



CHEMICAL ENGINEERING



Knowledge and Solutions for a Changing World

Every day the chemistry of our lives is being engineered in our labs. From new molecules and materials to innovative therapies and efficient energy systems, UW Chemical Engineering research provides cutting-edge solutions to today's most pressing societal problems.

OUR MISSION

LAUNCHING CAREERS

Educating top-quality engineers is the department's highest priority. Our graduates find employment and create companies in a variety of fields, including electronics, biotechnology, oil and chemical industries, consumer and forest products, environmental engineering and more. We take great pride in the achievements of our alumni and in the impact that their careers have in diverse sectors of the economy — locally, nationally and internationally.

CROSSING BOUNDARIES

UW chemical engineers are versatile, collaborative and innovative. More than half of our undergraduate students participate in interdisciplinary research in energy systems, bio-based systems, interfacial engineering, and data science. Our undergraduate curriculum has been reinvented to seamlessly integrate molecular design, nanoscale principles and sustainability concepts with the continuum and systems-level foundations of the discipline. Students can earn an option in Nanoscale and Molecular Engineering or a concentration in seven specialty areas. An Advanced Data Science Option is also available to our graduate students. The department offers multiple opportunities for experiential learning through entrepreneurial design, industrial internships, co-ops and laboratory research.

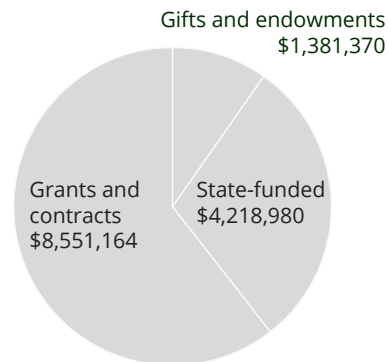
THE POWER OF INNOVATION

Chemical engineers turn raw materials into valuable products. We have a long history of technological development and disruptive inventions that include:

- The home kidney dialysis machine
- Electroluminescent polymers for organic light-emitting diodes (OLEDs) displays and solid state lighting
- Anti-fouling materials to coat ship hulls and promote medical implant integration
- Nanocrystalline inks from earth-abundant materials for high-efficiency and low-cost solar cell fabrication
- Engineered microorganisms for protein, small molecules and biofuel production, and for the conversion of methane into high value-added products

Our students work with internationally recognized faculty and participate in specialist PhD training in molecular engineering, nanotechnology and clean energy. Through continuous curriculum improvements, world-class research and startup creation, UW ChemE charts the future of chemical engineering.

FY16 EXPENDITURES BY SOURCE OF INCOME



TOTAL \$14,151,514

DEGREE PROGRAMS ////////////////

Bachelor of Science (BS) - prepares students for careers in research or industry, or further graduate studies

Master of Science (MS) - prepares students for graduate studies and careers in industry

Doctor of Philosophy (PhD) - intensive research prepares students for advanced-level careers in industry and academia

FACULTY

Composition

- 26 core teaching and research faculty
- 16 endowed positions
- 9 adjunct faculty
- 18 affiliate faculty
- 20 post-doctoral research associates

Honors and Awards

- 1 NAS and 5 NAE Members
- 5 AAAS, 1 ACS and 4 AIChE Fellows
- 1 ECS, 1 APS, 1 AAM, 1 AIMBE and 1 RSC Fellows
- 9 Washington State Academy of Science Members
- UW Clean Energy Institute Founding Director (Schwartz)
- 2016 Acta Biomaterialia Zwitterionic Materials Special Issue (Jiang)
- 2016 Technical Editor, Journal of the Electrochemical Society (Subramanian)
- 2016 ACS PMSE Young Investigator (DeForest)
- 2016 Shah Lecturer, University of Florida (Berg)
- 2016 Emerging Scholar in Higher Education, Diverse Magazine (Carothers)
- 2016 UW Distinguished Teaching Award (DeForest)
- 2016 UW College of Engineering Junior Faculty Award (Carothers)
- 2016 Nature Biotechnology Biomedical Research Greatest Hits (Jiang)
- 2016 Energy Innovation Summit Congressional Showcase (Subramanian)
- 2016 ACS Editors' Choice (Pfaendtner)

STUDENT DEMOGRAPHICS

For academic year 2015-2016:

Undergraduates enrolled: 211 | Bachelor's degrees awarded: 65
Graduates enrolled: 104 | Master's degrees awarded: 25
Doctoral degrees awarded: 10

DIVERSITY OF DEGREE RECIPIENTS

	BS	MS/PHD
Men	68%	76%
Women	32%	24%
Underrepresented Minorities*	7.6%	6%

*African American, Hispanic American, Native American and Hawaiian/Pacific Islander

UNDERGRADUATE EDUCATION

PROGRAM FEATURES

- Core fundamentals—coursework in mass and energy balances, fluid mechanics, heat and mass transfer, thermodynamics, process control, molecular engineering, and subjects such as separations, transport phenomena, reaction engineering, and applied mathematics
- Options—Nanoscale and Molecular Engineering option and concentration in seven specialty areas
- Knowledge integration and application – laboratory courses for all students; 50% participate in research and interdisciplinary projects
- Real-world experience –teamwork, communication skills, problem-solving skills, systems analysis, process and product design
- 94% student retention rate

Excellence

- UW Board of Regents Student Member 2016-17
- 2016 Dean's Medal for Academic Excellence
- 2016 Husky 100 undergraduate students (2)
- 1st place in 2016 AIChE Regional Student Paper Competition
- 3 Mary Gates Scholars
- 2nd place in 2016 UW Foster School Business Plan Competition and Environmental Innovation Challenge

GRADUATE EDUCATION

PROGRAM FEATURES

- Required courses and electives in special focus areas
- Advanced Data Science option available
- Thesis or dissertation research—opportunities for leading-edge, interdisciplinary work
- PhD students are supported by fellowships, research assistantships and teaching assistantships; MS students are self-supported

Excellence

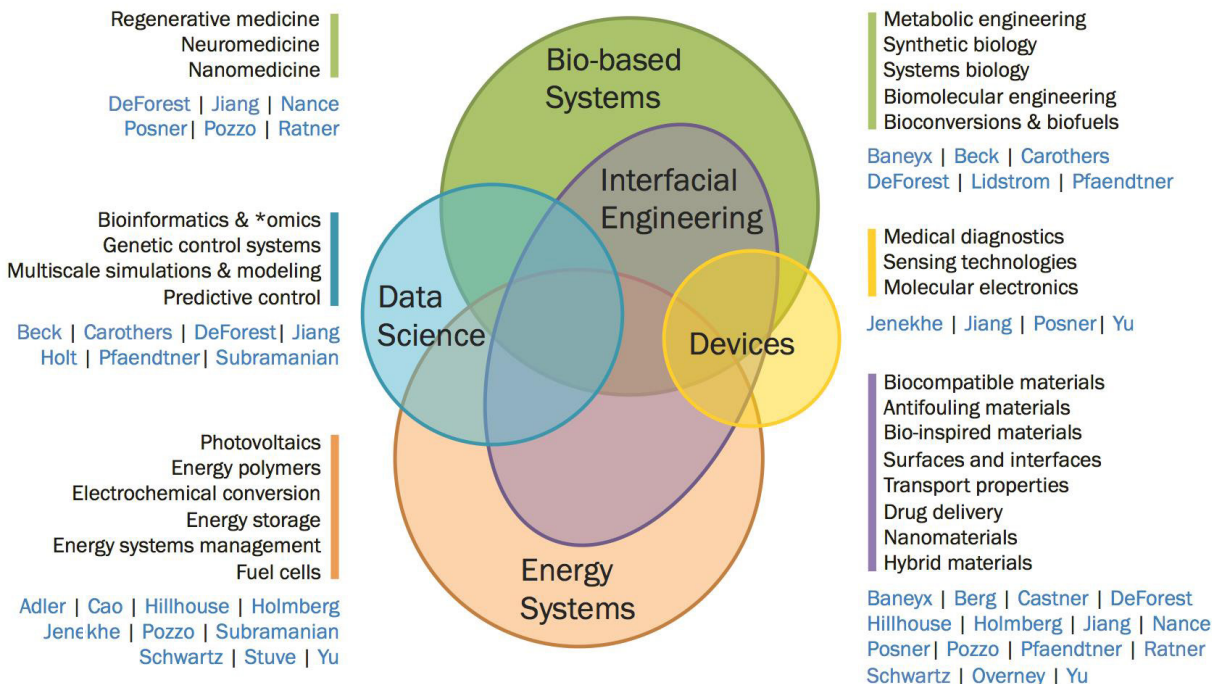
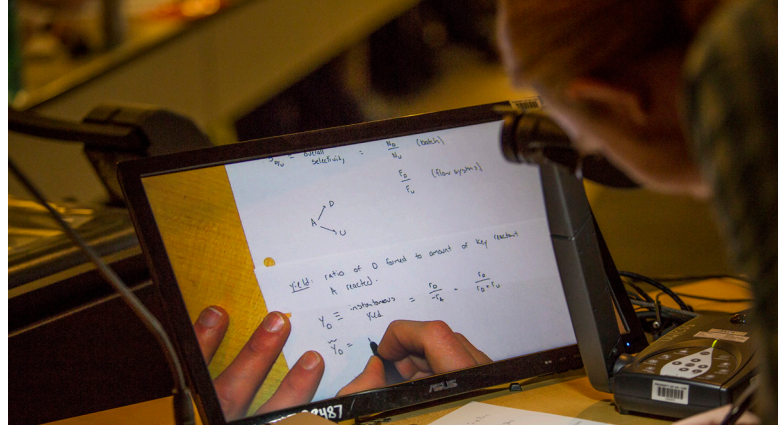
- Ranked #22 in 2017 *US News and World Report*
- 2016 Husky 100 graduate students (2)
- 2nd place winners in Business Plan Competition and Environmental Innovation Challenge
- 2015 Electrochemical Society Norman Hackerman Young Author Award
- 2015 Chinese Government Award for Outstanding Student Abroad
- 2015 SHPE Best Paper Award in Applied Physics/Electrical and Computer Engineering
- 2015 CoMSEF Conference Presentation Award
- 2015 UW CoMotion Graduate Innovator Award
- 2015 NSF I-Corps Grant (2)

Fellowships

- 2 NSF Graduate Research Fellows
- 2 NSF IGERT Big Data Fellows
- 7 ARCS Fellows
- 1 UW College of Engineering Dean's Fellow
- 3 UW Clean Energy Institute Fellows
- 1 UW CoMotion Commercialization Fellow

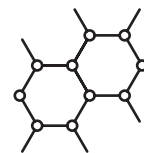
RESEARCH AND INNOVATION

From new molecules and materials to novel therapies and efficient energy systems, UW Chemical Engineering provides cutting-edge solutions to today's most pressing societal problems. Our faculty and students play key roles at flagship interdisciplinary centers including the Molecular Engineering and Sciences Institute and the Clean Energy Institute. Our alumni and faculty have launched companies and are industry leaders and prominent academic scholars.



RECENT STARTUP COMPANIES

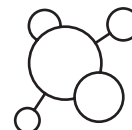
- **DecafStyle (Pozzo)** is developing new natural and cost-effective materials that provide instant beverage decaffeination without use of chemicals or affecting the taste.
- **Ionic Windows (Pozzo)** produces membranes to flow battery manufacturers that enable a 25 percent capital cost reduction, making grid-scale renewable energy economically viable.
- **PolyDrop (Pozzo)** makes innovative conductive polymer additives for use in paints, coatings, composites and adhesives.
- **Taproot Medical Technologies (Jiang)** is developing a new class of highly biocompatible materials and applying this technology to medical device development.
- **Battery Informatics, Inc. (Schwartz & Subramanian)** is developing next-generation Battery Management Systems for cost-effective use of lithium-ion batteries in power grid and electric vehicle applications.
- **Proteios (Baneyx)** is an emerging startup focused on providing researchers with affordable, easy-to-use and rapid kits to purify recombinant proteins. When commercialized, the kits will deliver the correct yield, purity and activity needed for downstream applications while utilizing environmentally friendly reagents.



**21 PATENTS
DISCLOSED**



**27 PATENT
APPLICATIONS
FILED**



**14 PATENTS
ISSUED**

**during 2015-2016*



TRAILBLAZERS

Many notable figures in industry and research earned degrees from the Department of Chemical Engineering or served on its faculty. Here are just a few:

Albert (Les) Babb (Professor Emeritus of UW Chemical and Nuclear Engineering; founding chair of Nuclear Engineering 1965-1981) — Established a division of bioengineering to coordinate the use of engineering, mathematics, and physics to develop new types of equipment for biology and medical research. Babb also designed and built the first portable kidney dialysis machine for home use, the first artificial kidney machine, and a system providing continuous blood treatment for those with sickle cell anemia and autoimmune disease.

W. Ronald Benson (BS '36; Distinguished Alumnus '94) — Invented yellow highway paint, a safety advance used worldwide. W. Ronald Benson owned and developed Benson Chemicals as a chemical distributor throughout the West, and served as Bardahl's chief chemist for automobile oil additives.

Jeet S. Bindra (MS '70; Distinguished Alumnus '97) — Retired as president of Chevron Global Manufacturing in 2009. Bindra was the chief negotiator for the pipeline from Tengiz oil fields to the Black Sea, which opened up the production of oil in Kazakstan. He was a key leader in Chevron's support of the Undergraduate Computing Laboratory. In 2010 he was elected to the board of directors for Edison International and Southern California Edison.

Linda Koffenberger (BS '69; Distinguished Alumna '95) — Worked for DuPont for 20 years, progressing through positions in process and product development, research management, product management, marketing, and business development. Worked as director of new business for Union Carbide and president of Amerchol Corporation, a worldwide supplier of ingredients in the personal care and cosmetics industry.

Charles Matthaei (BS '43; Distinguished Alumnus '03) — Developed the first large-scale process to manufacture whole-grain bread as CEO and owner of Roman Meal Co. Matthaei is president of Roman Meal Co. Canada and Japan and chairman of Roman Meal Company. He is active in many professional and community organizations and dedicated to furthering the activities and principles of the Boy Scouts of America.

Victor Mills (BS '26; Distinguished Alumnus '93) — Father of Pampers disposable diapers. During 35 years at Procter & Gamble, applied continuous process methods to improve products such as Ivory soap, Duncan Hines cake mix, and Jif peanut butter. Developed Pringles potato chips with long shelf life.

Scott Roberts (PhD '74; Distinguished Alumnus '06) — Joined Shell Chemicals in 1974. In the following 35 years, Roberts held management positions in olefins, synfuels, base chemicals, oil products, plastics and resins, business operations, and risk management. He served as vice president of European operations in The Hague, Netherlands, and then vice president Northwest. Roberts retired from Royal Dutch Shell in 2008.

Steven R. Rogel (BS '65; Distinguished Alumnus '00) — Served as president, CEO, and chairman of Weyerhaeuser Company (1997-2009). He was president and CEO of Willamette Industries, Inc. (1995-1997) and served on the board of the American Forest and Paper Association. Rogel is now chairman of the board of Energy Solutions, Inc., and a director of the Kroger Company and of Union Pacific Corporation.

Waldo Semon (BS '20; PhD '24; Distinguished Alumnus '93) — Best known as the man who invented PVC, Semon was awarded 116 U.S. patents in his lifetime, inventing not only vinyl, but also bubble gum. Under Semon's technical leadership at BF Goodrich, three major new families of polymeric materials were discovered: thermoplastic polyurethane, synthetic "natural" rubber, and the first oil-resistant synthetic rubbers. Inducted into National Inventors Hall of Fame.

"At UW Chemical Engineering, we emphasize a relevant and empowering education and conduct cutting-edge research with teams that tackle some of the world's most pressing societal problems. From the chemical and biotechnology industries to the electronics, environmental and energy sectors, and from consulting to policy and law, our graduates are making a real impact. We invite you to discover how UW Chemical Engineering fosters knowledge and solutions for a changing world"

François Baneyx, Department Chair and Charles W.H. Matthaei Professor

