



GRADUATE STUDY *at*



The Department of Mechanical Engineering (MECH) offers graduate degree programs that emphasize fundamental and applied aspects of mechanical engineering. The graduate educational and research programs lead to degrees of Master of Science (MS), Doctor of Philosophy (PhD), and Master of Mechanical Engineering (MME). The MS and PhD degrees require research and theses, while the MME is a non-thesis degree.

Graduate education and research in mechanical engineering includes the traditional subjects such as aerospace engineering, biomedical systems, computational fluid mechanics, computational mechanics, fluids-thermal science, mechanical design, mechanics, robotics, and systems dynamics and controls.

The MECH graduate program actively partners with other departments, campus institutes, the Texas Medical Center, and industry in its educational and research activities. These collaborations reflect the comprehensive scope of the research activities that make graduate study in mechanical engineering a rewarding experience.

DEGREE REQUIREMENTS

The M.S. degree requires successful completion of at least 24 semester hours of study (including six hours of thesis), of which 18 hours must have been at Rice. Upon completion of the thesis, students are required to defend the M.S. dissertation in a public oral examination. The non-research master's degree requires the completion of at least 30 semester hours of course work approved by the department.

The Ph.D. degree requires successful completion of 36 semester hours of course work, a minimum of 90 total semester hours (thesis research + course work) and an oral qualifying examination. Graduate students are required to defend the dissertation for their Ph.D. in a public oral examination.

The minimum residence requirement is four semesters for the Ph.D. degree and one semester for the master's degree. All entering graduate students pursuing a thesis degree will be subject to the Preliminary Candidacy Evaluation for the highest degree they intend to pursue. Students will be evaluated within the second semester of enrollment.

FACULTY

J. E. Akin. Professor of Mechanical Engineering, Professor of Computational and Applied Mathematics. Ph.D. (1968) Virginia Polytechnic Institute. Dr. Akin's fields of interest are finite element analysis, computer-aided design and object-oriented programming. His research activities involve adaptive finite element analysis and the use of computational mechanics in industrial applications. He is the author of six textbooks and has published more than 120 papers. Dr. Akin is a fellow of the American Society of Mechanical Engineers (ASME). He is a member of the American Society of Civil Engineers, the Society of Petroleum Engineers, the American Society for Engineering Education and the editorial board of the journal *Engineering Computations*.



Yildiz Bayazitoglu. Harry S. Cameron Professor in Mechanical Engineering and Materials Science. Ph.D. (1974) University of Michigan. Dr. Bayazitoglu's research interests are in the area of thermal sciences, including thermal properties; radiation heat transfer; and problems of combined conduction, convection and radiation in manufacturing and material processing. In 1999, Dr. Bayazitoglu received the George R. Brown Award for Superior Teaching at Rice University. She was a recipient of the Society of Women Engineers' National Distinguished Engineering Educator Award in 1997. In 2002, she received the Will Rice College Outstanding Associate Award, the Graduate Student Association Mentoring and Teaching Award and the Rich Inventor Award. She is the 2003 recipient of the Chance Prize for Excellence in Teaching. She is a fellow of ASME, fellow of AAAS, associate fellow of AIAA, recipient of the 2004 Heat Transfer Memorial Award and a member of the U.S. Scientific Committee of the Center for International Heat Transfer. Dr. Bayazitoglu is an editorial board member of the *Thermal Science and Engineering Journal* and the editor-in-chief of the *International Journal of Thermal Sciences*.



**GRADUATE STUDY
IN MECHANICAL
ENGINEERING**
RICE UNIVERSITY

WWW.MECH.RICE.EDU

FOR ADMISSION
IN 2014

Michael M. Carroll. Burton J. and Ann M. McMurtry Professor of Computational and Applied Mathematics and Professor of Mechanical Engineering. Ph.D. (1965) Brown University; D.Sc. (1979) National University of Ireland. Dr. Carroll's research interests are in solid mechanics, the mechanics of porous materials, and mechanics and sport. He is a member of the National Academy of Engineering; fellow of the American Academy of Arts and Sciences, American Academy of Mechanics; fellow and honorary member of the American Society of Mechanical Engineers. Dr. Carroll is a former chair of the Applied Mechanics Division of ASME and a former president of the Society for Engineering Science and of the American Academy of Mechanics. He is chair of the Peer Review Committee of the HENAAC Hall of Fame and a recipient of the HENAAC Chairman's Award. He is an adjunct professor of mathematical physics at the National University of Ireland, Galway; and he received an L.L.D. (honoris causae) from the National University of Ireland. He held the Shell Distinguished Chair at the University of California, Berkeley, 1983–88, and he served as the dean of the George R. Brown School of Engineering at Rice University, 1988–98.

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Andrew Dick. Assistant Professor of Mechanical Engineering. Ph.D. 2007 University of Maryland. Dr. Dick's research focuses on nonlinear vibrations and dynamics, system modeling, and signal analysis with applications to resonant micro-structures, atomic force microscope, and structures subjected to impulsive loading. He was a Air Force Office of Scientific Research Summer Faculty Fellow in 2008 and 2010. He is a member of the American Society of Mechanical Engineering, the American Society of Engineering Education, SAE, and Sigma Xi.

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Fathi H. Ghorbel. Professor of Mechanical Engineering and Bioengineering, Schlumberger Chair in Mechatronics and Robotics. Ph.D. (1991) University of Illinois at Urbana–Champaign. A joint member of the Departments of Mechanical Engineering and Bioengineering, Dr. Ghorbel has research interests in the areas of control systems, robotics and biomedical systems. He is a Management Committee Member of the IEEE/ASME Transactions on Mechatronics, and a past Associate Editor of the IEEE Transactions on Control Systems Technology, the ASME Journal of Dynamic Systems, Measurements, and Control, and the International Journal of Robotics and Automation. He is a member of the American Society of Mechanical Engineers and a senior member of the Institute of Electrical and Electronics Engineers.

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Andrew J. Meade, Jr. Professor and Chair of Mechanical Engineering. Ph.D. (1989) University of California at Berkeley. Dr. Meade's research interests include the development of parallel, distributed and adaptive computing tools for experimental and numerical fluid dynamics and applications of computational intelligence. He is an associate fellow of the American Institute of Aeronautics and Astronautics as well as a member of the AIAA technical committee on intelligent systems. He also the chair of the American Society of Mechanical Engineers' Applied Mechanics Division/Fluid Dynamics technical committee and a member of the American Physical Society and the American Society for Engineering Education.

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Angelo Miele. Research Professor and Foyt Professor Emeritus of Aerospace Sciences and Mathematical Sciences. Dr.A.E. (1946) University of Rome. Dr. Miele's research deals with flight mechanics, astrodynamics, applied aerodynamics, optimization theory and numerical methods. He has authored two books and served as a member of several national technical committees. Dr. Miele is editor of the *Journal of Optimization Theory and Applications* and editor of *Mathematical Concepts and Methods in Science and Engineering*. He is an honorary fellow of AIAA, a fellow of the American Astronautical Society and a member of the National Academy of Engineering, the Russian Academy of Science and the International Academy of Astronautics.

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Satish Nagarajaiah. Professor of Civil and Mechanical Engineering, Ph.D. (1990) State University of New York at Buffalo. Dr. Nagara-

jiah's teaching and research interests are in the areas of structural dynamic systems and control; smart-structures-materials-sensors; system identification; monitoring; applied nanotechnology; offshore structures; earthquake and wind engineering. His research is funded by the National Science Foundation, National Aeronautics and Space Administration, Department of Energy, Air Force Office of Scientific Research, other state and Federal Agencies. National Science Foundation has awarded him the prestigious CAREER award for his research in structural control. Dr. Nagarajaiah currently serves as the editor of the structural control and health monitoring [Wiley International Journal], and serves on the editorial board of four other international journals. He currently serves as the past chair and member of ASCE Structural Engineering Institute, Technical Activities Division Executive Committee that oversees all technical committees in the Structural Engineering Institute. He also serves as a member of the board of directors of the international association of structural control and monitoring. He served as the chairman of the U.S. panel on structural control and monitoring (2006-2008). He was the founding chair structural health monitoring and control committee (2004-2006), ASCE-Engineering Mechanics Institute, and chair of the structural control committee (1998-2002), ASCE Structural Engineering Institute. He is a member of ASME and AIAA. (Visit www.ruf.rice.edu/~nagaraja for full publication details.)

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Marcia O'Malley. Associate Professor in Mechanical Engineering and Associate Professor of Computer Science. Ph.D. (2001) Vanderbilt University. Dr. O'Malley is an Adjunct Associate Professor in the Departments of Physical Medicine and Rehabilitation at both Baylor College of Medicine and the University of Texas Medical School at Houston. Additionally, she is the Director of Rehabilitation Engineering at TIRR-Memorial Hermann Hospital, and is a co-founder of Houston Medical Robotics, Inc. At Rice, her research addresses issues that arise when humans physically interact with robotic systems, with a focus on training and rehabilitation in virtual environments. In 2008, she received the George R. Brown Award for Superior Teaching at Rice University. O'Malley is a 2004 Office of Naval Research Young Investigator and the recipient of the NSF CAREER Award in 2005. She received the Best Paper Award at the 2011 IEEE World Haptics Conference in Istanbul, Turkey. She is the former chair of the IEEE Technical Committee on Haptics and was on the founding editorial board for the *IEEE Transactions on Haptics*. She also served on the editorial board of the *ASME/IEEE Transactions on Mechatronics*.

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Pol D. Spanos. Lewis B. Ryon Professor of Mechanical Engineering and Civil Engineering. Ph.D. (1976) California Institute of Technology. Dr. Spanos's research interests are in the area of vibration and dynamics with emphasis on nonlinear and random aspects and applications to aerospace, biomedical, petroleum and structural engineering. In 1982 and 1991, he received ASME Gold Medals for outstanding achievement, and in 1984, he was named a NSF Presidential Young Investigator. In 1992, Dr. Spanos received the Freudenthal Medal for lifetime contributions to probabilistic mechanics. He received the George R. Brown Award for Superior Teaching at Rice University in 1995 and 1996 and a Humboldt Research Award for Senior Scientists from the A. von Humboldt Foundation, Germany, in 1995. He serves on the editorial boards of several international journals, and he is the editor-in-chief of the *International Journal of Non-linear Mechanics* and the *Journal of Probabilistic Engineering Mechanics*. He is a fellow of AAM, ASCE, ASME and AvHAA and a member of the National Academy of Engineering (U.S.A.), the National Academy of Greece and the National Academy of Engineering of India.

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Ilinca Stanciulescu. Assistant Professor of Civil and Mechanical Engineering, Ph.D. (2005) Duke University. Dr. Stanciulescu's research focuses on computational mechanics (non-linear finite elements), constitutive modeling of materials, multiscale and multiphysics formulations, non-linear dynamics and stability of complex systems. She is a member of the United States Association for Computational Mechanics

(USACM), the Society for Industrial and Applied Mathematics (SIAM), the American Mathematical Society (AMS), the American Society of Civil Engineers (ASCE), the American Society of Mechanical Engineers (ASME), and the American Institute of Aeronautics and Astronautics (AIAA). Before joining the Ph.D. Program at Duke University, she served as a junior lecturer (1996-2000) in the Department of Strength of Materials of the Technical University of Civil Engineering (T.U.C.E.) in Bucharest, Romania. She has also worked as a structural design engineer (full-time in 1995 before joining the faculty at T.U.C.E., and part-time thereafter). Prior to joining Rice University as Assistant Professor in July 2009 she served as Assistant Professor in the Civil and Environmental Engineering Department at the University of Illinois, Urbana-Champaign (2006-2009) and as Postdoctoral Research Associate in the Duke University Computational Mechanics Laboratory (2005-2006).

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Tayfun E. Tezduyar. James F. Barbour Professor in Engineering. Ph.D. (1982) California Institute of Technology. Dr. Tezduyar holds an NSF Presidential Young Investigator Award and is a Fellow of the American Society of Mechanical Engineers, the U.S. Association for Computational Mechanics, the International Association for Computational Mechanics, the American Academy of Mechanics and the School of Engineering at the University of Tokyo. He received the Computational Mechanics Award of the Japan Society of Mechanical Engineers, the Computational Fluid Dynamics Award of the U.S. Association for Computational Mechanics and the Computational Mechanics Award of the International Association for Computational Mechanics. Dr. Tezduyar was awarded an honorary doctorate from the Slovak Republic. He is editor of *Computational Mechanics* and an associate editor of *Mathematical Models and Methods in Applied Sciences*. Dr. Tezduyar is the chair of the ASME Applied Mechanics Division, the largest of the six divisions in the ASME Basic Engineering Technical Group. Dr. Tezduyar's research focuses on computational fluid mechanics, fluid-structure interactions, cardiovascular fluid mechanics, computer modeling of parachutes, moving boundaries and interfaces and finite element methods. For more information on Dr. Tezduyar's research, see <http://www.tafsm.org/~tezduyar/>.

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Chao-Cheng Wang. Noah G. Harding Professor Emeritus of Computational and Applied Mathematics, Professor Emeritus of Mechanical Engineering. Ph.D. (1965) Johns Hopkins University. A joint member of the Departments of Mechanical Engineering and of Applied Mathematics, Dr. Wang has research interests primarily in the mathematical aspects of mechanics, principally in continuum mechanics, and his current research concerns nonlinear elasticity theory of inhomogeneous bodies.

FACILITIES

Graduate education and research are supported by state-of-the-art equipment within the department's main building, including a departmental computational and graphics facility. The powerful engineering OWLNET system of workstations and personal computers also are available to all MECH students.

The MECH department houses the Team for Advanced Flow Simulation and Modeling, the Advanced Thermal Processing Lab, the Biomedical System and Instrumentation Lab, the Dynamic Systems Vibrations and Control Lab and the Mechatronics and Haptic Interfaces Lab. The building includes a network of materials labs with two new electron microscopes, X-ray diffractometers, electron beam characterization systems, thin film equipment and advanced mechanical testing equipment to support research and education in materials science.

FINANCIAL INFORMATION

Applicants who are made offers of admission to a thesis degree program with financial support, referred to as a fellowship, receive an award of a tuition waiver plus a monthly stipend for nine months. The tuition for 2014-15 is \$39,880. The MECH monthly stipend is \$1,850. The tuition for Professional Master's Degree programs is \$32,000.

CAMPUS VISIT

We encourage you to visit Rice at any time for a firsthand look at the department and the beautiful, tree-lined campus near the heart of historic Houston. During your time here, you will not only visit with faculty, but usually you'll be hosted by current graduate students from whom you can learn more about graduate life and lifestyles in Houston. In the meantime, feel free to contact the department with any questions you may have about its programs or the university.

HOW TO APPLY TO THE GRADUATE PROGRAM:

- You will find application instructions on the following MECH Web site: www.mech.rice.edu
- You can access the online applications and instructions from the MECH webpage above.
- General information about Rice University graduate school admissions can be found at: graduate.rice.edu

For further information:

- You may write to
Graduate Coordinator
Department of Mechanical Engineering—MS 321
Rice University
P.O. Box 1892
Houston, TX 77251-1892
Phone: 713-348-3933
Fax: 713-348-5423
- Or e-mail: graduatemech@rice.edu

Questions regarding the application process and applications should not be emailed to the MECH faculty.

Transcripts should be submitted by mail to the address above. All other application materials should be uploaded to the online application.

A complete application must include:

- Official transcripts from all colleges and universities attended
- Three letters of recommendation with Rice University recommendation forms attached (Online letters of recommendation are available.)
- \$85 application fee
- Please request the Educational Testing Service (ETS) to send us:
 - 1.) Official GRE scores taken within the last three years
 - 2.) Official Test of English as a Foreign Language (TOEFL) or the IELTS, if English is a second language

Most of our students are admitted for the fall semester each year, as our classes and programs are structured to begin in the fall.

For more information, visit our Web site:
www.mech.rice.edu



ABOUT RICE AND HOUSTON

Rice is a leading American research university—small, private and highly selective—distinguished by a collaborative, interdisciplinary culture and a global perspective. Only a few miles from downtown Houston, it occupies an architecturally distinctive, 285-acre campus shaded by nearly 4,000 trees. State-of-the-art facilities and laboratories, internationally renowned centers and institutes and one of the country's largest endowments support an ideal learning and living environment.

The university attracts a diverse group of highly talented students and faculty with outstanding graduate and professional programs in the humanities, social sciences, natural sciences, engineering, architecture, music and business. With just 2,636 graduate students and 3,848 undergraduates, it offers an unusual opportunity to forge close relationships with eminent faculty scholars and researchers and the option to tailor graduate programs to specific interests.

Houston offers all the expected educational, cultural and com-

mercial advantages of a large urban center, and more. It's home of the Texas Medical Center, the largest concentration of medical schools, hospitals and research facilities in the world, as well as several other universities. Rice has cooperative programs with the University of Houston, Baylor College of Medicine, the University of Texas Health Science Center and Texas Southern University. Houston is one of the few U.S. cities with resident companies in all four major performing arts—drama, ballet, opera and symphony. It also boasts a museum district featuring exhibits of national and international prominence.

As urban as it is, Houston also is a surprisingly green city. Houstonians enjoy the outdoors in more than 300 municipal parks and 120 open spaces, and many frequent the beach at Galveston Island, only a 45-minute drive away. Other short trips include Austin, the state's capital, and historic San Antonio, both of which are a little more than three hours away.

FOR MORE INFORMATION, CONTACT:

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FOR ADDITIONAL INFORMATION:

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Rice University Office of Graduate and Postdoctoral Studies homepage:
graduate.rice.edu
Rice University Office of International Students and Scholars (OISS) homepage:
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Graduate Student Association homepage:
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www.houston.org
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<http://houston.citysearch.com>