DISTINGUISHED ALUMNI

Graduates of the Department of Mechanical Engineering have become pioneers in automotive, aerospace and manufacturing industries. Here are some outstanding examples of how our alumni are changing the world:

Ron Crockett (BSME '62) is president of Northwest Racing Associates, a limited partnership that built and operates Emerald Downs. The only member of his family to attend college, he worked his way up from an engineer at Boeing to founding his own company, Air Repair (later named Tramco). He grew Tramco into the largest commercial aircraft overhaul business in the US. He serves as a mentor for many UW students.

Peter Janicki (MSME '89) is founder and CEO of Janicki Industries, which designs and builds high-precision tooling for the aerospace, marine, wind energy, and transportation sectors. The Sedro-Woolley company is a global leader in innovative use of composite materials including carbon fiber, fiberglass, and metals. Customers include Boeing, NASA, wind turbine manufacturers, and builders of super yachts and race cars.

Sally Jewell (BSME '78) is the 51st United States Secretary of the Interior, leading an agency with over 70,000 employees. In this role, she is responsible for stewarding 20 percent of the nation's lands, including national parks and wildlife refuges. Prior to becoming Secretary, Sally was the president and CEO of REI, a national outdoor retailer and the nation's largest consumer cooperative.

Donald Peterson (BSME '46) capped a 41-year career at Ford Motor Company by becoming president in 1980 and chairman and CEO from 1985 to 1990. He gained international recognition by focusing on quality and teamwork to lead the company through a spectacular turnaround. He is a member of the National Academy of Engineering and received UW Engineering's 2007 Diamond Award for Distinguished Achievement in Industry.

Patrick Shanahan (BSME '86) is vice president and general manager of Airplane Programs for Boeing Commercial Airplanes. In the industry he is highly regarded for his ability to manage complex and technically demanding programs. He held management positions in the 757, 767, and 787 programs, in rotorcraft systems, and was vice president and general manager of Boeing Missile Defense Systems.

Savio Woo (PhD '71) received an honorary gold medal at the 1998 Winter Olympics for his work in sports medicine. A bioengineering pioneer, he did landmark research on the biomechanics of the knee and healing of ligament injuries. Woo directs the University of Pittsburg Musculoskeletal Research Center. He is a member of the National Academy of Engineering and Institute of Medicine and was honored with the UW Engineering 2008 Diamond Award for Achievement in Academia.

"The potential to create technology that will lead to a cleaner environment, improved health, and a better standard of living for all is what makes mechanical engineering such a fascinating and rewarding profession."

PER REINHALL, PROFESSOR AND CHAIR, UW MECHANICAL ENGINEERING

TRAILBLAZERS

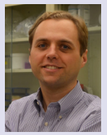
Mechanical Engineering faculty members are making great strides with the help of endowed faculty chairs and professorships:

Jonathan Posner, McMinn Professor, researches fluid mechanics, micro/nanofluidics, colloids, and electrochemistry. His current research focuses on developing nucleic acid based point-of-care diagnostics, application of engineering science to clinical challenges in medicine, and the development of a user-centric, clean biomass cookstove for the developing world.

Joseph Garbini, Morrison Chair, is leading the development of a special-purpose microelectro-mechanical system—magnetic resonance force microscopy (MRFM)—applying atomic resolution to important imaging technology. His collaborative efforts are supported by a five-year, five million dollar grant from the Army Research Office.

Jim Riley, PACCAR Professor, focuses his research on fluid dynamics with an emphasis on turblence and combustion. His groundbreaking work is in the development and application of direct numerical simulation to transitioning and turbulent flows. He is a member of the National Academy of Engineering.

Minoru Taya, Nabtesco Chair, directs the UW Center for Intelligent Materials & Systems, supervising projects related to multifunctional composites with sensing and active materials and compact actuators. Professor Taya and his team are developing "smart windows" to power zero-energy buildings.



Nathan Sniadecki, Albert Kobayashi Professor, researches the biomechanics of cells with an emphasis on MEMS and nanotechnology for measuring the nanonewton forces that cells generate when they contract or migrate. This characterizes the mechanical cues that influence cell function and engineers diagnostic sensors for detecting health problems.

Ramulu Mamidala, Boeing-Pennell Professor, researches the multi-disciplinary nature of materials, mechanics and manufacturing engineering, and primarily focuses on aircraft materials and structures. He received the Isadore T. Davis Award for Excellence in Collaboration of Engineering Education and Industry from the American Society for Engineering Education.

MECHANICAL ENGINEERING
UNIVERSITY of WASHINGTON

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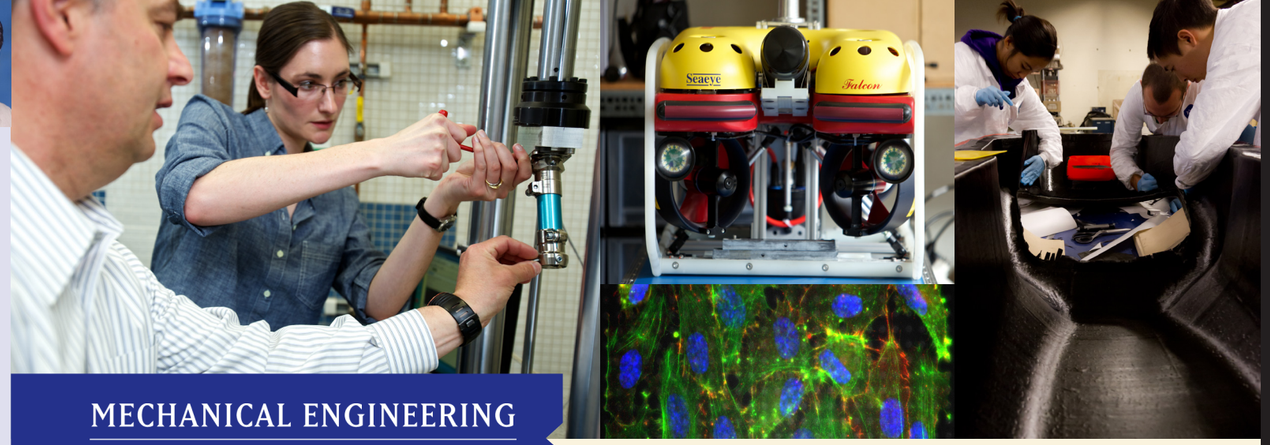


MECHANICAL ENGINEERING
UNIVERSITY of WASHINGTON

Every day the future is developed in our labs. From the development of devices for the early detection and treatment of cancer to development of alternative energy using nanotechnology, the faculty and students of the Department of Mechanical Engineering are doing their part to create a healthier, cleaner, and more prosperous world.

OUR MISSION: LAUNCHING CAREERS

Educating tomorrow's leaders is our highest priority. We draw talented and creative students and offer a world-class education with an incredible breadth of skill and technological training. Our graduates are well equipped to succeed and to move through their careers as life-long learners. They are making a difference in diverse sectors such as biotechnology and health, environmental engineering and energy, transportation, manufacturing, and information systems.

CROSSING BOUNDARIES

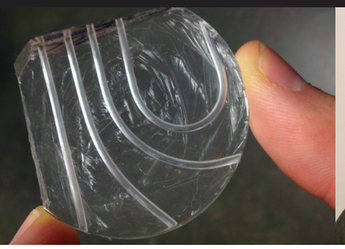
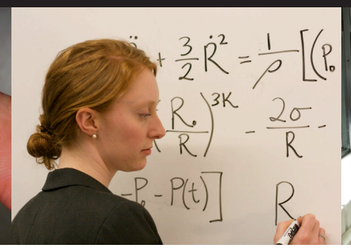
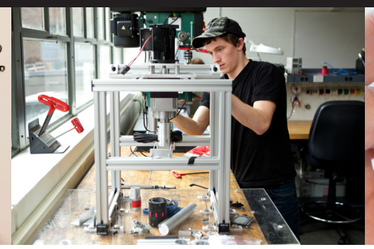
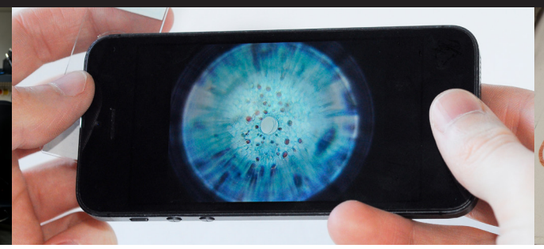
Interdisciplinary work is key to our success. Our students and faculty work together in a collaborative environment, forging partnerships across campus and with government agencies and industry partners. In recent years our research has increasingly focused on the health and energy sectors. This focus has allowed us to diversify our curriculum and is moving the department to the next level in national and international stature.

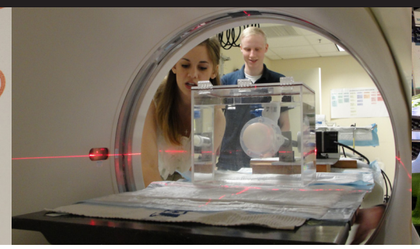
We have large research centers and programs in intelligent materials and systems with a focus on actuators and bio-inspired design, advanced composite materials in transport aircraft structures, marine energy through the harvesting of tidal and wind power, human photonics for early cancer detection and treatment, soft matter and microfluidics for the development of material structures for applications in health and energy, and quantum system engineering for the development of quantum microscopy to achieve comprehensive atomic-resolution imaging of complex molecular structures.

The department also has focused research programs in areas such as design for the environment, clean combustion and energy technology, turbulence, micro and nanotechnology, biomechanics and medical devices, advanced manufacturing and materials, control of flexible systems, mechanics, and acoustics.

THE POWER OF INVENTION

Mechanical Engineering is a leading department at the University of Washington for patents and for reporting innovations. Bringing research to market through startup companies and licensing agreements benefits the state economy. Our expertise in such diverse areas as energy, manufacturing processes, robotics, nanotechnology and medical devices, leads to revolutionary innovations that help address key societal challenges and improve our lives.


Mechanical Engineering Education

Degree Programs

- **Bachelor of Science in Mechanical Engineering (BSME)** — prepares students for diverse careers in engineering or industry, or for graduate work.
- **Master of Science (MSME)** — prepares students with a high level of technical competence for careers in research or industry, or further graduate study.
- **Master of Science in Engineeering (MSE)** — an interdisciplinary program for those whose research crosses traditional areas of study.
- **Doctor of Philosophy (PhD)** — intensive research prepares students for advanced-level professional careers in academia and industry.

Undergraduate Learning

PROGRAM FEATURES

- *Core fundamentals* — coursework in mass and energy balances, fluid and solid mechanics, heat and mass transfer, dynamics and vibrations, biomechanics, acoustics, materials, design, controls, and manufacturing.
- *Knowledge integration and application* — laboratory courses for all students; 100% of undergraduates participate in research or design projects.
- *Real-world experience* — teamwork, communication and problem-solving skills, systems analysis, process and product design, prototyping, interdisciplinary projects.
- Average time to receive the BSME degree is 4 years.
- New mechatronics, nanoscience and molecular engineering, energy, and engineering in medicine options.

UNDERGRADUATE STUDENT DEMOGRAPHICS

- 132 BSME degrees awarded in 2012-2013
- 332 undergraduates in 2013-2014
- 90 scholarships awarded by the department in 2013-2014

EXCELLENCE

- Average cumulative GPA of incoming undergraduates is 3.59.
- 60% of sophomores entering the Mechanical Engineering program are honor students.
- Formula SAE racecar took first place out of 80 cars in the 2013 FSAE West competition.
- The EcoCAR2 team, part of a three-year collegiate competition to redesign a Chevy Malibu into a hybrid vehicle, placed first for Energy Storage System Design and 4th overall at the 2013 Year 2 Competition.
- Washington Open Object Fabricators (WOOF) won the grand prize at the 2012 3D4D Challenge to use 3-D printing for social benefit in the developing world
- Microgravity team accepted into 2014 NASA Microgravity University program
- 8 Mary Gates Scholarships awarded to ME students from 2010-2013

Graduate Learning

PROGRAM FEATURES

- Required courses and electives in the student's area of special focus.
- Thesis or dissertation research — opportunities for leading-edge, interdisciplinary work.
- Most students supported by research and/or assistantships.
- Online program (EDGE) integrated into on-campus classes.

GRADUATE STUDENT DEMOGRAPHICS

- 53 MSME/MSE degrees and 16 PhD degrees awarded in 2012-2013
- 228 graduate students in 2012-2013

Faculty

COMPOSITION

- 38 tenured and tenure-track and research faculty
- 20 faculty joint or adjunct from other UW Engineering, medicine, and science departments
- 30 affiliate faculty representing industry and external research and educational institutions
- 10 research associates
- 28 visiting faculty and visiting scholars/scientists from 2010-2013

ACHIEVEMENTS

- 8 National Science Foundation Presidential, Young Investigator, and Early Career Award recipients
- 3 Fellows of National Academy of Engineering
- 27 Fellows of professional associations
- 3 UW Presidential Entrepreneurial Faculty Fellows
- 66 patents issued from 2010-2013
- Consistently ranked as most innovative UW department

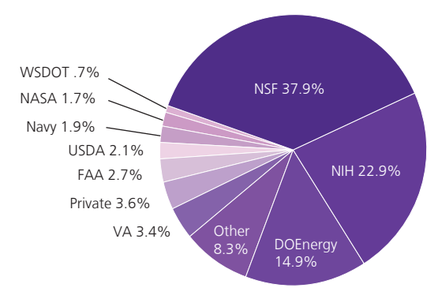
Research and Innovation

AREAS OF DEPARTMENTAL EXPLORATION

- Energy and the Environment
- Health Systems and Biotechnologies
- Advanced Materials and Manufacturing
- Mechatronics
- Sensors and Actuators
- Acoustics and Noise Control
- Fluid Mechanics and Microfluidics
- Energy and Fluids
- Mechanics of Materials and Manufacturing
- Systems, Dynamics, and Design
- Design and Manufacturing
- Medical Devices Entrepreneurship

UW MECHANICAL ENGINEERING RESEARCH FUNDING FY 2013

GRANTS & CONTRACTS	PERCENT	TOTAL
National Science Foundation	37.9	2,947,628
National Institutes of Health	22.9	1,777,006
Department of Energy	14.9	1,154,170
Other	8.3	647,137
Private	3.6	280,710
Veterans Administration	3.4	260,197
Federal Aviation Administration	2.6	205,000
United States Department of Agriculture	2.1	160,262
Navy	1.9	150,000
National Aeronautics and Space Administration	1.7	133,876
Washington State Department of Transportation	0.7	56,999
TOTAL		**$7,772,985**



PROGRESSIVE TECHNOLOGIES

- **Nanotechnology** – developing materials for systems at the nanoscale; applications in biomedicine, and advanced materials and sensors.
- **Photonics** – imaging and display technologies, electronic and optoelectronic polymers for flat-panel displays, thin-film solar cells, and flexible electronics.
- **Electrochemical and microsystem engineering** – electrochemical printing, self-assembly of microcomponents.
- **Fuel cells** – powering cell phones, computers, and vehicles.
- **Advanced composite materials** – for innovative aircraft and spacecraft.
- **Microsystem engineering** – electrochemical printing, microelectromechanical systems, energy conversion, multi-functional materials and devices.

INTERACTIVE EDUCATIONAL ELEMENTS

- **Integrated Learning Factory** – One of three established nation-wide in the late 1990s, the award-winning UW Integrated Learning Factory (ILF) supports ME design and manufacturing classes.
- **Society of Automotive Engineers Car** – Our ME students participate in an intensive nine-month project, designing and building formula-type racing cars for an annual Society of Automotive Engineers competition. In 2013, they designed and raced an electric car as well as a combustion car for the first time, and are ranked 6th in the world.
- **Engineering in Medicine** – A year-long program in which students partner with the School of Medicine to design devices aimed toward lowering healthcare costs.
- **Student Design Projects** – Examples include the EcoCAR3 Competition, the Microgravity team, the Robotics team, the Human Powered Submarine Team and Engineering in Medicine and 3D printing projects.