INDUSTRIAL & SYSTEMS ENGINEERING
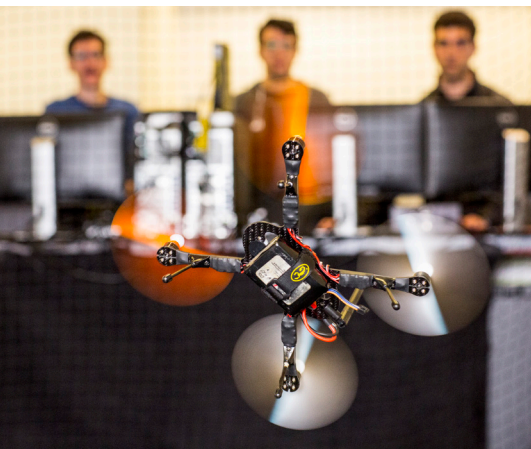
Combining machine learning, artificial intelligence and human factors, ISEs are industry leaders and innovators who analyze, design and optimize complex systems where people, engineering and information intersect.

The premiere ISE program in the Pacific Northwest, UW ISE is dedicated to fostering a safe, healthy and sustainable future for all.

WHERE ENGINEERING DISCIPLINES CONVERGE.

Industrial and systems engineers apply a systems approach, considering both technical solutions and societal impacts to make products and services more efficient, valuable and sustainable for all. Dubbed the **"business school of engineering,"** ISEs are trained to see the big picture, lead diverse teams and manage complex, multifaceted projects of all sizes.

IMAGINING THE SMART CITIES OF TOMORROW

In the future, every element of our urban landscapes - from manufacturing and robotics to autonomous vehicles and supply chains, and from healthcare services to disaster response - is governed by principles that amplify efficiency, minimize waste, ensure safety and enhance our quality of life. ISEs are innovators who design and optimize systems for public service and entrepreneurship.

SUSTAINABILITY AND EQUITY IN TECHNOLOGY

At UW ISE, we train engineers to prioritize sustainability and equity in technological advancements. Our education fosters a commitment to environmental responsibility and social inclusivity, preparing students to create solutions for a greener, fairer and brighter future for everyone.

A VERSATILE DEGREE FOR A VARIETY OF FIELDS

The most distinctive aspect of industrial engineering is the flexibility it offers. An ISE degree gives graduates the opportunity to work in many different businesses and industries where they continue to draw on their technical background.

TOP-TIER EDUCATION

DEGREE PROGRAMS

Bachelor of Science in Industrial Engineering (BSIE)
Provides students with the technical skills needed to serve as organizational change agents who have a systems view for solving problems.

Master of Industrial & Systems Engineering (MISE)
A part-time degree program for working professionals that emphasizes technical leadership management and systems engineering. Classes are offered in person or online.

Master of Science in Industrial Engineering (MSIE)
An advanced, research-oriented program for students pursuing careers in industry, government, or in preparation for a PhD.

Doctor of Philosophy in Industrial Engineering (Ph.D.)
A rigorous academic research program that prepares students for leadership roles in academia, industry, and top research institutions.

PROFESSIONAL DEVELOPMENT

Professional Practice features talks from ISE alumni and industry partners to prepare undergraduates for the working world.

Certificate Programs allow working professionals to receive advanced training in Global Integrated Systems Engineering (GISE) or Engineering Leadership.

External Advisory Board is a diverse team of private and public sector professionals who support and advocate on behalf of the ISE Department, both in training and mentoring of students, and in building relationships with industry partners and recruiters.

PROJECT–BASED LEARNING:
STARBUCKS EMPLOYEE DEPLOYMENT TOOL

ISE students developed a dynamic algorithm that improved Starbucks staffing software and reduced customer wait time by more than a minute and increased sales by $440 per day.

STUDENT GROUPS

Student organizations provide opportunities for students to participate in student-led activities, networking, industry visits and other activities.

Alpha Pi Mu
The UW branch of the national industrial engineering honor society.

The Human Factors & Ergonomics Society is interested in understanding human characteristics applicable to systems design.

Institute of Industrial & Systems Engineers (IISE)
The UW student chapter strives to create a positive impact by strengthening interaction between students, faculty and industry within engineering.

OUR STUDENTS*

130 Undergraduate students

50 Bachelor's degrees awarded

80 Graduate students

28 Master degrees awarded

5 Ph.D degrees awarded

per academic year, on average

SENIOR DESIGN PROJECTS – CAPSTONE

Our graduating seniors have a unique opportunity to partner with companies and organizations in the Pacific Northwest to work on selected company-proposed problems.

Students gain professional experience while participating organizations receive innovative student-proposed solutions, including:

The Genie Production Line Footprint Optimization team identified 4M: method, machine, manpower and material, areas of improvement to a Genie production line. They designed a new layout and validated changes using simulation models.

The Clinic Resource Optimization for UW Medicine Ambulatory Care team developed a tool that optimized space, physicians and staff to eliminate wasted time and resources.

FACULTY

UW ISE is committed to research with impact. We are finding solutions in an increasingly diverse, dynamic and technological world. Our faculty and students leverage data, statistics, stochastics and mathematical models to understand and improve the interaction of humans with technology.

COMPOSITION

10 Tenure-track faculty

1 Teaching faculty

5 Affiliate faculty

6 Emeritus faculty

FACULTY EXCELLENCE

- 3 NSF Early CAREER Awards
- 6 Fellows - INFORMS, IEEE, IISE
- 6 Excellence in Teaching Awards
- 6 IISE Outstanding Professor Awards

NOTABLE INDUSTRY PARTNERS

- Alaska Airlines
- Accenture
- Amazon
- Apple
- AT&T
- Blue Origin
- Boeing
- Disney
- Genie
- Google
- Honeywell
- Intel
- Microsoft
- Netflix
- PACCAR
- Philips
- Physio Control
- Seagen
- Seattle Cancer Care Alliance
- Seattle Children's Hospital
- Starbucks
- Toyota
- UPS
- UW Medical Center

FACULTY SPOTLIGHT
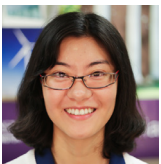
Shan Liu (Associate Professor) researches healthcare interventions to improve patients' health and enable cost-effective care delivery. She received a UW Population Health initiative grant to improve access to trauma care.

Prashanth Rajivan (Assistant Professor) examines how human behavior affects cyber security in order to develop effective interventions that prevent attacks, promote safe behaviors and help people to take protective actions.

RESEARCH AREAS

- **Operations research** seeks solutions for decision-making problems, applying optimization and stochastic models to improve design and product flow.
- **Applied statistics and production systems** improves the quality of products and services through data monitoring and analysis of complex systems.
- **Human factors and ergonomics** designs technological systems that improve the safety and efficiency of healthcare, transportation and manufacturing.

RESEARCH LABS

The Disaster Data Science Laboratory uses data to help others before, during, and after disasters, and provides evidence-based remedies to assist in recovery efforts and build community resilience.

The Human and Systems (HAS) Laboratory investigates the fields of human performance modeling, neuroergonomics, and cognitive engineering to ensure that work systems can better accommodate individual differences.

The Scale-independent Multimodal Automated Real Time Systems (SMARTS) Lab develops automated decision-making methods for cyber-physical systems to achieve optimal and robust performances.

Behavioral Research in Information and Computer Security (BRICS) Lab works on problems at the intersection of human factors and cyber security to understand the social and cognitive processes that people use to detect malicious signals online.

TOP RESEARCH FUNDERS

- National Institutes of Health
- National Science Foundation
- U.S. Department of Transportation
- U.S. Navy
- Seattle Children's Hospital

TRAILBLAZERS

Ashis Banerjee (Assistant Professor) directs the Scale-independent Multimodal Automated Real Time Systems Lab. He develops decision-making methods for cyber physical systems at widely varying scales ranging from optically actuated micro-bio systems to large manufacturing enterprises.

Shuai Huang (Associate Professor) develops methodologies for modeling, monitoring, anomaly detection, diagnosis and prognosis of complex networked systems, such as brain connectivity networks, manufacturing processes, enterprise systems, cyber-physics systems and Internet of Things (IoT).

Ji-Eun Kim (Assistant Professor) designs work systems that better accommodate individual differences through the use of physiological measurements and human performance modeling. She is director of the Human and Systems Lab.

Chaoyue Zhao (Assistant Professor) developed innovative data-driven approaches to enable effective decision-making under uncertainty for power system scheduling problems such as optimal power flow and unit commitment.

Tolu Abe (Ph.D. '17) is a senior manager at Amazon. As a Ph.D. student, she developed mathematical models to improve patient outcomes and credits the department's diverse cultures and perspectives with providing a unique collaborative learning environment that enhanced her academic experience.

Daniel Chen (B.S. '02) is board director and president of HNA Group Co., Ltd., a global conglomerate encompassing core divisions in aviation, financial services, real estate, tourism and logistics. He holds leadership positions in real estate and aviation-related companies.

Fiete Krutein (Ph.D. '22) is an operations research scientist for Convoy, the leading freight market platform. He develops core routing algorithms that enable the company to build highly efficient and flexible shipping schedules across multiple fulfillment channels.

Susie Lu (B.S. '10) is a data visualization engineer at Netflix where she makes custom data visualization applications to help the business effectively look at the data they collect. "Working collaboratively was a huge part of what I learned from UW ISE."

YOUNG ALUMNI SPOTLIGHT

Sirena Merfalen (M.S. '18) is a customer engineering manager at Boeing. As a student, she participated in Women Engineers Rise (WE Rise), and continues to volunteer with the program as a mentor. In this role, she served on a panel with other Boeing women at the WE Rise annual conference.

Abby Synder (B.S. '20) is an industrial engineer at Boeing. At ISE, she received a UW Population Health award for developing an optimization tool that uses route visualization to efficiently distribute vaccines to health centers in rural Mozambique.

Blending technical skillsets with strategic thinking, ISE graduates are ready to take on leadership roles, manage complex projects and make impactful decisions. From manufacturing and healthcare to logistics and finance, name an industry and ISE graduates are maximizing their potential.

- Cynthia Chen, Interim Chair & Professor

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UNIVERSITY of WASHINGTON