ELECTRICAL & COMPUTER ENGINEERING

At UW ECE, we cultivate innovation and inspire through high-impact research. We educate and develop tomorrow's leaders to help solve the world's most pressing challenges.

PEOPLE

Innovation at UW ECE is exemplified by our outstanding faculty and by the exceptional group of students they advise and mentor. Students receive a robust education through a strong technical foundation, group project work and hands-on research opportunities. Our faculty work in dynamic research areas with diverse opportunities for projects and collaborations. Through their research, they address complex global challenges in health, energy, technology and the environment, and receive significant research and education grants.

IMPACT

We continue to expand our innovation ecosystem by promoting an entrepreneurial mindset in our teaching and through diverse partnerships. The field of electrical and computer engineering is at the forefront of solving emerging societal challenges, empowered by innovative ideas from our community. As our department evolves, we are dedicated to expanding our faculty and student body to meet the growing demand for engineers. We welcomed six new faculty hires in the 2018-2019 academic year. Our meaningful connections and collaborations place the department as a leader in the field.

UW Electrical & Computer Engineering is ranked **#9** in the nation for computer engineering and **#19** in the nation for electrical engineering

DEPARTMENT HIGHLIGHTS

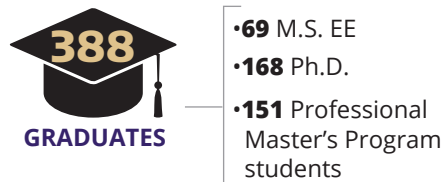|	
#1 STARTUP GENERATOR OF ALL UW DEPARTMENTS *Source: CoMotion*	**#8** IN EE DEGREE PRODUCTION *Source: ASEE*
100% ADMITTED PH.D. STUDENTS RECEIVE FUNDING	**70%** UNDERGRAD STUDENTS RECEIVE INTERNSHIPS

DIVERSITY

UW ECE exceeds the national average of women in the field for undergraduate and graduate degrees awarded. In addition, we lead in the number of women in tenured and tenure-track faculty positions.

Population	UW ECE	Natl. average
Undergrad degrees awarded to women	19%	13%
Graduate degrees awarded to women	24%	23%
Female faculty	22%	16%

Data from ASEE 2017

OUR STUDENTS

572

UNDERGRADUATES
64% Washington residents

388
GRADUATES

- **69** M.S. EE
- **168** Ph.D.
- **151** Professional Master's Program students

UNDERGRADUATE EDUCATION

Students who graduate with a UW B.S. EE degree are prepared for the workforce with skills in all aspects of electrical and computer engineering. They receive a strong grounding in fundamentals with opportunities outside of the classroom for internships, leadership roles and hands-on research with renowned faculty in one of 40 department labs.

We offer a combined B.S.-M.S. program for ambitious undergraduates who plan to pursue graduate work. Students accepted into the program seamlessly begin graduate studies in the daytime M.S. EE program the autumn quarter following completion of their bachelor's degree.

PROMOTING STUDENT INNOVATION: **ENGINE**

The Engineering Entrepreneurial Capstone Program (ENGINE), endowed by Milton and Delia Zeutschel in 2016, gives undergraduate students an opportunity to build their entrepreneurial skills. Through an industry-sponsored project, students embark on a year-long system design and integration project; participate in two courses on innovation readiness, and startups and new ventures; and receive mentorship provided by faculty and industry sponsors.

ENGINE'S GROWTH BY-THE-NUMBERS

ENGINE STUDENTS 2016 AT PROGRAM INCEPTION AND 2019

2016   **2019**

Our goal is to increase ECE undergraduate participation in ENGINE to **85%.**
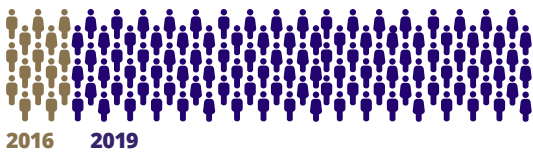
2016 → 4 projects, 4 sponsors, 15 students
2019 → 49 projects, 40 sponsors, 150 students

GRADUATE EDUCATION

Students who receive a graduate degree from UW ECE are prepared to address pressing challenges in healthcare, energy, the environment, communication and more. With our location in the Puget Sound, students have unique opportunities to interact with prominent technology companies and a vibrant start-up community.

Our Professional Master's Program (PMP) focuses on cutting-edge technical topics and the latest university research. Designed for recent graduates as well as professionals already working in the field, the PMP prepares graduates for new and rewarding career opportunities.

Our graduates find employment at top companies in the region, including: **Amazon • Apple • Boeing • Facebook • Google • Microsoft • T-Mobile • Verizon**

UW ECE: Engineering Innovation

Since 2009, ECE faculty and students have founded or been in leadership roles at more than 25 successful startup companies. A few examples include:

- **Jeeva Wireless** – Reimagining connectivity with low-power backscatter technology.
- **Olis Robotics** – Making robots smarter through progressive autonomy
- **OneRadio** – Changing the way we access the radio-frequency spectrum.
- **PotaVida** – Bringing data-driven decision making to aid in disaster relief.
- **Senosis Health** – Turning smartphones into health monitoring devices
- **ThruWave** – Providing state-of-the-art millimeter-wave (mmW) 3D imagers.
- **WiBotic** – Providing wireless power solutions for robotics.
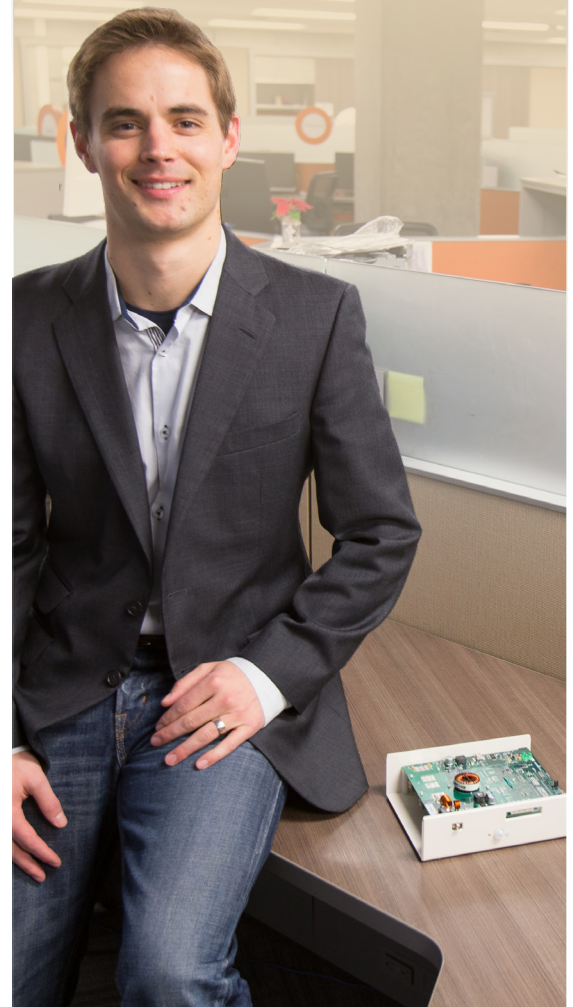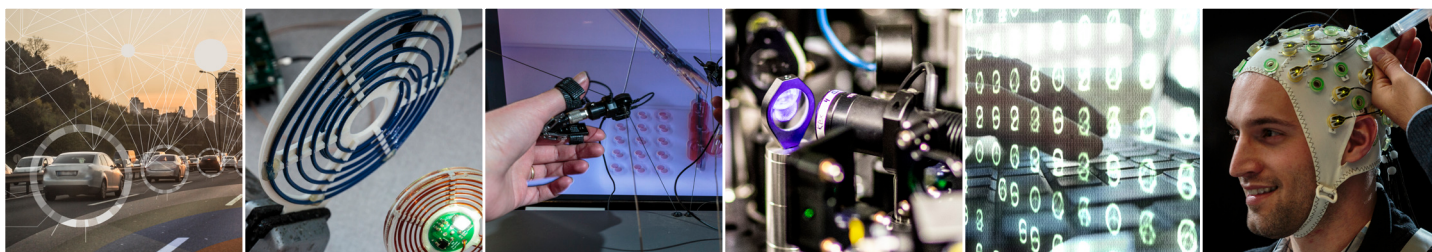
RESEARCH

RESEARCH AREAS

Computing & Networking – Computer engineering and architecture, VLSI, embedded systems, wireless communication, cybersecurity

Power & Energy Systems – Smart Grid, integration of renewable energy sources, grid security, power system economics, energy harvesting

Robotics & Controls – Surgical biorobotics, smart cities, haptics, network control systems

Photonics & Nano Devices – Nanoscale materials and structure, MEMs

Data Sciences – Machine learning, statistical signal processing, speech and natural language processing, computer vision and image processing

Biosystems – Synthetic biology, neural engineering, medical devices, mobile health

EMERGING STRATEGIC RESEARCH AREAS

Integrated nanophotonics and quantum optics
Quantum computing, communication, sensing, metasurface and metamaterials, neurophonics, and hybrid photonics with new materials.

Device-driven rehabilitation – Neural interface devices to improve recovery after brain and spinal cord injury. Includes wireless implantable neural interface devices, optogenic treatments for stroke, multi-modal brain-computer interfaces, and spinal stimulation for rehabilitation.

In 2018, ECE faculty were awarded **$17.2 million** in research grants

FACULTY

Our department's reputation is based on the quality of our faculty and their contributions to education, research and leadership. UW ECE faculty are frequently honored nationally and internationally for excellence. Attracting, retaining, and rewarding faculty remains one of our highest priorities.

56	Core Faculty
6	Research Faculty/ Full-time Lecturers
103	Affiliate Faculty
36	Adjunct Faculty

ACHIEVEMENTS			
26	IEEE Fellows	**5**	Sloan Fellows
1	MacArthur Fellow	**3**	NAE members

CENTERS AND LABS

UW ECE faculty lead or participate in interdisciplinary research centers across campus, and direct laboratories at the cutting-edge of the field.

- Institute for Nano-engineered Systems
- Center for Neurotechnology
- CMMB Vision – Center for Satellite Multimedia & Connected Vehicles
- AMP Lab – Amplifying Movement and Performance

STATE-OF-THE-ART FACILITIES

Makerspaces for students to work on rapid prototyping and experimentation.

Washington Nanofabrication Facility, led by ECE professor Karl Böhringer, provides micro and nanotechnology services.

CoMotion, UW's collaborative innovation hub, helps faculty and students take ideas from lab to market.

ECE TRAILBLAZERS

ECE trailblazers are honored for the work they do to effect positive change in the world. Our academic pioneers' far-reaching research has created important paths for other electrical and computer engineering scholars to build upon, while our industry leaders' ground-breaking enterprises have provided important solutions that improve lives.
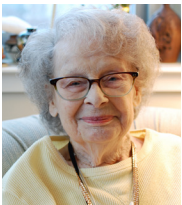
ACADEMIA

Akira Ishimaru (Ph.D. '58) is a National Academy of Engineering member and one of the world's top experts in wave propagation and scattering in random and turbulent media. His work has influenced advancements in ultrasound imaging, microwave remote sensing, satellite and cellular communications and more.

Simon Sze (M.S. '60) is co-inventor of the nonvolatile semiconductor memory (NVSM) popular in today's consumer electronics. His book, "Physics of Semiconductor Devices," is one of the most cited works in contemporary engineering and science publications with over 22,000 citations.

Irene Peden (Professor Emerita) is a National Academy of Engineering member and the first woman engineering professor at UW. She is known for her leadership in engineering education in antennas and radio wave propagation, as well as the first woman engineer/scientist to conduct field work in the interior of the Antarctic.

Dean Lytle (Professor Emeritus) is the author of two textbooks, Introduction to Random Processes, and with W.W. Harman, Electrical and Mechanical Networks. His work in communications, networks, probability and signal processing included long-term and high-impact appointments at Boeing, Honeywell and Bell Telephone.

INDUSTRY

Jean Wang (M.S. '04, Ph.D. '07) is a founding member and first woman on the Project Glass team, a pioneering project that signaled a pivotal change in accessible computing devices and laid the foundation for modern AR/VR hardware. Jean lead the project through 10 design iterations until its introduction to the market.

Cherng Jia Hwang (M.S. '64, Ph.D.'66) is a pioneer in semiconductor lasers and fiber optic communications, and the inventor of the first long-life semiconductor laser. His work created new markets and produced technology with widespread medical and defense applications and economic impact.

Milton Zeutschel (B.S. '60) is an entrepreneur with the ability to recognize an engineering problem and design a marketable solution, resulting in the formation of three successful companies— Zetec, Data I/O Corp. and Zetron, Inc.—all making an impact in today's marketplace.

Tom Rolander (M.S. '76) is an entrepreneur, engineer, and developer of the multitasking multiuser operating system MP/M created for microcomputers in 1979. These operating systems laid the groundwork for modern day OS's, and he continues to create companies that improve our lives through innovation.

"When we recently changed our name (from electrical engineering to electrical and computer engineering) we opened up opportunities for our students to partner with industry in the PNW and enhanced our capabilities to recruit from a pool of top tier faculty and students." **Radha Poovendran, Professor and Chair**

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