-scale research in our program focuses on the modeling and experimentation of novel materials and devices. Facilities include state-of-the-art labs and equipment for cutting-edge research.





- **Hands-on courses and projects**
- **State-of-the-art labs**
- **Focused advanced study in Nanotechnology**
- **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 Nanotechnology:

**H. Espinosa:** Micro and Nano Mechanics, MEMS, NEMS

**D. Ho:** Nanomedicine, bionanotechnology, drug delivery, biosensing and diagnostics

**C. Liu:** Sensors and sensing technology, micro and nanofabrication

**C. Sun:** micro/nano 3D fabrication technologies, design and manufacturing for metamaterials and devices

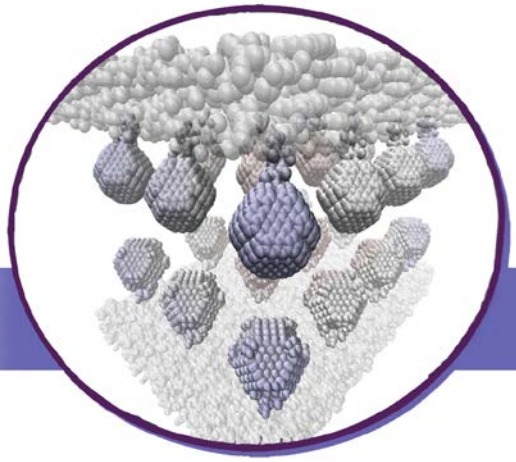
**C. Brinson:** Polymer and bioinspired nanocomposites

**J. Cao:** Microforming

**K. Ehmann:** Micro/meso-scale machine tools

**Q. J. Wang:** Nanotribiology

**T. Belytschko** and **W.K. Liu:** Nanomaterials and micro/nanomanufacturing, co-directors of NSF Summer Institute on Nanomechanics.



The thesis option requires nine classes at the 300-level (upper division level) or above, of which at least five must be ME courses, and at least five must be 400-level (graduate level), plus three project units (ME 590) culminating in a thesis. The course-only option requires eleven classes at the 300-level or above, of which at least seven must be ME courses, and at least five must be 400-level, plus one project unit (ME 499). To satisfy the breadth requirement, one course must be taken from three of the following seven areas: Solids, Fluids, Biomedical/Biology, Design/Manufacturing/Tribology, Robotics/Controls, Mathematics/Sciences, and Engineering Management.

## Nanotechnology Core Courses in ME:

ME 381 Introduction to MEMS

ME 382 Experiments in Micro/Nano Science and Engineering

ME 385 Nanotechnology

ME 445 Micromanufacturing

## Other Nanotechnology Courses in ME:

ME 317 Molecular Modeling and Interface to Micromechanics

ME 318 Molecular Modeling and Interface to Micromechanics II

ME 446 Advanced Tribology

ME 495 Computational Nanodynamics

ME 499-1 MEMS Microfabrication

ME 499-2 MEMS/Nano Instrumentation

ME 499-3 Nanofabrication Methods I

## Selected Nanotechnology Courses in other Departments:

CHEM 360 Nanoscale Patterning

CHEM 448 Computational Chemistry

ChBE 379 Intro to Computational Biology

EECS 381 Electronic Properties of Materials

EECS 384 Solid State Electronic Devices

EECS 388 Nanotechnology

MSc 340 Ceramic Processing

MSc 355 Electronic Materials

MSc 361 Crystallography and Diffraction

MSc 455 Physics of Nanostructures

PHYS 422-1,2,3 Condenced-Matter Physics

**Additional course information available at these webpages:**

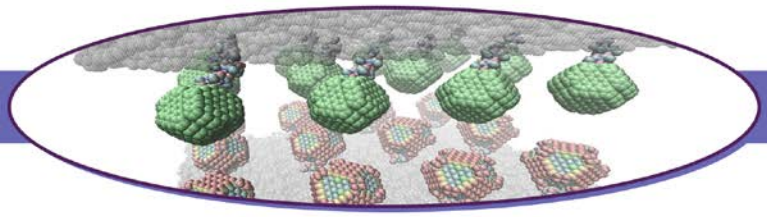
ME courses: http://www.mech.northwestern.edu/web/courses/

ChBE courses: http://www.chem-biol-eng.northwestern.edu/undergraduate/prospective/courses/index.html

EECS courses: http://www.eecs.northwestern.edu/academics/course-descriptions.html

MSC courses: http://www.matsci.northwestern.edu/2011-12_3qtr_schedule.pdf

Physics courses: http://www.physics.northwestern.edu/graduate/catalog.html



*In addition to Nanotechnology, MS degrees with other specialization options are available.*

**For more information contact:**

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