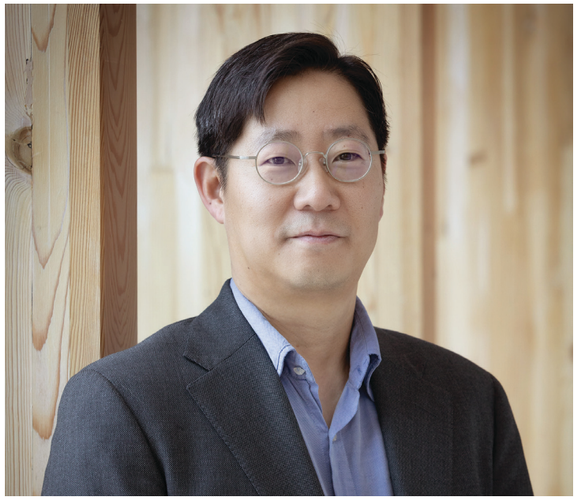
ECE

Electrical and Computer Engineering

COMMUNICATOR

2024

Meet the U Asia Campus's first ECE graduate!



A Message from the Chair

Dear Esteemed Alumni, Donors, Parents and Friends,

I hope this letter finds you well. It is with great pride and excitement that I share the recent achievements and milestones of our Department of Electrical and Computer Engineering (ECE) at The University of Utah.

In 2023–24, our ECE faculty, staff and students have reached extraordinary heights and demonstrated an unwavering commitment to innovation, research and education. I am incredibly proud to announce that:

- Our department continues to grow and thrive. We are currently training over 1,095 students, the highest ever! This year, ECE graduated 85 BS, 57 MS, and 23 Ph.D.s, another record! I hope you can welcome them in your own region. We now offer over 80 classes per semester and are in the process of creating a freshman Artificial Intelligence (AI) course to keep up with the needs of the engineering world.
- The Utah Asia Campus ECE Department opened its first lectures in Incheon, Korea, in January 2021 with 8 students enrolled and 1 faculty member. As of June 2024, our accumulated enrollment exceeded 140 students with 5 faculty members. These students were recruited from across Asia, Middle East, and Africa, including Korea, Mongolia, Japan, Northern Mariana Islands, Qatar, and Tanzania. They will spend 2.5 years at the Asia Campus and complete their studies at the Salt Lake City Campus. This year, our first Utah Asia Campus student graduated with a Bachelor's degree! Additionally, we have begun sending sophomore students from the Salt Lake City campus to the Utah Asia Campus as part of a study abroad program.
- The ECE department received a total of 35 new research awards, with the total sponsored research awards surpassed the $9.0 million mark: another record. We hold the #1 position within the Price College of Engineering for the total number of research proposals submitted despite. Our faculty members, including 4 National Academy members, 15 Early State Career Awardees, and 39 tenure-track professors, are dedicated to advancing the frontiers of knowledge and technology. Our faculty members have received many international recognitions this year, such as Pierre-Emmanuel Gaillardon's selection as the Under 40 Innovator Awardee by the Design Automation Conference. I am also very proud to report that Florian Solzbacher's company, Blackrock Neurotech, has received huge attention in the brain-human interface area.

This magazine highlights some of the most significant developments, innovative research projects, and outstanding achievements within the ECE department. Each story reflects the collective dedication, hard work and passion of our entire community—faculty, students, staff and supporters like you.

Your continued support and engagement are crucial to our success. Last year we offered 70 scholarships and fellowships to assist our students' educational journies. We are deeply grateful for your contributions, which enable us to provide a world-class education, conduct groundbreaking research, and make meaningful impacts in our field. Together, we are shaping the future of electrical and computer engineering.

Thank you for being a valued member of the University of Utah ECE community. I look forward to sharing our successes with you, and hope you take pride in the remarkable progress we have made together.

Warm regards,

Hanseup Kim
Chair and Professor, Department of Electrical and Computer Engineering, The University of Utah

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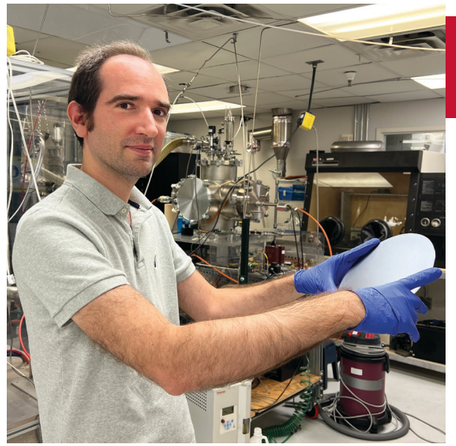
Photos by University of Utah Photography, Dan Hixson, and Marlee Jeppsen.
Magazine layout and design by Marlee Jeppsen.

ECE RESEARCH HIGHLIGHTS

Fu Receives HCI Engineering Award

Electrical and Computer Engineering assistant professor Kai Fu, in conjunction with Radiation Oncology clinical professor Vikren Sarkar, has received the prestigious HCI Engineering Award: Innovation in Cancer Engineering. Their proposal, focused on designing novel detectors for proton therapy, was selected due to its "outstanding potential to provide impactful solutions to cancer challenges." The funding will allow them to continue their work in developing reliable and portable GaN-based proton detectors tailored for proton therapy.



Sensale-Rodriguez Enhances Student Experiences in Semiconductor Research

Berardi Sensale-Rodriguez has been awarded the ExLENT and INCLUDES CHIPS awards—advancing research and enhancing student experiences in the semiconductor field. The prime objective of this project is to provide students with deep hands-on learning experiences that will ultimately promote a diverse, job ready workforce and foster employee retention. Through a partnership with academia and industry, this project will deploy a hands-on semiconductor training program: "Semiconductor Manufacturing." This cohort-based training model incorporates three key components: customized curriculum focused on semiconductor manufacturing and characterization, hands-on experiential learning, and direct interaction with industry.

New Light-filtering Lenses to Combat Migraine

Steve Blair has made significant contributions to the development of Avulux Migraine & Light Sensitivity Lenses. These next-generation lenses, designed to reduce light sensitivity in migraine sufferers, were created in collaboration with Moran Eye Center's neuro-ophthalmologist Dr. Bradley J. Katz. Blair's expertise in light filtering technology was instrumental in designing the lens characteristics and developing the prototypes.

Liu and Ardakani Receive SETO OPTIMA Funding

Mingxi Liu and Mostafa Ardakani have spearheaded the U's involvement in the Operation And Planning Tools for Inverter-Based Resource Management and Availability for Future Power Systems funding program. The duo will focus on addressing emerging challenges and opportunities for grid planning and operation. Liu's research group will focus on developing next-generation multi-agent reinforcement-learning based methods for efficient, reliable, and robust control of variable renewable energy resources and distributed energy resources in transmission and distribution (T&D) operations. Ardakani's research group will emphasize the development of a tool to identify T&D system components that are at risk during severe weather incidents.

Sanchez Terrones Utilizes NSF Funding to Improve Cardiovascular Monitoring

Benjamin Sanchez Terrones has been awarded a grant from the National Science Foundation to research and develop technology that will enable continuous and convenient blood pressure monitoring. His goal is to create a device that provides multiple data points for patients with cardiovascular diseases, the leading cause of death worldwide. He aims to develop "a game changer to address one of the largest worldwide epidemics." His work will focus on developing the science needed to use electricity to measure blood pressure without the inconvenience of an arm cuff.

Discover the latest ECE news at *ece.utah.edu/news*

The graduating class of 2024.

Bridging Continents and Code: Utah Asia Campus's First ECE Graduate

Meet Seoin Kim, the first Electrical and Computer Engineering graduate from the University of Utah Asia Campus. Kim finished her undergraduate degree with a Bachelor of Science in Computer Engineering in May 2024. Kim was among the first students to enroll in the U Asia Campus ECE program.

Kim began her college career majoring in communications. When the Electrical and Computer Engineering program was introduced to the U Asia Campus during Kim's sophomore year, she changed her major to computer engineering. Equipped with a strong math and science background, Kim completed 90 credits at the U Asia Campus before finishing her studies at the Salt Lake City campus.

Kim at graduation.

Kim was all smiles recounting her journey from the U Asia Campus to the scenic Salt Lake City campus, recalling how impressed she had been with the scenery and the fresh mountain air when she first arrived in Utah. When engaging in her first classes in Utah, she was "so excited to have the opportunity to collaborate with diverse groups of people." Kim was invigorated by the larger class sizes that allowed her to collaborate, connect and learn from many different types of people. She was also inspired by the large scale of modern technology available at the Salt Lake City campus, such as the Utah Nanofab laboratory.

Between classes, studying, and tutoring her peers, Kim spent the majority of her time split between the Merrill Engineering Building and the Warnock Engineering Building, calling the WEB "[her] second home." In addition to being a base of operations for many engineering students, the WEB also hosts the annual ECE Technical Open House. The TOH is an opportunity for all undergraduate seniors to present, demonstrate and answer questions about their final capstone projects. Participating in the TOH was one of Kim's most memorable experiences.

Working with a small group of students, Kim and her team members dedicated months to showcasing the skills they had learned for their Embedded Systems Design class—notably, Kim's favorite course!

"I had the best classmates ever," Kim recalled. "We spent so much time together on our Technical Open House project. We thought everything was working perfectly, but the day before the Open House, something malfunctioned." Determined to find a solution, Kim and her teammates stayed in the WEB until 5 a.m. until they isolated the problem—a short in the hardware—and got their project working. When they found success just a few short hours before the TOH was due to begin, the team "[cried] and [clapped]" with how "happy [they were] to have figured out the problem."

> **"I had the best classmates ever!"**

Interacting with the campus community, like she did with her TOH team, was a highlight of Kim's time on the Salt Lake City campus. One of her favorite campus events was the popular semesterly extravaganza, Crimson Nights, which brings the entire student body together for a themed party at the A. Ray Olpin Student Union. "I loved attending Crimson Nights!" said Kim with a smile, recalling that the event was a great way to let loose and make new connections with all types of people. She also enjoyed getting to know the campus community through ECE social hours, job fairs and extracurricular activities like the Ultimate Frisbee Club.

To current and future students, Kim suggests taking every opportunity to branch out and meet new people. "Don't stick with the same people," she suggests. "Connect with other students who are already on campus, go to ECE social hours, events and join clubs!"

Overall, Kim is pleased with her experience at the Salt Lake City campus and is excited about what the future holds. Since graduating, Kim has been exploring various employment opportunities. She has been accepted to graduate school here at the University of Utah, and is considering continuing her studies. She looks forward to making meaningful contributions to the field of computer engineering. Her journey reflects the endless possibilities that lie ahead for all University of Utah students.

by Lindsay Simas

Jacob George with graduate students.

Jacob George Named University of Utah's 2023 Innovator of the Year

Many researchers go into their work with a problem in mind that needs to be solved. Not Jacob George: he approaches research with the end in mind. George's end? "[To make] an impact in people's lives—quickly."

George's lab, the Utah NeuroRobotics Lab, was founded in 2020 on the idea that their work in neurorobotics shouldn't just sit on a desk or be published in papers—it should be able to help actual people as soon as possible. The Utah NeuroRobotics Lab has accomplished just that: their work in the intersection of artificial intelligence, robotics, and neuroscience has led them to develop biologically-inspired artificial intelligence and brain-machine interfaces to restore and/or enhance human function. In simpler terms: George's team has created both invasive and non-invasive technology solutions for people who have experienced limb loss, strokes, spinal cord injuries, or traumatic brain injuries. Their technology allows people to regain control over missing or non-functioning body parts at an unprecedented level.

But the Utah NeuroRobotics Lab isn't stopping there. Utilizing the non-invasive technology they've developed, the lab is working to offer this technology to everyone, regardless of physical capability. George "[envisions] an inclusive world where everyone can seamlessly interact with the technology around them, regardless of their physical capabilities." With this technology, one could text a friend, check their online bank account, or call their mother—simply by thinking about the action.

In recognition of his research advancements at the intersection of artificial intelligence, robotics, and neuroscience, the University of Utah's PIVOT center has named Jacob George the 2023 Innovator of the Year.

George would like to thank the PIVOT Center for their generosity and consideration; Huy Tran, the Utah NeuroRobotics Lab's "right-hand man" at the PIVOT Center for his tireless work in helping them maintain funding and develop connections; and all members of the Utah NeuroRobotics Lab for their diligent work. The Utah NeuroRobotics Lab plans to continue their work and keep pushing the boundaries of what is truly possible with technology.

by Marlee Jeppsen

ECE by the Numbers

$262,900
scholarship spending

68
scholarships

47
faculty

143
UAC students

85
BS degree graduates

15
Early State Career Awardee faculty

$9M
sponsored research awards

836
undergraduate students

4
National Academy faculty

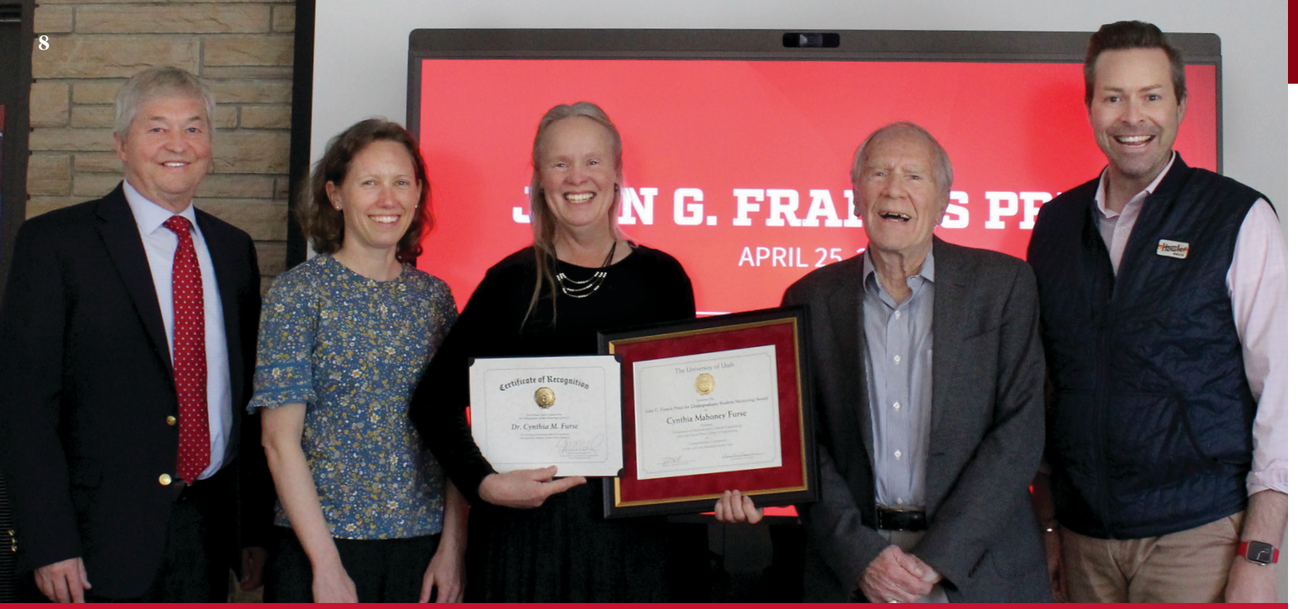
259
graduate students

23
PhD degree graduates

55
MS degree graduates

17
staff

2
fellowships



Faculty Awards and Recognition

Cynthia Furse
» Distinguished Professor
» John G. Francis Undergraduate Mentoring Prize
» Fellow of ACES

Pierre-Emmanuel Gaillardon
» Under 40 Innovators Award, Design Automation Conf.

Jacob George
» 2024 Outstanding Undergraduate Research Mentor Award

Carlos Mastrangelo
» Research featured in IEEE Journal

Rajesh Menon
» SPIE Fellow

Masood Parvania
» Roger P. Webb Endowed Professorship

Benjamin Sanchez Terrones
» Research featured on the front page of Head & Neck Journal
» Institutional Research Grants, American Cancer Society

Florian Solzbacher
» Gerald and Barbara Stringfellow Endowed Professor

ECE Department Awards

Jon Davies
» 2024 Outstanding Staff

Weilu Gao
» 2024 Junior Faculty Rising Star

Masood Parvania
» 2024 Researcher of the Year

Jamesina Simpson
» 2024 Outstanding Service

Gerald B Stringfellow
» 2024 Lifetime Achievement

Heayoung Yoon
» 2024 Teacher of the Year

Support the Next Generation

The ECE Department has worked hard to lower the cost of lab fees and equipment, while maintaining the best quality hands-on learning experience. However, the financial cost of college creates a barrier for some students. Please consider making a small donation to support ECE students. All donations will go directly to supporting the student experience.

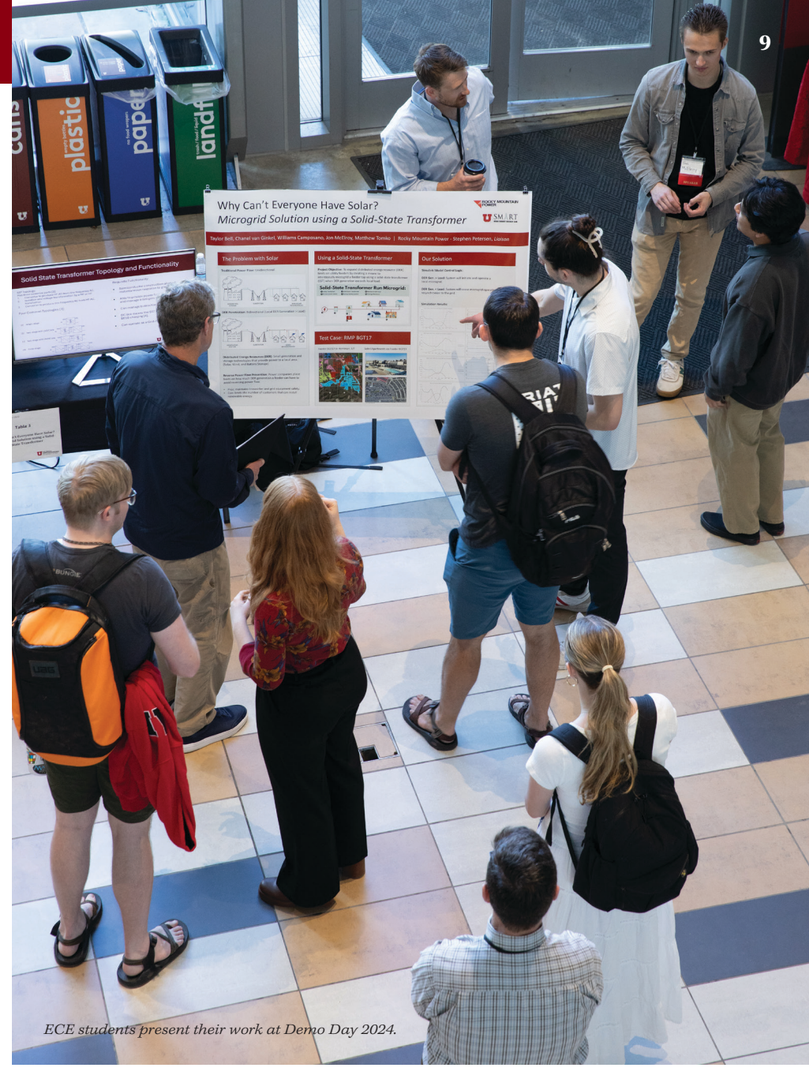
$1–$500
Student Snack Support Fund

$100–$500
Senior Lab Kits

$1,000–$3,000
Sophomore/Junior Lab Kits

$1,500–$3,000
Freshman Lab Kits

$1,000–$5,000
Scholarship Fund



ECE students present their work at Demo Day 2024.

How to Donate:

- Select "Development" or "Scholarship" fund, and leave a note dictating how you would like your donation applied.
- As you complete the form, look for the "Match your gift" link, which will allow you to select the company where you work. Several companies offer matching donations: if yours does, please indicate so. Doing so can potentially double your donation.

Upon donation, your name or organization will be recorded on the donor wall and website, as well as course syllabus and/or lab kits for recognition.

Contact john.bolke@utah.edu with questions. Additional donor information is available at ece.utah.edu/donors/

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