Mechanical Engineering Graduate Programs

M.S.

Ph.D.

Mechanics & Design

Thermofluids Engineering

Materials Science & Engineering

Graduate Advisers

- **Materials Science & Engineering**
  Professor Teiichi Ando, 249 SN
  617-373-3811, tando@coe.neu.edu

- **Mechanics & Design**
  Professor George Adams, 203 SN
  617-373-3826, adams@coe.neu.edu

- **Thermofluids Engineering**
  Professor Mo Taslim, 371 SN
  617-373-5514, m.taslim@neu.edu

Master of Science

- Thesis Option (6 courses + thesis;
  ~ 2 years, required for all students
  receiving department financial support)

- Non-thesis Option (8 courses; ~1.5 years)

PhD Program

- Direct BS to PhD (12 courses + dissertation, ~5 years)
- PhD (entering with MS degree, 6 courses + dissertation, ~4 years)
- PhD Qualifying Exam
  - Preliminary Exam
  - Area Exam
- Dissertation Defense

Preliminary Examination Subjects:

A
Engineering Mathematics
Engineering Computation
Probability and Statistics

B
Thermodynamics
Fluid Mechanics
Heat Transfer

C
Dynamics and Vibrations
Mechanics of Deformable Bodies
Dynamic Systems and Control
Finite Element Method

D
Materials Science
Mechanical Behavior of Materials
Thermodynamics of Materials
Kinetics of Phase Transformations
Polymer Science & Engineering

ME Graduate Courses

Mathematical Methods

- Mathematical Methods for Mechanical Engineers 1
- Mathematical Methods for Mechanical Engineers 2
- Advanced Mathematical Methods for Mechanical Engineers

Seminars

- Technical Writing and Matlab
- Research Seminars

Materials Science & Engineering

- Macroscopic Transport in Materials Processing
- Mechanical Behavior & Strengthening Mechanisms
- Thermodynamics of Materials
- Kinetics of Phase Transformations
- Properties & Processes of Electronic Materials
- Environmental Issues In Manufacturing & Product Use
- Corrosion of Materials
- Particulate Materials Process
- Structure, Properities & Processing of Polymeric Materials
- Advanced Materials Processing

Mechanics and Design

- Elasticity & Plasticity
- Dynamics & Mechanical Vibration
- Advanced Mechanics of Material
- Musculoskeletal Biomechanics
- Solid Mechanics - Cells & Tissues
- Control and Mechatronics
- Mechanics of Contact & Lubrication
- Theory of Plates & Shells
- Finite Element Method
- Advanced Finite Element Method
- Composite Materials
- Fracture Mechanics & Failure Analysis
- Advanced Vibration
- Continuum Mechanics
- Microelectromechanical Systems
- Nanomanufacturing

Thermofluids Engineering

- General Thermodynamics
- Essentials of Fluid Dynamics
- Statistical Thermodynamics
- Heat Conduction & Thermal Radiation
- Convective Heat Transfer
- Aerodynamics
- Combustion & Air Pollution
- Fundamentals of Combustion
- Computational Fluid Dynamics With Heat Transfer
- Heat Transfer Processes in Microdevices
- Solar Thermal Engineering
- Two-Phase Flow
- Turbulent Flow
- Aerosol Mechanics
- Turbomachinery Design

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MECHANICAL & INDUSTRIAL ENGINEERING

The Mechanical and Industrial Engineering Department at Northeastern University offers a wide variety of educational opportunities for undergraduate and graduate students. Undergraduate students receive a high quality classroom based education in conjunction with industrial work experience as part of our top rated cooperative education program. Graduate students work with our world renowned faculty to achieve research experience and their career goals.

Recent News

Water Powered Energy

The Ocean Renewable Power Company is using the designs for the Helical Turbine invented by MIE Professor Emeritus Alexander Gorlov to create a giant tidal powered turbine generator in Maine.

Visions from Mars

MIE Alum Megan Richardson who started as a coop and was later hired at NASA JPL in CA is part of the MSL team that recently placed the rover on Mars.

Congratulations Ming Wood

MIE middler Ming Wood was selected as the recipient of the $2500 Robert L. Peaslee-Detroit Brazing and Soldering Scholarship which will be presented at the AWS conference in Las Vegas. August 6, 2012

Ruberti Gets $240K Grant

FACULTY

Department Chair

- Jacqueline Isaacs

Associate Chair and Director of Industrial Engineering

- Emanuel Melachrinoudis

Faculty (A-L)

- George G. Adams
- Telichi Ando
- James Benneyan
- Ahmed Busnaina
- Srinath Chakravarthy
- John W. Cipolla
- Thomas Cullinane
- Randall Erb
- Nasser Fard
- Susan Freeman
- Donald Goldthwaite
- Andrew Gouldstone
- Jacqueline Griffin

Faculty (M-Z)

- Constantinos Mavroidis
- Hameed Metghalchi
- Marilyn L. Minus
- Ronald Mourant
- Sinan Muftu
- Uichiro Narusawa
- Hamid Nayeb-Hashemi
- Jim Papadopoulos
- Jeffrey W. Ruberti
- Vinod Sahney
- Sandra Shefelbine
- Reza Shekhi
- Rifat Sipahi

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- Faculty
- Affiliated and Visiting Scientists
- Emeritus Professors
- Academic Specialists
- Academic Advisors
- Post-Docs
- Co-op Advisors
- Staff

News

Cooperative Education

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- Ahmad [illegible]
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SRINATH CHAKRAVARTHY

Assistant Professor
Department of Mechanical & Industrial Engineering
334 Snell Engineering Center
360 Huntington Avenue
Boston, MA 02115

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email: s.chakravarthy@neu.edu

Research Interests

- Multi-scale/meso-scale numerical methods in development of predictive material modeling of micro/nanostructural features
- Mechanics

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Prospective Students

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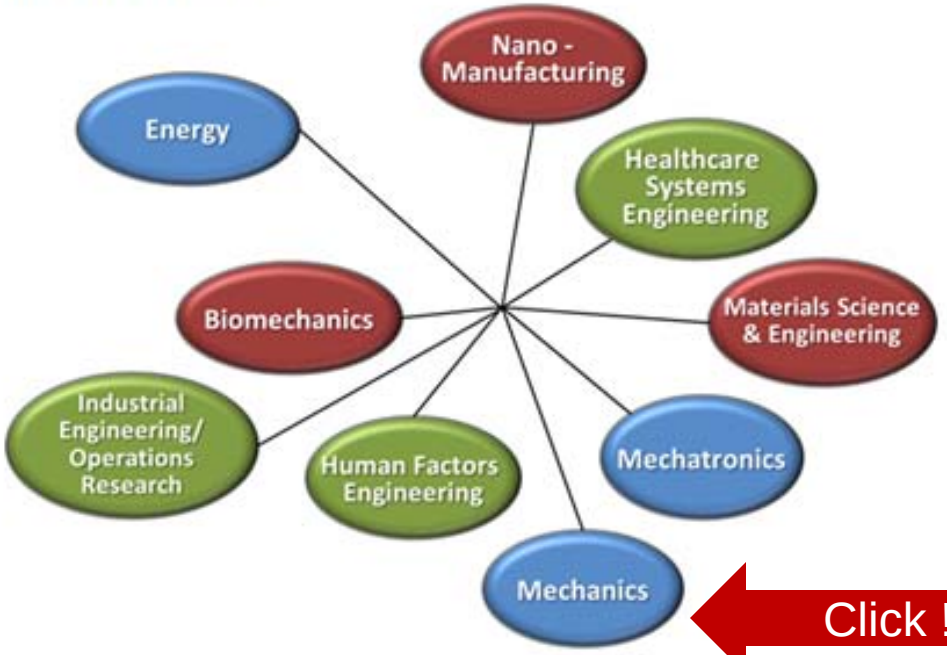
Research Areas

- Biomechanics
- Energy
- Healthcare Engineering Systems
- Human Factors Engineering
- Industrial Engineering Operations Research
- Material Science
- Mechanics
- Mechatronics
- Nano-Manufacturing
- Centers & Labs

People

RESEARCH AREAS



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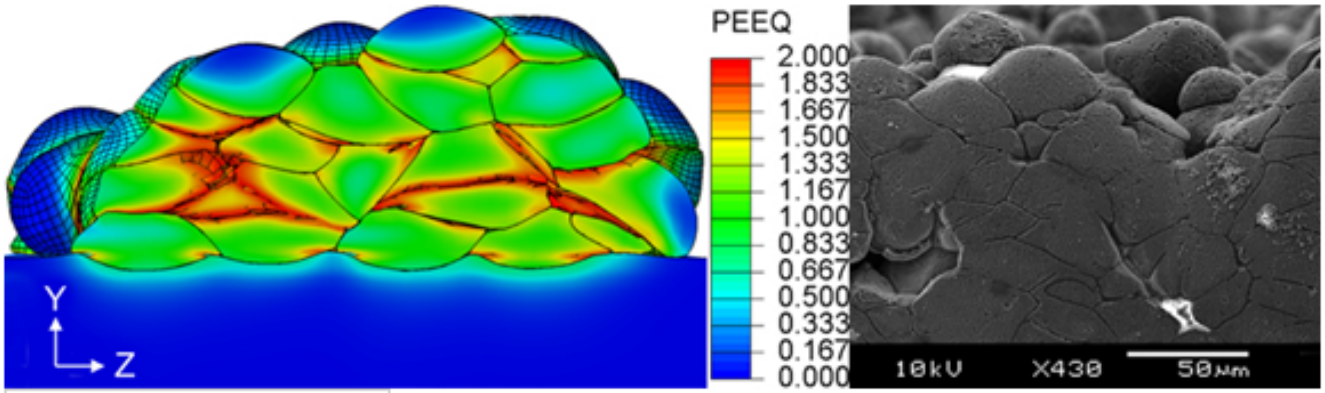

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Research Areas

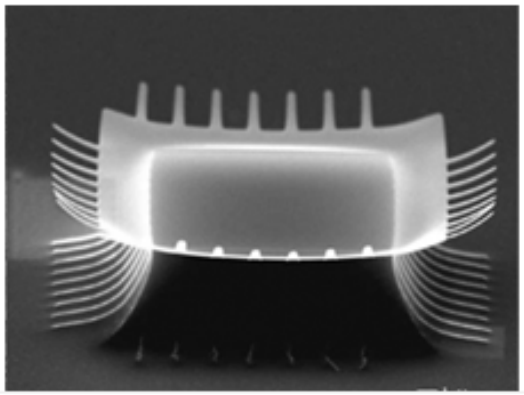
- Biomechanics
- Energy
- Healthcare Engineering Systems
- Human Factors Engineering
- Industrial Engineering Operations Research
- Material Science
- Mechanics
- Mechatronics
- Nano-Manufacturing
- Centers & Labs

People

MECHANICS

Advances in mechanics enable key engineering innovations. Using complementary computational, experimental, and design tools, the mechanics area is addressing challenges from nanoscale actuators and human health to energy systems and bridges. For example, our biomechanics research is creating robotic rehabilitation aids and a new understanding of cellular biomechanics and the assembly and degradation of biomaterials. At the tiniest length scales, we are creating a new understanding of nanomechanics, contact mechanics, tribology, MEMS, and the application of nanomaterials for energy storage systems. Our research goals also include the understanding, design and creation of piezoactive sensors and actuators as well as the stability assessment and control of dynamical systems. Our research and teaching together prepare students to understand and exploit mechanics to enable their future engineering innovations.

- Adams, George
- Chakravarthy, Srinath
- Gouldstone, Andrew
- Jalili, Nader
- Livermore, Carol
- Mavroidis, Constantinos
- Muftu, Sinan
- Nayeb-Hashemi, Hamid
- Sipahi, Rifat
- Vaziri, Ashkan
- Wan, Kai-Tak
- Zeid, Ibrahim



Mechanics Faculty

- Professor Adams
- Professor Chakravarthy
- Professor Hashemi
- Professor Jalili
- Professor Livermore
- Professor Mavroidis
- Professor Muftu
- Professor Ruberti
- Professor Sipahi
- Professor Vaziri
- Professor Wan

ENERGY

Developing and implementing energy solutions to maintain and grow our standard of living requires multifaceted solutions. Through the use of Mechanical Engineering sciences, not only will the future designs of renewable energy sources and nanoscale energy harvesting devices be conceived, but they will be integrated with existing systems to satisfy energy requirements of our society. Improving the energy usage of buildings through the use of better cooling and heating products designs, as well as introducing co-generation systems depends on educating the next generation of Mechanical Engineers. Research into combustion systems, designs to recycle waste to effective fuel sources and gas turbines are all integral parts of the energy solutions of the future that are embedded in the fabric of the Mechanical Engineering Department at Northeastern University.

- Busnaina, Ahmed
- Cipolla, John
- Coskun, Ahmet
- Jung, Yung Joon
- Kowalski, Gregory
- Levendis, Yiannis
- Liu, Yongmin
- Livermore, Carol
- Metghalchi, Hameed
- Narusawa, Uichiro
- Sheikhi, Reza
- Taslim, Mohammad
- Whalen, Richard
- Yener, Yaman

Faculty Research Websites

- Computational Energy and Combustion
- Thermodynamics and Combustion Laboratory

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YIANNIS LEVENDIS

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334 Snell Engineering Center
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Research Interests

- Energy

Faculty Website

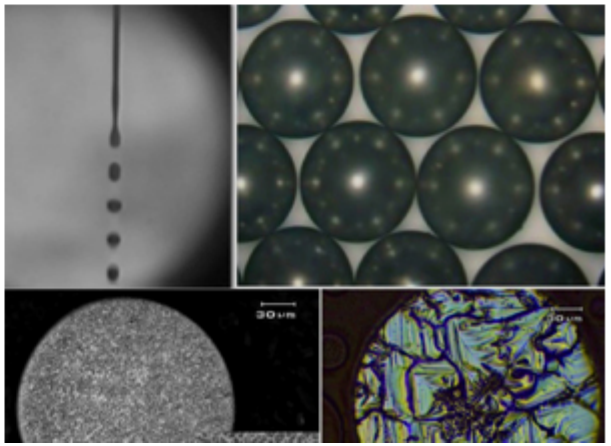
Thermofluids Faculty

- Professor Busnaina
- Professor Cipolla
- Professor Kowalski
- Professor Levendis
- Professor Metghalchi
- Professor Narusawa
- Professor Sheiki
- Professor Yener

MATERIAL SCIENCE ENGINEERING

Materials Science has been the key enabler in virtually all of the engineering breakthroughs that have occurred from early metal ages to the present nano-age. In step with the scientific development and discovery of materials, members of the MIE faculty are involved in interdisciplinary research to further materials processing, synthesis and design. Research areas are aligned with Northeastern University's broad initiatives of Sustainability, Security, and Health, as well as national initiatives in manufacturing and nanotechnology. Investigations in the areas of metals/alloys, polymers, bio-materials (including bio-mimetics), and composites incorporating nano-scale materials make use of experimental, theoretical, and computational techniques to tailor structure-processing-property relationships in materials for specific applications. Current areas of research include, controlling synthesis and assembly processes to produce well-defined atomic structures; defect engineering; manipulating atomic/micro-structures and the chemistry of materials to optimize properties for next-generation structural, electronic, and energy applications; solidification and deformation processing; and life cycle assessments for nano-composites/materials. The faculty and students are committed to creative thinking and engineering innovation to propel materials development to the forefront of scientific research.

- Ando, Teiichi
- Busnaina, Ahmed
- Gouldstone, Andrew
- Isaacs, Jacqueline
- Jung, Yung Joon
- Lee, HeaYeon
- Liu, Yongmin
- Minus, Marilyn
- Smyser, Bridget
- Upmanyu, Moneesh
- Vaziri, Ashkan



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ANDREW GOULDSTONE

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Secondary appointment in Chemical Engineering

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email: a.gouldstone@neu.edu

Research Interests

- Biomechanics
- Material Science Engineering
- Mechanics

Faculty Website

Materials Faculty

- Professor Ando
- Professor Gouldstone
- Professor Isaacs
- Professor Minus
- Professor Upmanyu

Mechanical and Industrial Engineering Office, 334 SN

Katherine Swan, Noah Japhet, and Joyce Crain Welcome YOU!

Next Steps…

- Meet with your adviser for program planning
- Register for Classes
- If you encounter registration problems, contact Ms. Lisa O'Neill (li.o'neill@neu.edu) or Mr. Bryce Cheney (b.cheney@neu.edu) in the Graduate School of Engineering Office (130 SN).