MECHANICAL ENGINEERING (ENME)

Graduate Degree Program
College: Engineering

Abstract
The Department of Mechanical Engineering offers graduate study leading to the Master of Science and Doctor of Philosophy degrees. In addition, students may pursue a Master of Engineering degree through the Professional Master's Program of the Office of Advanced Engineering Education. The Department's instruction and research are carried out through the following four divisions:

1. Design and Reliability of Systems;
2. Electronic Products and Systems;
3. Mechanics and Materials; and

Design and Reliability of Systems
(Formerly known as Design, Risk Assessment and Manufacturing) - The focus of this area of concentration is the study of:

- Product and process design and decision making;
- Manufacturing system modeling and automation;
- Manufacturing process modeling and control;
- Reliability and failure modes associated with specific semiconductor devices;
- Manufacturing technology designed specifically to meet high standards for yield and quality;
- Reliability test methods for various electronic or mechanical devices;
- Test screening of parts or systems to eliminate latent defects;
- Reliability and safety assessment tools for complex aerospace, nuclear, or chemical process systems.

Electronic Products and Systems
This area of concentration addresses the fundamental methods to attain more cost-effective and reliable electronic packaging. Areas of specialization include:

- Electronic packaging;
- Materials characterization;
- Acceleration testing;
- Condition monitoring;
- Computer aided life cycle engineering (CALCE).

Mechanics and Materials
This division concentrates on the study of analytical and experimental fundamentals of mechanics and materials. Areas of specialization include:

- Computational modeling;
- Control systems;
- Design, characterization, and manufacturing of materials;
- Elasticity;
- Experimental mechanics;
- Fracture mechanics;
- Linear and nonlinear mechanics;
- Micro-nano-bio systems;
- Noise and vibration control;
- Nonlinear dynamics;
- Robotics and intelligent machines;
- Smart structures.

Thermal, Fluids and Energy Sciences
This division encompasses two broad disciplines: thermal science and fluid mechanics. Areas of specialization include:

- Heat transfer;
- Combustion;
- Energy systems analysis;
- Hydrodynamics;
- Turbulence;
- Computational fluid dynamics (CFD).

Reliability and Risk Engineering
This program covers aspects of engineering related to reliability and risk assessment. The primary areas of specialization include:

- Microelectronic reliability;
- Reliability analysis;
- Risk analysis;
- Software reliability.

Financial Assistance
Financial assistance is available to highly qualified students in the form of research and teaching assistantships. The most outstanding applicants are offered fellowships. Students seeking financial assistance should submit with their applications a current resume or CV as well as a statement regarding their qualifications and/or past research or teaching experience. Financial assistance is sought for all worthy students. For example, the following fellowships are available for incoming Ph.D students; Dean's Fellowships (supplements Teaching Assistantships and Research Assistantships; managed by the A. James Clark School of Engineering); University Fellowships administered by the Graduate School (supplements Teaching Assistantships and Research Assistantships); and LSAMP Bridge to the Doctorate Fellowship. Current graduate students may also apply to the Clark School's Future Fellows Program; Dissertation Fellowship from the Graduate School; Litton Fellowship (ME & ECE); and other internally awarded and administered fellowships and scholarships. Assistance is also available in identifying and applying for prestigious external fellowships. ARCS Fellowship.

Contact
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Hugh A. Bruck
Admissions

General Requirements

- Statement of Purpose
- Transcript(s)
- TOEFL/IELTS/PTE (international graduate students)

Program-Specific Requirements

- Letters of Recommendation (3)
- Graduate Record Examination (GRE)
- CV/Resume
- Publications/Presentations

The programs leading to the M.S. and Ph.D. degrees are open to qualified students holding a bachelor's degree in mechanical engineering. Admission may also be granted to students with degrees from other areas of engineering, mathematics, and physical sciences. In some cases, students may be required to take undergraduate courses to fill gaps in their background.

For more admissions information or to apply to the program, please visit our Graduate School website: www.gradschool.umd.edu/admissions

Application Deadlines

<table>
<thead>
<tr>
<th>Type of Applicant</th>
<th>Fall Deadline</th>
<th>Spring Deadline</th>
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<tr>
<td>Domestic Applicants</td>
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<td>International Applicants</td>
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<tr>
<td>F (student) or J (exchange visitor) visas, A, E, G, H, I and L visas and immigrants</td>
<td>15 Mar</td>
<td>28 Sep</td>
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</table>

Other Deadlines: Please visit the program website at http://www.enme.umd.edu

Requirements

- Mechanical Engineering, Doctor of Philosophy (Ph.D.) (https://academiccatalog.umd.edu/graduate/programs/mechanical-engineering-enme/mechanical-engineering-phd)
- Mechanical Engineering, Master of Science (M.S.) (https://academiccatalog.umd.edu/graduate/programs/mechanical-engineering-enme/mechanical-engineering-ms)

Facilities and Special Resources

The department and college of engineering provide access to a wide variety of experimental and computing facilities. Selected department computer resources include approximately 100 networked PC systems and 100 UNIX workstations. In addition, an enriched CAD computing environment is provided through a large number of third-party software products, including computer aided design applications.

Faculty

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First/Middle Name</th>
<th>Graduate Faculty Status</th>
<th>Academic Credentials</th>
<th>Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anand</td>
<td>Davinder K.</td>
<td>Full Member</td>
<td>B.S., George Washington University, 1959; M.S., 1961; Ph.D., 1965. GCEN Academic Advisor for Energetic Concepts Development</td>
<td>Professor Emeritus, Mechanical Engineering</td>
</tr>
<tr>
<td>Name</td>
<td>Status</td>
<td>Position</td>
<td>University</td>
<td>Degree</td>
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</tr>
<tr>
<td>Armstrong</td>
<td>Full</td>
<td>Professor Emeritus, Mechanical Engineering</td>
<td>University of California</td>
<td>2007</td>
</tr>
<tr>
<td>Berger</td>
<td>Full</td>
<td>B.S., University of Pennsylvania, Mechanical Engineering</td>
<td>M.S., Dr.</td>
<td>1959</td>
</tr>
<tr>
<td>Bergles</td>
<td>Non-Member</td>
<td>Assistant Professor, Mechanical Engineering</td>
<td>University of Maryland</td>
<td>1962</td>
</tr>
<tr>
<td>Bernard</td>
<td>Full</td>
<td>B.E., City University of New York-City College, Mechanical Engineering</td>
<td>Ph.D.,</td>
<td>1977</td>
</tr>
<tr>
<td>Bigio</td>
<td>Full</td>
<td>B.S., Case Western Reserve University, Mechanical Engineering</td>
<td>University of Maryland</td>
<td>1971</td>
</tr>
<tr>
<td>Bergbreiter</td>
<td>Full</td>
<td>Associate Professor, Mechanical Engineering</td>
<td>University of Maryland</td>
<td>1968</td>
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<tr>
<td>Buckley Jr.</td>
<td>Non-Member</td>
<td>B.S., University of Maryland, Mechanical Engineering</td>
<td>University of Maryland</td>
<td>1959</td>
</tr>
</tbody>
</table>


Aute Vikrant C. Non-Member B.E., 1997; M.Sc., University of Maryland; Ph.D., 2010, University of Maryland.

Azarm Shapour Full Member B.S., University of Tehran, 1977; M.S., George Washington University, 1979; Ph.D., University of Michigan-Ann Arbor, 1984.

Balachandran Balakumar Full Member B.Tech., Indian Institute of Technology-Madras, 1985; M.S., Virginia Polytechnic Institute & State University, 1986; Ph.D., 1990.

Bar-Cohen Avram Full Member Ph.D., Massachusetts Institute of Technology, 1971.


Bergbreiter Sarah E. Full Member B.E., Princeton University, 1999; M.S., University of California-Berkeley, 2004; Ph.D., 2007.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Choo Kyosung</td>
<td>Non-Member</td>
<td>B.S., 2005, Handong University; M.S., 2007, Korea Advanced Institute of Science &amp; Technology; Ph.D., 2011, Korea Advanced Institute of Science &amp; Technology</td>
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<tr>
<td>Chopra Nikhil</td>
<td>Full Member</td>
<td>Bachelor of Technology Honors Mechanical Engineering, Indian Institute of Technology, Kharagpur, India, 2001; Ph.D., Systems and Entrepreneurial Engineering, University of Illinois at Urbana-Champaign, 2006.</td>
</tr>
<tr>
<td>Chung Peter</td>
<td>Full Member</td>
<td>B.S., 1994, University of Virginia; M.S., 1996, University of Minnesota; Ph.D., 1999, University of Minnesota</td>
</tr>
<tr>
<td>Cukier Michel</td>
<td>Full Member</td>
<td>Ph.D., National Polytechnic Institute of Toulouse, France, 1996</td>
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<tr>
<td>Cunniff Patrick F.</td>
<td>Full Member</td>
<td>B.C.E., Manhattan College, 1955; M.S., Virginia Polytechnic Institute &amp; State University, 1956; Ph.D., 1962.</td>
</tr>
<tr>
<td>Dally James W.</td>
<td>Full Member</td>
<td>B.S., Carnegie Institute of Technology, 1951; M.S., 1953; Ph.D., Illinois Institute of Technology, 1958.</td>
</tr>
<tr>
<td>Name</td>
<td>Degree Details</td>
<td>Full Member</td>
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<tr>
<td>DeVoe Donald</td>
<td>B.S., University of Maryland-College Park, 1991; M.S., 1993; Ph.D., 1997.</td>
<td>Full Member</td>
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<tr>
<td>Dessiatoun Serguei</td>
<td>B.S., 1972, Donets Polytechnic Institute; M.S., 1980, Moscow Technical University; Ph.D., 1987, Moscow Automobile Institute</td>
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<td>Dieter George E., Jr.</td>
<td>B.S., Drexel University, 1950; Sc.D., Carnegie-Mellon University, 1953.</td>
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<td>Droguett Enrique</td>
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<tr>
<td>Firebaugh Millard S.</td>
<td>SB, MIT, 1961; Professor of Practice, Mechanical Engineering</td>
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</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Full Member</td>
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<tr>
<td>Gupta Satyandra K.</td>
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<td>Han Bongtae</td>
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Professor Emeritus, Mechanical Engineering
Associate Professor, Mechanical Engineering
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution and Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sengers</td>
<td>Full Member</td>
<td>B.S., University of Amsterdam, 1952; M.S., 1955; Ph.D., 1962; M.Sc., Brown University, 1968; Ph.D., Brown University, 1972.</td>
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<td>Severinsky</td>
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<td>Shooshtari</td>
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<td>Stoliarov</td>
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<td>B.S., Cornell University, 1983; M.S., University of Massachusetts Engineering Amherst, 1986; M.S., University of Michigan, Ann Arbor, 1994; Ph.D., University of Michigan, Ann Arbor, 1995.</td>
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</tr>
<tr>
<td>Short</td>
<td>Non-Member</td>
<td>PhD, University of California at Berkeley</td>
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</tbody>
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diMarzo Marino Full Member Dr. Ing., University of Naples-Italy, 1976; Ph.D., 1986. Professor, Fire Protection Engineering