Graduate Studies in the Mechanical, Industrial and Manufacturing Engineering Department at The University of Toledo

• Efstratios Nikolaidis, Graduate Director
• Ray Hixon, Group Leader, Thermal & Fluid
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Outline

1. Why pursue graduate studies
2. Why in MIME at the University of Toledo
3. Your prospects: graduate programs
4. How to apply and get a graduate assistantship
1. Why pursue graduate studies

Education pays:

<table>
<thead>
<tr>
<th>Unemployment rate in 2010 (%)</th>
<th>Median weekly earnings in 2010 ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.9</td>
<td>Doctoral degree</td>
</tr>
<tr>
<td>2.4</td>
<td>Professional degree</td>
</tr>
<tr>
<td>4.0</td>
<td>Master's degree</td>
</tr>
<tr>
<td>5.4</td>
<td>Bachelor's degree</td>
</tr>
<tr>
<td>7.0</td>
<td>Associate degree</td>
</tr>
<tr>
<td>9.2</td>
<td>Some college, no degree</td>
</tr>
<tr>
<td>10.3</td>
<td>High school diploma</td>
</tr>
<tr>
<td>14.9</td>
<td>Less than a high school diploma</td>
</tr>
</tbody>
</table>

Average: 8.2%


Higher Pay
Better Job Security
Invest your time doing what you like

BS

- R&D, Conceptual Design
- Management
- CAD, drafting
- Operations, labor

MS

Ph.D.
2. Why MIME

• One of the best departments on campus and in Ohio, with advanced research programs

• 24 faculty members
  – Society fellows: ASME (5), American Ceramic Society (1)
  – Six book authors
  – Journal editors, associate editors, conference chairs
Why MIME (continued)

Dr. Mohamed Samir Hefzy
ASME Fellow

Dr. Sarit Bhaduri
Fellow American Ceramic Society
Why MIME (continued)

• $6.4 M annual sponsored research
  – Government: ARO, NASA, NIH, NREL, NSF
  – Industry: Bell Helicopter Textron, Chrysler, Cooper Tire and Rubber, Eaton, Ford, GM, Orbital Research

• Excellence awards in teaching, research and service
2. Why MIME (continued)

• Excellent job placement prospects
  – Close ties to the industry
  – Faculty and students’ reputation

• Examples of employers:
  – Johns Hopkins University
  – University of Minnesota
  – Universitatea Tehnica "Gh. Asachi" Iasi
  – NASA Glenn
  – Biorand
  – Chrysler
  – Ford Motor
  – GM R&D, Warren, MI
  – Honda
  – John Deere
  – Kimberly-Clark Corporation
  – NSK Motion and Control
  – SDRC
  – Stryker
3. Your prospects: graduate programs

- MS or Ph.D. options
- MIME graduate program is specialized in terms of both teaching and research
  
  1. Manufacturing
  2. Solid Mechanics and Design
  3. Thermal Sciences and Fluids

You will select one focus area; this choice will determine your course work, research and expertise
Graduate Programs

• MS
  – Thesis option
    • 30 semester credit hours
      – Course work: 21 credit hours
      – Thesis: 9 credit hours
    • Research oriented
    • Expected to publish at least one refereed journal paper
    • Duration: 1-2 years
  – Coursework only option (less common)
    • 36 semester credit hours
    • No funding
    • Suitable for students working in industry/government
PhD Program

• Can register after MS, or directly from BS

• Research-Based Degree
  – 60 credit hours beyond MS
  – No specific topic requirements
  – Duration: 3-4 years after MS

• Dissertation Research:
  – Between 30-45 credits depending on coursework

• Dissertation
  – Significant, consequential, original piece of work
  – Expected to publish at least two refereed journal papers
Research Opportunities

Manufacturing
Nanotechnology and MEMS
Material Joining Laboratory
Precision Micromachining

Solid Mechanics and Design
Nanocomposites
Biomechanics and Smart Materials
Experimental and Analytical Research on Fatigue
Fuel Cells

Thermal Sciences and Fluids
Small Turbines
Computational Aeroacoustics
Wind Turbine Research
High Performance Computing
Nanotechnology and MEMS

• Current Research Projects:

1. **Graphene based multiplexed Sensors:** Investigation of carbon nanotube and graphene, and other single layer materials for sensor applications.

2. **Laser Processing of Thin Films:** Investigation of the fundamental phenomena of laser irradiation on metal oxide-based thin films relevant to sensor performance

Dr. A. H. Jayatissa (Jay)
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Material Joining Laboratory:
High Performing Friction–Stir Riveted Joints
Dr. Hongyan Zhang and Dr. A. Jayatissa
Dr. Ioan Marinescu

Projects 2011
• Nano ELID Technologies for Semiconductors Industry
• Nano Polishing of AlTiC Sliders
• Precision Burnishing for Aerospace Industry
• Heat Transfer/Fluid Mechanics Modeling of Grinding
• UV Bonding of Abrasive Tools

• Contact: Professor Ioan Marinescu
Modeling electrical percolation onset in polymer nanocomposites

Dr. Lesley Berhan

Percolation in nanocomposites is of high interest because of the potential to create electrically and/or thermally conductive systems with an extremely low mass of particles. The study of percolation is relevant to many areas including thermal management, EMI shielding, and lightning strike protection.
Biomechanics and Smart Materials Research: New spinal implant device for minimally invasive surgery, faster recovery
Dr. V. Goel* and Dr. M. Elahinia

* Bioengineering Department
Fatigue Research Laboratory, Dr. A. Fatemi
Conductive and Oxidation Resistant Silicates-Silver (Dr. Y. Gan)

**Objective**

Develop glass-based electrode materials for high temperature thermoelectric energy conversions
Small Gas Turbine Slinger Design for Combustion Chamber
Dr. K.C. Masiulaniec & Dr. A.A. Afjeh
Direct Prediction of Turbulent Wake Noise with Computational Aeroacoustics (Sescu/Hixon)

Perturbation vorticity magnitude snapshot
Linux HPC Cluster

- Dr. C. Sheng, Director

- 268-core 2.66 GHz Xeon processors
- 584 GB 1333 Mhz RAM
- 10 TB MD 3000 storage with RAID6
- Three times faster than Ohio Supercomputing Center (OSC)
Research and Curriculum Development on Wind Turbines: Drs. Afjeh, Cioc and Nikolaidis
4. Apply for admission and graduate assistantship

Minimum requirements for admission:

- **MS:**
  - Minimum GPA: 2.7/4.0
  - If the undergraduate program is not ABET accredited, GRE: verbal, quantitative and analytic portions equal to or in excess of 450 and 700 and 4.0
  - If the baccalaureate institution is located in a country where English is not the native language, scores from the Test of English as a Foreign Language (TOEFL) equal to or in excess of 550 (for paper test) or 213 (for computer test) must be submitted.

- **Ph.D.:**
  - Minimum GPA: 3.3/4.0
  - If the institution granting the MS degree has an ABET accredited baccalaureate engineering program and the language of the thesis is English, the above is sufficient.
  - If the baccalaureate program of the institution granting the MS degree is not ABET accredited, then results of the GRE must be submitted with scores on the verbal, quantitative and analytic portions equal to or in excess of 450 and 700 and 4.0, respectively.
  - If the student has both the baccalaureate and MS degrees from institutions, located in countries where English is not the native language, scores from the TOEFL at least 550 (or 213) must be submitted.
Applying for Admission

- Having a B.S. in Engineering from UT or other ABET accredited, highly regarded institutions,
  with GPA >3.0, highly likely to be admitted to MS program, and
  GPA> 3.4, highly likely to receive tuition scholarship and stipend
- For details visit at
  http://www.eng.utoledo.edu/mime/faculty_staff/index.php
  http://www.eng.utoledo.edu/~enikolai/
- Get information about required documents for application:
  http://www.utoledo.edu/graduate/prospectivestudents/admission/guidelines.html
- Apply on line:
  http://www.utoledo.edu/graduate/prospectivestudents/admission/mainapply.html
- Deadline for Fall 2012: March 1, 2012.
  Please apply for admission earlier to meet application processing timeline.
How to get financial support

• Fill out graduate assistantship application, available on the webpage of the college of graduate studies
• Tuition scholarship (TS): Pays tuition only, student is responsible for living expenses, including health insurance
• Research assistantship (RA): Pays both tuition and stipend.
  – MS stipend: $13,000 (approximate) for Fall and Spring semester (total)
  – Ph.D. stipend: $16,000 (approximate)
  – Work on research project (externally funded)
• Teaching assistantship (TA): Pays both tuition and stipend at same level as RA, but you have to work as a teaching assistant.