Greetings from our new home in the new Engineering Education and Research Center (EER)! The EER building is magnificent and is finally providing us with the right infrastructure to deploy our ambitious vision for the department.

Distance collaboration and telepresence technologies pervade our classrooms and meeting spaces. Small and large conference rooms are spread across the building, encouraging spontaneous and planned interactions between researchers and students. A very large maker-space, with over 20,000 sq. ft. of space, is a strong provocation to invent and inquire. It is also rapidly becoming a new mindset for our students and faculty and not just a physical facility. The state-of-the-art auditorium, complemented by breakout rooms and a welcoming reception space, provides an ideal setting for holding events that bring academia, industry, government and the venture community together, such as the inaugural Disruptive Technologies Conference held in early September.

Our most valuable resource is unquestionably our human capital: the faculty, students, staff, and visitors who form the creative and dynamic Texas ECE community.

The selectivity of our program keeps increasing, with undergraduate and graduate admissions rates of 23.8% and 15.4%. The quality of our faculty is reflected in their prestigious awards and recognitions, their visibility in professional venues and in the media, the steady rise in our externally funded research, and our winning of a National Science Foundation (NSF) Materials Research Science and Engineering Center (MRSEC) this past year.

With such phenomenal human capital and superb facilities, we are implementing our vision to become a teaching, research and disruptive innovations department.

Our students, alumni and research help drive new markets and the creation of product categories. Our bold and ambitious curriculum reform focuses on learning through invention, offering deep year-long design experiences for the first time to our freshman, changing the way that critical electrical and computer engineering concepts are packaged into courses and delivered, providing our students with a strong liberal arts education and an unprecedented amount of flexibility in their curriculum, and most importantly using experiential learning to teach them the myriad of soft skills they need to master to become true disruptive innovators. We are also working to identify potentially disruptive research problems in collaboration with industry and the venture capital and entrepreneurial ecosystems.

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Texas ECE will be adding 11 new tenured and tenure-track faculty in the next academic year.

New Faculty

Alex Q. Huang
Assistant Cockrell Centennial Chair in Engineering

Dr. Huang is a world-renowned expert of power semiconductor devices, power electronics, smart grid and renewable energy systems. He has published more than 500 papers in journals and conferences, has more than 30 granted patents, and is the inventor of more than 20 U.S. patents including several patents on the Emitter turn-off (ETO) thyristor technology that received a prestigious IEEE PES Award in 2000. Dr. Huang is also widely credited for his contribution in developing the Energy Internet concept and the Solid State Transformer (SST) based Energy Router technology. His work on SST has been named an MIT Technology Review as one of the world’s 10 most important emerging technologies in 2012.

Jaydeep Kulkarni
Assistant Professor

Dr. Kulkarni’s research is focused on integrated circuits and systems for Cyber-Physical System applications such as Cyber-Physical Grid Monitoring, Cyber-Physical System Security and Cyber-Physical Energy Systems. His current research interests include energy data analytics, machine learning methods for data analytics, and machine learning methods for system control.

Hao Zhu
Assistant Professor

Dr. Zhu’s research focuses on electricity market design, power system operation and control, power electronics and electric vehicle charging. His work recently received a grant from the National Science Foundation to support the development of a cyber-physical energy system for electric vehicle charging and operation. The work is expected to provide insights into the integration of electric vehicles into the power grid.

Moore Inventor Fellowship

Prof. Deji Akinwande was awarded the inaugural Moore Inventor Fellowship for creating an atomically thin 2D-aluminum oxide known as Al2O3, which could provide a 10-fold increase in energy efficiency for integrated circuits such as computer chips.
Lightweight, Inexpensive Distributed Technology Incorporated into Child Independent Mobility

Prof. Christine Julien and Prof. Mohit Tiwari are investigating the use of lightweight, inexpensive distributed technology to foster community supported Child Independent Mobility (CIM). The project envisions small “tags” carried or worn by children that are detectable by trusted community devices that are carried by adults or embedded in the community. The project will make it possible for parents to define rules that capture conditions in which their child is considered safe or unsafe, reliably triggering notifications or community response to anomalous events.

Netflix’s Video Quality System Relies on Neuroscience-based Visual Information Fidelity (VIF) Model

Emmy Award-winning Professor Al Bovik’s Television picture quality measurement tools continue to be used on a grand and growing scale. Recently, his neuroscience-based Visual Information Fidelity (VIF) model has been built as the core engine of Netflix’s video quality system that controls the picture quality of every video streamed by Netflix to all customers worldwide. Prof. Bovik’s video quality measurement models, which have injected the principles of visual neuroscience deep into global communication networks, affect the viewing experiences of hundreds of millions of broadcast, satellite, cable, and internet television viewers each day.

Researchers Receive $15.6 million NSF Materials Research Science and Engineering Center (MRSEC) Grant to Discover and Advance New Types of Materials

Texas ECE professor Edward Yu will serve as director of a new center to discover and advance new types of materials for use in many applications including energy storage, medical devices and information processing. The UT Austin Center for Dynamics and Control of Materials (CDCM) will include 23 faculty members from the university’s Cockrell School and College of Natural Sciences and one researcher from Rice University.

Researchers at the center are particularly interested in developing materials that have the ability to form, reform and reconfigure with different properties as they are being used. These new capabilities could pave the way for new technologies in medicine, electronics and other areas.

Texas ECE Hosts Disruptive Technologies Conference

Texas ECE hosted a conference on disruptive technologies on September 7, 2017 which brought together industry executives, academics, and venture capitalists to discuss cutting-edge research and the challenges of collaborating between the three sectors.


The Autonomous Vehicles and Safety Critical Systems panel focused on the challenges of deploying millions of autonomous vehicles that consistently operate safely and reliably.

The Applied Machine Learning panel addressed questions such as the role of man-machine symbiosis or man-machine learning collaboration in the future and the infrastructure/hardware/networking needs to deploy machine learning.

The Future of Education panel debated what defines electrical engineering, computer engineering and computer science education in the 21st century, and how we prepare our students for the jobs they will hold in 30 years.

The panel on The Future of Infotainment explored the future of augmented reality, virtual reality and their integration with brain-machine interfaces, and breakthroughs needed to deliver these systems in form factors that will be acceptable to the self-image conscious consumer.

The conference also presented discussions on the future problems and potential solutions of a variety of technologies including Security and Privacy, Wireless Communications, Flexible Electronics, Robotics, and Data Centers.
Bite-Sized Courses
Bites courses are envisioned as small courses focused on specific skill sets that our students need to be successful in internships, careers (and in their courses) that are not part of the core coursework. Some of our students have already acquired these skills by other means, so these bite offerings are meant to be supplementary and preparatory for a subset of the students. They are designed to be offered on a short course format, where one-credit worth of material is encapsulated more densely in one half of the semester. The first of these courses was designed and offered by one of our own graduate students under the supervision of a tenure-track faculty member, giving the graduate student a traineeship in teaching. In the future, we expect bites courses on a range of topics, taught by a vibrant mixture of regular faculty, visitors from industry, and supervised graduate students.

First-Year Design Experience
First-Year Design Experience (FDE) is a two semester “bite-sized” course where students form groups of five and use the conceptual topics they are being taught to design components, bigger components, and finally, systems. It is a combination of a top-down and bottom-up learning approach that introduces them to a hands-on design experience they will use throughout their academic careers. For example, this year’s first-year students will reinvent the iPhone, decomposing the iPhone down into component-size objects that need to be designed and fabricated.

Edison Lecture Series Encourages STEM Careers in Middle and High School Students
The Edison Lecture Series engages middle and high school students with the fun side of electrical and computer engineering. Edison attendees learn the fundamentals of an engineering topic through a university-style lecture, then see these concepts come to life through hands-on demos. Edison has reached over 28,000 Central Texas students since its inception in 2005. The 2018 Edison Lecture Series will be held February 9, 2018 and will focus on Autonomous Vehicles, continuing the exploration of the topic from the Disruptive Technologies Conference.

The Energy Case Competition
As freshmen, Michael Liu and Marwan Madi started The Energy Case Competition to spark teams of three to four undergraduate students of any major to collaborate and use their problem-solving skills and aptitude creatively to create and present an innovative and prospective solution plan that addresses the main challenges facing the United States energy sector. The students research current technologies to tackle today’s largest issues of growing energy demand and climate change.

(L-R): Michael Liu (Petroleum Engineering junior), Marwan Madi (Texas ECE sophomore)