



[www.engr.wisc.edu/ep](http://www.engr.wisc.edu/ep)

## DEGREES OFFERED

MS and PhD in:

- Engineering Mechanics
- Nuclear Engineering and Engineering Physics

## GRADUATE ENROLLMENT (9/05)

- Engineering Mechanics—30
- Nuclear Engineering and Engineering Physics—58
- Non-EP students advised or supported by EP faculty—28

## FACULTY

- 14 Professors
- 7 Associate Professors
- 4 Assistant Professors
- 6 Affiliate Professors

## ACADEMIC STAFF

- 5 Lecturers and Researchers
- 2 Postdoctoral Fellows
- 8 Assistant Scientists
- 4 Associate Scientists
- 3 Senior Scientists
- 3 Research Professors

## RESEARCH FUNDING

More than \$17.5 million in 2004-2005

COLLEGE OF ENGINEERING UNIVERSITY OF WISCONSIN-MADISON

# AT A GLANCE

NUCLEAR ENGINEERING ENGINEERING PHYSICS ENGINEERING MECHANICS & ASTRONAUTICS

## INDICATORS OF QUALITY

- Nuclear engineering ranked in top five graduate programs for more than 40 years
- Three members of the National Academy of Engineering
- Two Wisconsin Distinguished Professorships
- Four named professorships

## AREAS OF EMPHASIS IN THE GRADUATE PROGRAM

### Mechanics of Materials

*(Professors Allen, Blanchard, Bonazza, Carpick, Crone, Drugan, Kammer, Lakes, Malkus, Plesha, Smith, Waleffe, Witt)* Engineering mechanics concerns the fundamental study of force, stress, deformation and motion as applied to engineering materials and structures. Research is conducted with a wide range of experimental, computational and theoretical techniques. Materials and structures under study include shape memory alloys, nanostructured films, biomaterials, bone and soft tissue, geomaterials, space structures, viscoelastic liquids, and fiber-reinforced composites. Close collaboration with the Departments of Materials Science & Engineering and Biomedical Engineering is emphasized.

### Nuclear Systems Engineering

*(Professors Allen, Bier, Bisognano, Blanchard, Bonazza, Corradini, Henderson, Kulcinski, Moses, Pfothenauer, Wilson, Witt)* Nuclear systems engineering emphasizes research in radiation transport and neutronics, materials science and engineering, and thermal-hydraulics, as well as risk analysis and systems integration studies for fission reactors, fusion systems, accelerators and medical applications of nuclear technology. These efforts are conducted in bench-top labs as well as large-scale experimental facilities in combination with theoretical and computational modeling. Close collaboration with the Departments of Mechanical Engineering and Medical Physics is emphasized in student, research scientist and faculty teams.

### Plasma Science and Engineering

*(Professors Callen, Fonck, Hegna, Hershkowitz, Moses, Sovinec, Whyte)* Plasma science and engineering emphasizes high-temperature plasmas for fusion energy applications (both magnetic and inertial), low-temperature plasmas for industrial applications, such as plasma processing and plasma-aided manufacturing, and basic plasma physics. The research carried out is both experimental and theoretical/computational. Close collaboration with the Departments of Physics and Electrical & Computer Engineering is emphasized. UW-Madison has one of the largest and most highly regarded plasma physics programs in the United States.



## RESEARCH CENTERS/FACILITIES

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Departmental centers and research groups, and interdepartmental research centers and facilities in which the department faculty have a significant involvement, include the following:

Center for Human Performance and Risk Analysis  
Center for Mathematical Sciences  
Center for Plasma-Aided Manufacturing  
Center for Plasma Theory and Computation  
Fusion Technology Institute  
Materials Research Science and Engineering Center  
Materials Science Center  
Materials Science Program  
Mechanics and Materials Research Group  
Pegasus Plasma Experiment  
Rheology Research Center  
Synchrotron Radiation Center  
UW Nuclear Reactor  
Wisconsin Institute of Nuclear Systems  
Wisconsin Plasma Processing and Technology Research Consortium  
Wisconsin Shock Tube  
Wisconsin Structures and Materials Testing Laboratory

*Further information on these centers can be found on the department website: [www.engr.wisc.edu/ep](http://www.engr.wisc.edu/ep)*

## EMERITUS FACULTY

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James D. Callen, Max W. Carbon, Gilbert A. Emmert, David S. Malkus, William F. Vogelsang

## AFFILIATE FACULTY

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Paul M. DeLuca Jr., Thomas Rockwell Mackie, Dane Morgan, Izabela Szlufarska, Bruce R. Thomadsen, Ray Vanderby Jr.

## THE FACULTY AND THEIR RESEARCH AREAS

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**Todd R. Allen**, Assistant Professor. Nuclear materials, radiation damage of materials.

**Vicki M. Bier**, Professor. Probabilistic risk analysis, reliability, decision-making theory, game theory, uncertainty analysis.

**Joseph J. Bisognano**, Professor; Director, Synchrotron Radiation Center. Accelerator physics, theoretical analyses of stochastic cooling phenomena.

**James P. Blanchard**, Professor. Plant life extension and properties of materials, fission/fusion radiation damage, MEMS micronuclear technologies.

**Riccardo Bonazza**, Associate Professor. Shock interface interactions, vapor explosion phenomena, experimental fluid mechanics.

**Robert W. Carpick**, Associate Professor. Friction and mechanics at the atomic/nanometer scale, scanning probe microscopy, nanostructured materials.

**Michael L. Corradini**, Wisconsin Distinguished Professor. Thermal hydraulics and multiphase flow in reactor operation and safety, waste disposal, risk analysis.

**Wendy C. Crone**, Associate Professor. Experimental mechanics of materials, plasticity, mechanics in shape memory alloys, metallic single crystals, biomaterials.

**Walter J. Drugan**, Professor. Nonlinear fracture mechanics, plasticity theory, advanced materials, shock waves in solids, continuum mechanics, applied math.

**Raymond J. Fonck**, Steenbock Professor. Experimental research in plasma physics, atomic processes in high-temperature plasmas, applied optics.

**Chris C. Hegna**, Professor. Plasma theory for magnetic confinement and instabilities of high-temperature plasmas, experimental scaling and analysis.

**Douglass L. Henderson**, Professor. Radiation transport, transmutation of nuclear waste, fusion reactor neutronics and activation.

**Noah Hershkowitz**, Irving Langmuir Professor. Experimental studies of ICRF effects of fusion plasmas, basic plasma physics, plasma processing.

**Daniel C. Kammer**, Professor. Dynamics, stability and control of large structures, system identification, nonlinear dynamics.

**Gerald L. Kulcinski**, Grainger Professor and Associate Dean of Research. Nuclear materials, radiation damage, fusion reactor design studies.

**Roderic S. Lakes**, Wisconsin Distinguished Professor. Experimental mechanics, composite materials, biomechanics, nanomechanics.

**Gregory A. Moses**, Professor. Modeling of dense plasmas for inertial confinement fusion, parallel computation of particle transport.

**John M. Pfothner**, Professor. Applied superconductivity and cryogenics.

**Michael E. Plesha**, Professor. Finite element and numerical methods, structural dynamics, contact-friction problems.

**Leslie M. Smith**, Professor. Applied mathematics, computational fluids, turbulence.

**Carl R. Sovinec**, Assistant Professor. Computational plasma physics, 3D-MHD.

**Fabian Waleffe**, Professor. Applied mathematics, fundamentals of fluids, turbulence.

**Paul P.H. Wilson**, Assistant Professor. Neutron diffusion and neutron transport, fuel cycle analysis and inventory analysis, generation IV reactor design and analysis.

**Robert J. Witt**, Associate Professor. Finite element methods in solid/fluid mechanics.

**Dennis Whyte**, Assistant Professor. Experimental plasma physics, ion-material interaction.