

2024 ELECTRICAL AND COMPUTER ENGINEERING NEWSLETTER | OKLAHOMA STATE UNIVERSITY

ECE NETWORKS



SCHOOL OF
**ELECTRICAL AND
COMPUTER ENGINEERING**
College of Engineering, Architecture and Technology

3

STUDENTS AND FACULTY

Student Awards 3
 New Faculty 7
 Faculty Awards 9
 Cyclone Cowboys 11
 Student Activities 13



5



11

15

RESEARCH HIGHLIGHTS

Dr. John O'Hara 15
 Dr. Hamid Nazaripouya 17
 Dr. Weihua Sheng 19
 Dr. Ying Zhang 20
 Dr. James Stine 21



9

22

ALUMNI AND CONTRIBUTORS

Dr. Joseph Campbell 22
 Derek Gates 23



15

17

19

20

21

24

NOTES AND NOTICES

Dr. Fan's New Initiatives 24
 Thank you, Gary Yen 27
 ECE Thanks Jeffrey Young 28
 Staff Application and GE Donation 28
 By the Numbers 29



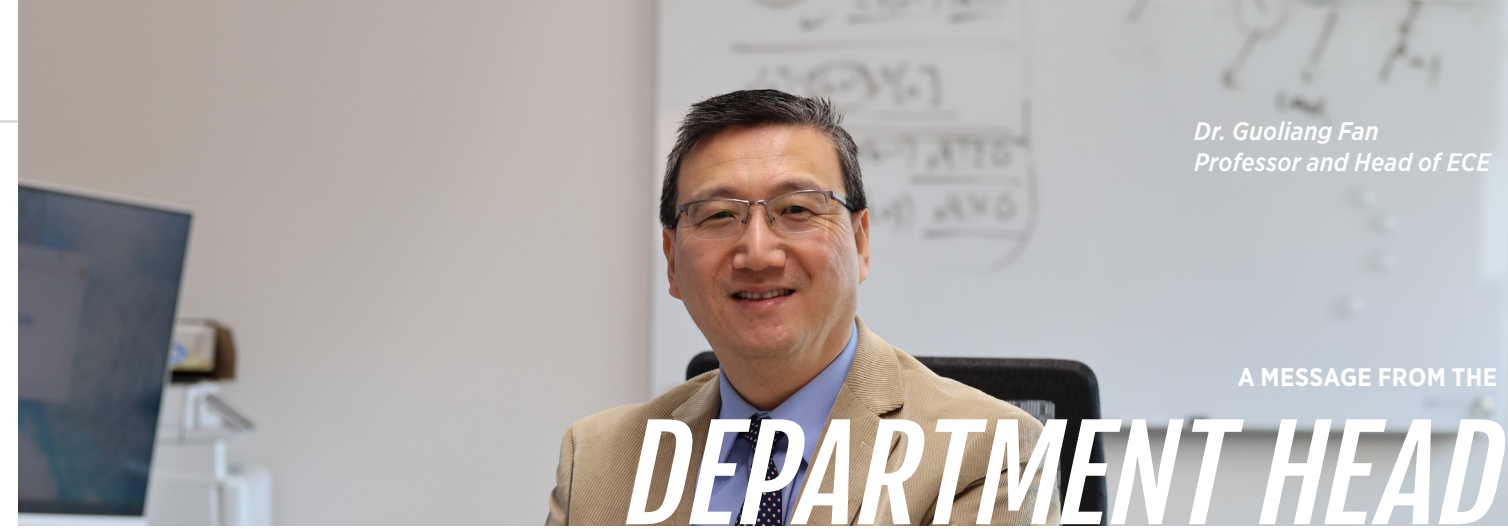
24



27



28



Dr. Guoliang Fan
 Professor and Head of ECE

A MESSAGE FROM THE

DEPARTMENT HEAD

▶ **IT HAS BEEN A YEAR** since we moved into the totally transformed Engineering South. All faculty, students and staff appreciate and enjoy the state-of-the-art facilities, from offices to meeting rooms, to the student lounge to the graduate student offices, and the high-tech seminar room to the well-equipped conference room. All of those are worth the wait and \$24 million expenses, thanks to electrical and computer engineering alumni and friends



as well as Oklahoma State University administration. Special thanks go to the former Department Head Dr. Jeffrey Young who returned to the faculty ranks after completing two full terms as head. Young played a key role in the ES renovation and fundraising efforts, leaving a legacy for the future of ECE.

2024 is a record-setting year for ECE. Our enrollment has reached a record high since 2019 with 551 students. For the first time, the number of students who claimed computer engineering as their primary major exceeds those for electrical engineering, showing the tremendous increase in the interest from students, which is driven by the high demand of the CpE graduates in the industry. Our externally sponsored research expenditure, for the first time, exceeds \$3 million per year thanks to our faculty's exceptional effort and productivity. This year, we also welcomed four exceptionally talented new faculty members—Drs. Ying Zhang, Syed Jehangir, Hritom Das and Shahriar Shahabuddin—making this our largest recruitment year in recent times. More information about their academic backgrounds and research interests is provided in this newsletter.

Moreover, we are proud of the achievement of Dr. Ying Zhang who recently received a \$1.1 million subaward from a \$6 million National Science Foundation grant that is aimed at developing artificial intelligence and digital twinning techniques to optimize energy use, integrate renewable sources more effectively and improve overall climate resilience. Equally so, Dr. Nazaripouya was awarded a \$2.1 million project from NASA to advance power grid and pre-fire situational awareness by integrating fire-ignition electrical fault data with high-resolution Earth observations of ecological and biophysical factors.

These two awards signify tremendous growth in the power and energy area at OSU.

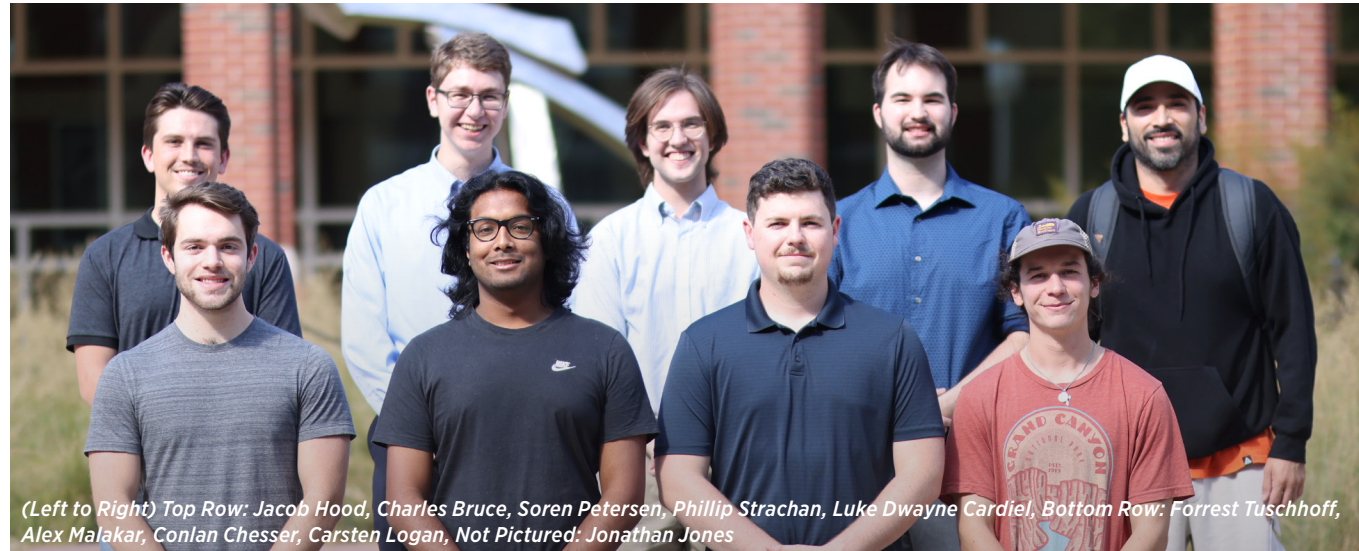
In addition, ECE delights in the achievements and contribution of two outstanding alumni, Dr. Joseph Campell, a Laboratory Fellow from the Lincoln Lab at MIT, and Mr. Derek Gates, the Owner & Principal at D. W. Gates Engineering, both of whom were inducted into CEAT's prestigious Hall of Fame. Campell also received the Melvin R. Lohmann Medal, the highest recognition to honor alumni of the College of Engineering, Architecture and Technology. Congratulations to both Campell and Gates.

As we hired faculty into the department, we also saw faculty retire in the same year. Regents Professor Dr. Gary Yen, after 28 years of dedicated service at OSU, announced his retirement by the end of 2024. In addition to being a vital part in the School of ECE in many ways, Yen has been an influential scholar and educator, leaving a lasting legacy at OSU through his nearly three decades of dedicated service. His presence will be deeply missed by colleagues and students.

This newsletter also brings exciting updates about new initiatives in ECE, along with faculty and student awards and various student activities. A heartfelt thank you goes to the Publicity Committee and the CEAT Marketing and Communications department for their collaborative efforts in producing this content-rich newsletter. I am confident that you will enjoy reading it and share our enthusiasm and gratitude.

Since I was appointed as Interim Head in early 2024, my leadership approach has centered around learning, understanding and exploring innovative strategies. The positive developments in our students, faculty, staff and core areas such as teaching, research and service have inspired me to formally pursue the Head position. With the approval by the OSU A&M Board of Regents on Dec. 6, 2024, I started my first term of the Head of ECE. My vision is to build and nurture a vibrant and dynamic student-centered and faculty-supportive ECE community that is anchored by three fundamental pillars: Engage, Communicate, and Empower—collectively referred to as “the ECE spirit”. With the strong backing of our faculty, staff and the CEAT administration, I am confident in my ability to continue fostering growth and long-term sustainability of the ECE-spirited ECE.

SINCERELY, GO POKES



(Left to Right) Top Row: Jacob Hood, Charles Bruce, Soren Petersen, Phillip Strachan, Luke Dwayne Cardiel, Bottom Row: Forrest Tuschoff, Alex Malakar, Conlan Chesser, Carsten Logan, Not Pictured: Jonathan Jones

ECE Miller Research Scholars

► **IN THE FALL OF 2024**, the School of Electrical and Computer Engineering introduced a new initiative aimed at encouraging undergraduate students to engage in research with ECE faculty members. This initiative is supported by the Lynn T. Miller fund through the OSU Foundation and will provide annual funding for 10 Miller Scholars, each receiving \$2,000. The inaugural class of ECE Miller Research Scholars followed by their faculty mentor for 2024-2025 are:

- Forrest Tuschoff, Dr. O'Hara
- Carsten Logan, Dr. Piao
- Charles Bruce, Dr. Sheng
- Soren Petersen, Dr. W. Zhang
- Luke Dwayne Cardiel, Dr. Y. Zhang
- Jonathan Jones, Dr. Fan
- Jacob Hood, Dr. Sha
- Phillip Strachan, Dr. Nazaripouya
- Conlan Chesser, Dr. Sheng
- Alex Malakar, Dr. Sha

CEAT's Orange Gown Recipient

► **CARSON SAGER**, electrical and computer engineering student and Cowboy basketball player, was selected as the OSU CEAT Orange Gown recipient for the spring 2024 semester. The Orange Gown serves as a testament to Sager's exceptional accomplishments and active participation in college activities throughout his time at OSU.



Carson Sager in CEAT's Orange Gown.



Zhidong Su

Graduate College Commencement Marshal

ZHIDONG SU, an ECE Ph.D. student, was named the 2024 OSU Graduate College Honorary Graduate Commencement Marshal. His Ph.D. advisor is Dr. Weihua Sheng. The Honorary Graduate Commencement Marshal recognition is the highest honor bestowed on doctoral and master's degree graduates at each commencement. Marshals have demonstrated scholarly achievement, as evidenced by academic performance and discipline-appropriate scholarly contributions that capture the essence of OSU's land-grant mission.



Tyler Graham

Universities Space Research Association Award

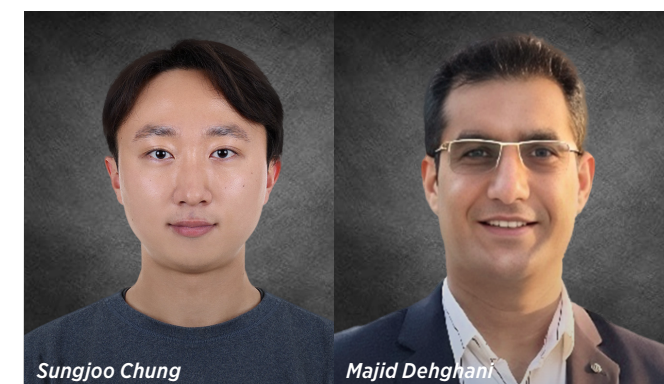
► **ECE SENIOR TYLER GRAHAM** was recently selected as a Distinguished Undergraduate for 2024 by the Universities Space Research Association. The USRA is a nonprofit research corporation founded to strengthen NASA's knowledge base in new areas of space research and to promote university student and faculty involvement. Tyler's unyielding leadership in ECE to build OSU's inaugural CubeSat program ties in perfectly with the USRA mission. Tyler is one of only five recipients selected in the entire nation, based on the strength of his academic accomplishment and leadership qualities. Tyler is also a recipient of the 2024 ECE Outstanding Senior award.

Senior Design Expo Award

► **TEAM JOYRIDE**, a six-member team, won first place in CEAT's spring 2024 Senior Design Expo. This senior design project's goal was to qualify and compete in the annual Intelligent Ground Vehicle Competition in Michigan, which consists of several different challenges such as left/right turns, stopping at a stop sign, changing lanes, avoiding obstacles and various parking maneuvers. The team's tasks included developing a stop sign detection program using artificial intelligence, enhancing the existing object avoidance system to fix the issues from previous semesters, adding lanes into the mapping software, and further developing the Drive-By-Wire system so that the vehicle can be controlled with a remote controller. The team consisted of Alex Wilburn, Gage Howard, Seth Baucum, Gabe Ferguson, Carson Sager and Scot Sigler.



Alex Wilburn, Gage Howard, Seth Baucum, Gabe Ferguson, Carson Sager, Scot Sigler



Sungjoo Chung

Majid Dehghani

Dr. Ramakumar Family Energy Scholarship

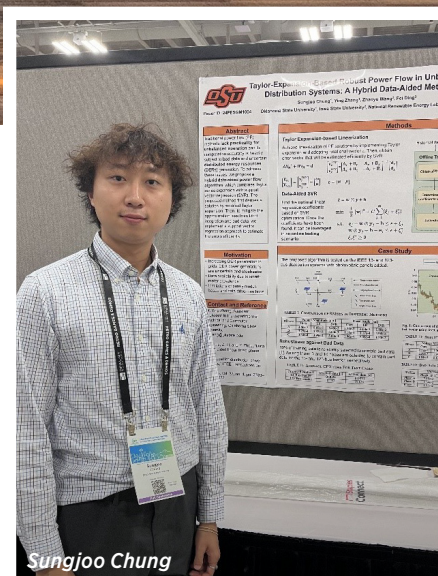
► **TWO ECE GRADUATE STUDENTS**, Sungjoo Chung and Majid Dehghani, were awarded this year's Dr. Ramakumar Family Energy Scholarship. Sungjoo is advised by Dr. Ying Zhang and Majid is advised by Dr. Hamid Nazaripouya. The Ramakumar Family Energy Scholarship was created by Dr. Rama Ramakumar, an Emeritus Regents Professor of ECE, with a goal to encourage undergraduate and graduate students to engage in research in power and energy fields.

Inaugural ECE Freshman Showcase

► **ECE WELCOMED A RECORD 135 FRESHMEN THIS FALL**, a 32% increase from 2023. Recognizing that first-year students have limited direct engagement with ECE faculty, the department set out to organize an event to encourage meaningful interactions. Faculty, IEEE & HKN leaders and distinguished alumni Mr. Gates and Dr. Campbell attended. Students enjoyed a “walk-and-talk” poster session to discuss faculty research and a thrilling Tesla Coil demonstration, crafted within ECE by Dr. Jerzy Krasinski, ECE emeritus professor. The showcase underscored how faculty are deeply invested in student success and growth.

Poster Contest Winner

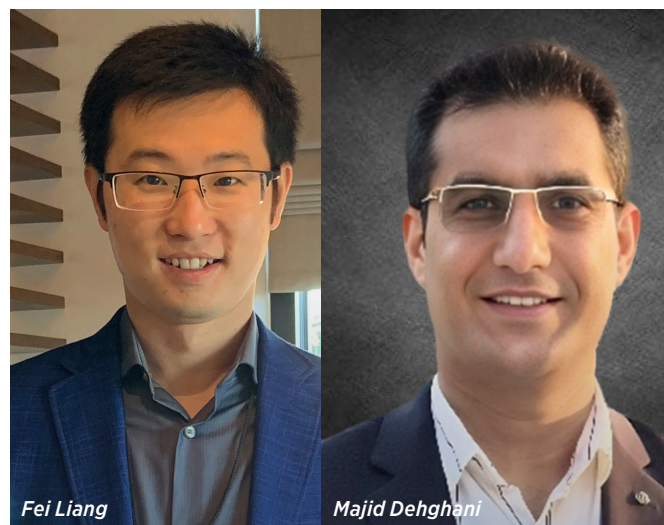
► **ECE PH.D. STUDENT SUNGJOO CHUNG**, supervised by Dr. Ying Zhang, won first prize in the Graduate Student Poster Contest at the 2024 IEEE Power and Energy Society General Meeting, the flagship conference in the power and energy engineering field. His poster is titled “Taylor-Expansion-Based Robust Power Flow in Unbalanced Distribution Systems: A Hybrid Data-Aided Method.”



Sungjoo Chung

Graduate College Robberson Research and Creative Activity Award

► **TWO ECE PH.D. STUDENTS, FEI LIANG AND MAJID DEGHANI**, have received the 2024 Summer Robberson Research and Creative Activity Grant to support their innovative research. Fei Liang, supervised by Dr. Weihua Sheng, has research interests in wearable computing, robotics and machine learning. He has published over 10 papers on activity monitoring for elderly care using wearable devices and companion robots. This award has enabled him to conduct real home tests of his activity monitoring system. Majid works under the supervision of Dr. Nazaripouya to develop Power Hardware-in-the-Loop systems. This award has allowed Majid to make significant advancements in control strategies for modern power grids. His work will contribute solutions that can adapt to the evolving demands of the energy industry.



Fei Liang

Majid Dehghani

other

ECE Graduate Awards



ANDREW ASH was nominated by Prof. John Hu to receive the Harold Fristoe Memorial Award for being a model graduate student in every aspect of scholarly work.



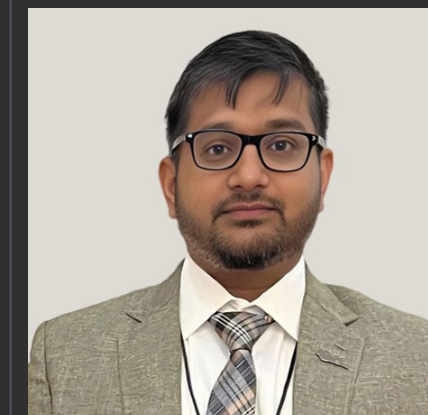
JIKUI ZHAO was nominated by Prof. Qi Cheng to be awarded the Distinguished Graduate Fellowship through his work in Automated Modulation Recognition, which is crucial to the future of cognitive radio and security.



FAHIM HOSSAIN was nominated by Prof. John O’Hara to be awarded the Dr. Rao Yarlagadda Graduate Fellowship by making outstanding experimental work with theoretical and analytic backing, ready for 6G communications.



ROSE THOMPSON was nominated by Prof. James Stine to be awarded the 2024 ECE Outstanding Graduate Student Award through her work in co-writing a textbook and numerous publications and co-teaching a class in ECEN 4243: Computer Architecture.



TAHAA SAEED KHAN was nominated by Prof. Hamid Nazaripouya to receive the Jeff Szcinski Visionary Award by demonstrating evidence of “going the extra mile” to strive for excellence.

Dr. Shahriar Shahabuddin

► **DR. SHAHRIAR SHAHABUDDIN** received his M.Sc. and Ph.D. degrees from the Centre for Wireless Communications at the University of Oulu, Finland, in 2012 and 2019, respectively. During the Spring of 2015, he was a Visiting Scholar with the Computer Systems Laboratory at Cornell University, Ithaca, NY. Since 2017 and 2020, he has held positions as a System on Chip Specialist and Senior Digital Signal Processing Engineer at Nokia, Finland, and Nokia, Dallas, respectively. Shahabuddin received the adjunct professor/docent title from the Faculty of Information Technology and Electrical Engineering, University of Oulu, Finland in 2021. He also served as an Assistant Professor of Instruction in the Electrical Engineering Department at the University of Texas at Arlington during 2023 and 2024. Shahabuddin's current research interests lie in digital VLSI design for 6G wireless communications, signal processing, machine learning and wireless security. He is a Senior Member of IEEE and serves as an Associate Editor for the Journal of Signal Processing Systems.

Dr. Ying Zhang

► **DR. YING ZHANG** received her Ph.D. degree in Electrical Engineering at Southern Methodist University in 2020. Before joining OSU, she was a postdoctoral research associate in the Interdisciplinary Science Department in the U.S. Department of Energy's Brookhaven National Laboratory, an assistant professor at Montana State University, and a visiting scholar at Cornell University, respectively. Her research interests are rooted in power system situational awareness and focus on grid-based interdisciplinary research, overlapping climate change and data science. She received the National Scholarship for Highest Academic Distinction in China, the Frederick E. Terman Award for Graduate Students, and the inaugural IEEE Power and Energy Society Outstanding Doctoral Dissertation Award (one of four awardees for the Ph.D. students in power and energy systems who graduated in 2020-2022). She has authored over 30 publications in flagship journals such as IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, IEEE Transactions on Sustainable Energy, IEEE Transactions on Power Delivery, and IEEE Transactions on Neural Networks and Learning Systems, etc., including one Global ESI top 1% highly cited paper and two Best Papers. Zhang serves as the Secretary of the IEEE Task Force on Performance Evaluation of Distribution System State Estimation and Associate Editor for IET Generation, Transmission & Distribution.

Dr. Hritom Das

► **DR. HRITOM DAS** received his B.Sc. in Electrical and Electronic Engineering from American International University-Bangladesh, Dhaka, Bangladesh, his M.Sc. in Electronic Engineering from Kyungpook National University, Daegu, South Korea, and his Ph.D. in Electrical and Computer Engineering from North Dakota State University, Fargo, North Dakota, in 2012, 2015 and 2020 respectively. He was a visiting Assistant Professor with the department of Electrical and Computer Engineering at the University of South Alabama, Mobile, AL. In addition, he was a Post-Doctoral Research Associate with the department of Electrical Engineering and Computer Science at the University of Tennessee, Knoxville. Currently, Das is working as an Assistant Professor with the department of Electrical and Computer Engineering at Oklahoma State University. His research interests include neuromorphic computing, emerging memory, low-power VLSI circuit design and data privacy for edge devices.

Dr. Syed Jehangir

► **DR. SYED SHAHAN JEHANGIR** received his M.S. in Electrical Engineering from King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, in 2017, and his Ph.D. in Electrical Engineering from the Advanced Radar Research Center at the University of Oklahoma, Norman, Oklahoma, in 2023. He is currently an Assistant Professor of Electrical Engineering at Oklahoma State University, where he also serves as the Director of the Materials, Antennas, Radar, and Sensors Lab. Before joining OSU in 2024, he worked as an Antenna Engineer at Garmin International, headquartered in Olathe, Kansas. Jehangir was a Research Associate with the Department of Electrical Engineering at the United Arab Emirates University from 2017-2019, where he worked on artificial magnetic absorbers in collaboration with Dassault Aviation, France, and Abu Dhabi Autonomous Systems, UAE. Jehangir's research interests span various aspects of applied electromagnetics, including antenna theory and design, antennas and phased arrays for radars and UAVs, UWB dual-polarized antennas, microwave, mm-Wave, and sub-THz antennas, reconfigurable and integrated MIMO antennas for 5G/6G communication devices, wearable antennas, biosensors, dielectric antennas, and conventional as well as artificial electromagnetic materials. Jehangir has published over 30 refereed journals and conference papers and holds three US patents. He has received several prestigious awards including the recent Ph.D. dissertation award granted by the Gallogly College of Engineering, OU in 2023.



DR. SHAHRIAR SHAHABUDDIN



DR. HRITOM DAS



DR. YING ZHANG



DR. SYED JEHANGIR

Dr. Nazaripouya named Distinguished Fellow of Electrical and Computer Engineering

▶ **DR. HAMID NAZARIPOUYA** was named a Distinguished Fellow of Electrical and Computer Engineering. This department-level honor recognizes junior faculty who excel in both research and teaching. Nazaripouya's research focuses on power systems and power electronics, and he leads multiple research projects, including a \$2.1 million NASA FireSense initiative, focusing on power systems and wildfire management.

Since joining OSU in 2020, he launched the Power Grid Modernization Lab, which provides valuable hands-on research opportunities for students and focuses on cutting-edge advancements in energy systems and technology integration. He is also recognized for his impactful teaching, creating an inclusive learning environment and inspiring students to solve real-world problems. Nazaripouya's work blends traditional power engineering with modern technologies, ensuring students engage with cutting-edge research and are well-prepared for careers in the power and energy sectors.

Dr. Ying Zhang and team won the Best Paper award at the 2024 IEEE Power and Energy Society General Meeting

▶ **DR. YING ZHANG AND HER PH.D. STUDENT SUNGJOO CHUNG**, alongside collaborators from the National Renewable Energy Laboratory and Iowa State University, received the Best Paper award at the 2024 IEEE Power and Energy Society General Meeting for their paper "Taylor-Expansion-Based Robust Power Flow in Unbalanced Distribution Systems: A Hybrid Data-Aided Method." Their paper introduces a hybrid data-aided method for power flow calculation in unbalanced distribution systems, blending power engineering knowledge with regression techniques to improve accuracy and reduce calculation time.

They bring a new perspective to AI-aided power system operation by focusing on fast yet accurate power flow calculation in complex electric distribution systems with distributed energy resources. This hybrid method achieves significant performance synergy in terms of accuracy, calculation time, and robustness against outliers or cyberattack measurements. Their method advances grid monitoring and management by enhancing performance and robustness in systems with distributed energy resources. Chung, the first author, was also recognized with the 2024 Dr. Ramakumar Family Energy Scholarship.

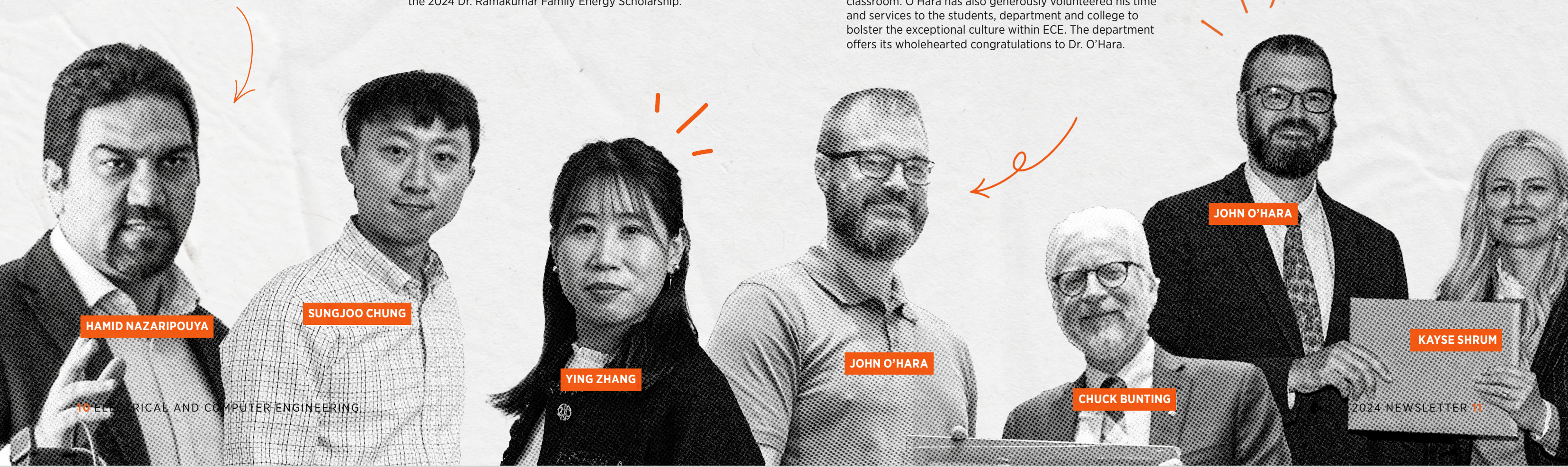
Dr. John O'Hara receives the Excellent Faculty Award in the Senior Status Category

▶ **ASSOCIATE PROFESSOR JOHN O'HARA** was honored at the CEAT 2024 Faculty, Staff and Student Awards Banquet with the CEAT Excellent Faculty Award, which recognizes "overall excellence as a faculty member, as evidenced by teaching excellence, scholarly achievement, research enterprise productivity, collegiality, contributions to professional societies and student engagement." O'Hara's academic achievements since he was hired in 2017 have truly been outstanding. For example, he has secured \$4.8 million in total external and internal support while at OSU as a PI and Co-PI. His most recent annual research expenditures were \$346,000. O'Hara was a recipient of the prestigious NSF CAREER award in 2023, the lead PI on an impressive, nationally competitive NSF Major Research Instrumentation grant (\$893,000) and the lead Technical PI on a \$1 million NASA grant dealing with 6G communication systems. He has secured 15 grants while at OSU from prestigious external sources including NSF, NASA and the Air Force Office of Scientific Research. He is an internationally recognized scholar with over 9,600 Google citations and an H-index of 40. Moreover, ECE students offer high praise of his teaching effectiveness in the classroom. O'Hara has also generously volunteered his time and services to the students, department and college to bolster the exceptional culture within ECE. The department offers its wholehearted congratulations to Dr. O'Hara.

Dr. O'Hara named 2024 President's Fellows Faculty Research Award recipient

▶ **DR. JOHN O'HARA** has been awarded the 2024 President's Fellows Faculty Research Award. His research focuses on the use of novel terahertz and optical systems for the realization of 6G communications, optical and RF/optical hybrid sensing and communication, IoT, artificial electromagnetic materials and STEM outreach to rural communities. The \$20,000 award will fund a graduate student to work on a device that simulates electromagnetic wave behavior, aiding in the future development of 6G wireless networks.

O'Hara's background includes positions at Los Alamos National Laboratory, Motorola, and founding Wavetech LLC. His extensive industry and research experience have driven advancements in artificial electromagnetic materials and wireless technologies. He continues to push forward innovations in communication and sensing technologies that could shape the next decade of wireless communications.



CYCLONE COWBOYS

► In the College of Engineering, Architecture and Technology, ECE is fostering innovation with its Cyclone Cowboys, an interdisciplinary team devoted to wind energy. This diverse group of students, ranging from freshmen to seniors, is working on developing a prototype wind turbine and designing a theoretical offshore wind farm off the coast of Oregon this year. Their dedication extends beyond just engineering, as they emphasize outreach and diversity within the team. The Cyclone Cowboys' journey began in fall 2022 and has continued into the current academic year, with the team representing OSU in Phase 2 of the U.S. Department of Energy's Collegiate Wind Competition.

A STUDENT-LED INITIATIVE

► Cyclone Cowboys started as a senior capstone design project, but its scope has since expanded into a student organization open to all OSU students. With 36 active members, including students from various disciplines, the team is united by a shared passion for renewable energy. Their work is not limited to mechanical and electrical design; it spans plant and wildlife research, soil analysis, financial planning, STEM curriculum design and marketing. This broad skill set ensures that Cyclone Cowboys is a truly interdisciplinary initiative, offering opportunities for students in various fields, not just engineering.

Kris Barton, the team lead, is joined by a host of dedicated students, such as Maddie Holland, the electrical systems lead, Danny Stearman, the outreach lead and student organization president, Mason Quinton, the mechanical systems lead and Evan Quinton, the project development lead.

Their collective efforts are essential in developing functional wind turbine systems and preparing for the Collegiate Wind Competition, a national contest in which OSU competes against other renowned universities.

PREPARING STUDENTS

► The primary goal of Cyclone Cowboys is to bring together students passionate about renewable energy, particularly wind power, while educating the broader Oklahoma community.

The team's hands-on experience with wind turbine systems and virtual wind farm development goes beyond what is traditionally offered in OSU's curriculum. They not only design the mechanical components and electrical control systems, but also build a comprehensive 20-year business plan for their theoretical wind farms, considering environmental impact and community engagement. There are many benefits for the students involved.

INSPIRING THE NEXT GENERATION

► Cyclone Cowboys is not only about technical development but also about outreach and education. They actively engage with K-12 students, making complex engineering concepts accessible through kinetic, hands-on activities. These fun, interactive ways to learn about electrical circuits, turbine blade design and the mechanics of power generation are always a hit with the students. The team's collaboration with KidWind, an organization dedicated to teaching renewable energy concepts, has been instrumental in shaping their outreach program that visits all six elementary schools in Stillwater.

Professor Nate Lannan, the team's advisor is quick to acknowledge the contributions of key partners, such as Professor Laura Southard from the School of Mechanical and Aerospace Engineering, Northern Oklahoma College's Dr. Frankie Wood-Black and KidWind's Kathy Jackson. These partnerships have been critical to the team's success, providing expertise and educational resources that elevate their work.

Ultimately, Cyclone Cowboys is more than just a student organization or a capstone project; it is a hub for innovation, education and outreach in the field of renewable energy. The students involved are gaining practical experience and creating meaningful change, both within OSU and in the broader community. As the wind energy industry continues to grow, the Cyclone Cowboys are positioning themselves—and Oklahoma State University—as leaders in this vital sector.





IEEE-OSU officers

► **OKLAHOMA STATE UNIVERSITY'S IEEE STUDENT BRANCH** aims to provide students with a community of peers, and a connection to faculty and industry professionals who drive innovation in countless technical fields. The branch provides engaging activities and events to enlighten students about career and employment opportunities and innovations in Electrical and Computer Engineering.

In Spring of 2024, IEEE activities included a networking engagement opportunity with various departments of The Boeing Company, faculty research presentations, and participation in student competitions at the annual IEEE Region 5 Conference April 5-7.

While at the 2024 IEEE Region 5 Annual Conference, members of IEEE-OSU participated in various student competitions, including circuit design and ethics, and robotics competitions. These competitions represented real-world challenges and stimulated valuable skills in problem solving, time management and collaboration. Competitors in the Circuit Design challenge received a technical problem statement and necessary components and were tasked with designing and constructing a circuit to its specifications using only knowledge obtained from textbooks. IEEE students prepared for this competition by seeking guidance from OSU professors in Electrical Engineering. Competitors in the Ethics Challenge were tasked by the IEEE Ethics and Member Conduct Committee to analyze a hypothetical ethical case, prepare and deliver

an analysis in a presentation aligning with the IEEE Code of Ethics and then defend their analysis and recommendations during a Q&A period. Students who took part in these competitions reported that they learned valuable skills that will aid them in the years pursuing their degrees, and that they will continue to participate at future Region 5 Conferences.

During the 2024-2025 academic year starting Fall of 2024, the IEEE-OSU branch is led by President Jeremiah Young (junior), with Vice President Elizabeth White (junior), Secretary Danny Johnson (junior), Treasurer Skylar Araujo (junior), CEAT Student Council Chair Miguel Vergara (senior) and Conference Coordinator Katilynn Mar (senior).

The IEEE student branch kick-started the 2024-2025 academic year with a resume workshop aided by CEAT Career Services, as well as a career panel made up of representatives from Koch and Texas Instruments. The purpose of these activities was to prepare students for the Fall 2024 CEAT Career Fair, by providing valuable career and application advice and creating an environment for networking with the very same representatives who would be recruiting at the Career Fair.

IEEE-OSU has also committed to community outreach. IEEE-OSU attended this year's Tinkerfest event at the Oklahoma Science Museum to advocate for and generate exposure to Electrical Engineering and Computer Engineering. Tinkerfest is a daylong celebration of curiosity and creativity and is mostly attended by young students

who are largely unaware of such a career path. The student branch also developed a fun and interactive activity using skills gained in their classes to present to attendees at Tinkerfest.

The student branch continues to plan events and activities for its members that promote professional development and community outreach. Collaborations with many of OSU's STEM student organizations are also underway, with October marking the beginning of a collaborative yet competitive effort to raise donations for Our Daily Bread Food and Resource Center, as well as a STEM Trick-or-Treat outreach event planned for children within the community. The IEEE student branch of OSU would like to thank all the donors that made their efforts possible during 2024. Continuous support of the student chapter is appreciated with gratitude and the students' robust growth towards professional careers. OSU IEEE looks forward to and is excited for what is to come.

HKN

► **ETA KAPPA NU (HKN)** is a nationally recognized honor society of the Institute of Electrical and Electronics Engineers. The OSU Omega Chapter, established in 1930, honors outstanding and distinguished students who have shown academic excellence, leadership and service. The honor society is open to undergraduate juniors, seniors and graduate students majoring in electrical engineering or computer engineering.

This year, the Omega Chapter is also extending invites to electrical engineering technology and computer science students, following the lead of HKN national. Since HKN is an exclusive honor society for high-achieving students, there are certain academic requirements interested students must meet: Eligible students must be in either the top 25% of juniors, the top 20% of seniors or graduate students in "good academic standing."

On October 8, the Omega Chapter initiated 12 additional students into IEEE-Eta Kappa Nu. The traditional initiation ceremony includes the history of HKN and its founding principles. Emphasis is placed on the student's scholarship, character and attitude.

The 2024-25 Omega Chapter officers are Kaci Anderson (President), Brandon Collings (Vice President), Cade Seay (Treasurer), and Lenna Abouzahr (Secretary). Dr. Weihua Sheng is the faculty advisor.



► (Left to Right)
Top Row: Gunnar Willis, Christian Landrum, Ethan Brown, Charles Bruce, Landon Fox
Middle Row: Zach Wilson, Abbie Schlatter, Elizabeth White
Bottom Row: Landren Martin, Luke Diener, Logan Buford, Jeremiah Young



2024-25 Officers: Kaci Anderson, Cade Seay, Lenna Abouzahr, Not Pictured: Brandon Collings



DR. JOHN O'HARA

PREMISE

► Associate Professor John O'Hara, principal investigator of multiple NSF-funded projects, is a distinguished figure in electrical engineering, specializing in terahertz (THz) wave technology, wireless communications, and metamaterials. O'Hara's academic journey began with a Bachelor of Science in Electrical Engineering from the University of Michigan in 1998, followed by a Ph.D. in electrical engineering from Oklahoma State University in 2003. His postdoctoral work at Los Alamos National Laboratory led to groundbreaking research in controlling THz waves through metamaterials. He later founded Wavetech LLC, focusing on Internet of Things and automation technologies, before

returning to OSU as an Associate Professor and the PSO/Albrecht Naeter Professor of ECE. His recent research is centered on advancing the next generation of wireless communication and THz sensing, supported by accolades like the NSF Early Career Award in 2023. The NSF-funded projects under O'Hara include a pioneering effort to develop next-generation (6G) wireless backhaul communication systems, as well as a Research Experience for Undergraduates supplement focusing on the same. These initiatives support graduate and undergraduate students in cutting-edge research, further contributing to Oklahoma's three-decade legacy in THz research and technological innovation.

RESEARCH GOALS

► The technical goals of O'Hara's research address understanding the fundamental capabilities and challenges of wireless backhaul, a vital part of 6G networks. Backhaul serves as the bridge between user devices and the core internet, traditionally reliant on fiber optics for high-capacity data transmission. However, in regions where deploying fiber optics is impractical, wireless backhaul becomes essential. The shift to 6G technology introduces the potential for using THz waves, which offer near fiber-optic speeds. Unlike traditional cellphone technologies, THz waves work more like laser beams, making them suitable for fixed, point-to-point communication links necessary for backhaul. However, this also makes them more susceptible to communication challenges. OSU's research into these high-frequency waves uses its unique capability for long-distance experimental work, enabling O'Hara's research team to confirm communication performance in real-world environments. This knowledge is crucial for designing wireless backhaul systems that can efficiently manage large data loads, especially in areas where traditional infrastructure is not practical.

In related work, O'Hara received the 2024 OSU President's Fellowship to investigate a 6G channel emulator. This project aims to enable more effective testing of wireless communication system designs by simulating real-world conditions in a controlled environment. This is particularly important as THz technology is currently very expensive and difficult to deploy. To overcome these challenges, O'Hara's team is developing a channel emulator using field-programmable gate arrays to replicate the conditions under which THz waves operate.

This device allows engineers to see how signals interact with various physical and atmospheric obstacles. This emulator is designed to offer deeper insights into the behavior of 6G networks, ensuring that devices can support performance and reliability under complex conditions. The outcome is a critical tool that aids in refining the design and implementation of future wireless systems.

THE IMPACT

► The broader impacts of these research projects extend significantly beyond OSU and Oklahoma, with potential global implications for the advancement of 6G wireless communication. The backhaul studies developed by O'Hara provide new scientific foundations upon which future communication systems will be engineered. The channel emulator work is a key innovation that will aid in the global transition to 6G technology by offering more precise simulations of real-world conditions. These contributions are crucial for ensuring that 6G networks can deliver on their promises of higher data rates and more reliable connectivity. Locally, these projects further solidify Oklahoma's role as a leader in THz research. They enhance OSU's reputation as a hub for advanced communication research, attracting new collaborations and funding opportunities.

The REU supplement project further amplifies the local and national impact by providing undergraduate students with hands-on research experience in cutting-edge communication technologies. The focus on involving undergraduates in research aligns with NSF's mission to build a technically skilled workforce capable of driving future innovations. Students taking part in the project gain valuable insights into the design and implementation of THz-based communication systems, preparing them for careers in a rapidly evolving field. The practical skills acquired through this research are directly applicable to the needs of industries and research institutions, strengthening the workforce both in Oklahoma and beyond.

Both projects hold significant promise for addressing broader societal needs. As global demand for data and connectivity continues to grow, innovations in wireless backhaul and communication testing are essential to meeting these demands sustainably. The advancements made through O'Hara's research can help ensure that 6G networks, powered by THz waves, become a viable alternative to traditional wired infrastructure in remote and underserved regions. By offering a reliable means of delivering high-speed internet without the extensive costs associated with fiber optic installations, this research supports efforts to bridge the digital divide. The potential applications of these technologies are vast, from improving rural connectivity in the United States to supporting infrastructure development in emerging economies.

Overall, these projects reflect OSU's commitment to pushing the boundaries of what is possible in wireless communication and to training the next generation of engineers and researchers. O'Hara's work not only

contributes to the field of THz research but also embodies the university's broader mission of using scientific inquiry to address pressing global challenges. Through a combination of cutting-edge research, student engagement and a focus on real-world applications, these initiatives help position Oklahoma as a pivotal player in the future of wireless communication, contributing to technological progress at both the local and global levels.





DR. HAMID NAZARIPOUYA

PREMISE

▶ Assistant Professor Hamid Nazari Pouya is at the forefront of multiple multidisciplinary projects aimed at tackling critical challenges in power systems, renewable energy integration and community resilience. Supported by prestigious funding bodies such as the NASA, the National Science Foundation and the United States Department of Agriculture, these projects span various aspects of energy critical electric infrastructure, climate energy resilience and rural development. His expertise in power systems engineering is complemented by a diverse team of collaborators, including experts in fire dynamics, Earth

sciences, transportation and agriculture, making these projects rich in interdisciplinary knowledge. The NASA-funded project focuses on enhancing wildfire risk prediction modeling and management through advanced data integration, aligning with NASA's FireSense initiative to address climate challenges.

Meanwhile, the NSF project explores the potential of Vehicle-to-Grid (V2G) technology using electric school buses (ESBs) as mobile energy storage units, aiming to bolster community resilience against climate-induced disasters. The USDA-funded effort emphasizes developing skills in rural renewal among students through research and hands-on extension activities, particularly in the realms of power and renewable energy. Each project is tailored to address specific societal challenges, from wildfire

prevention to energy resilience and rural sustainability, creating a comprehensive approach to environmental and infrastructural challenges.

RESEARCH GOALS

▶ The technical objectives across these projects represent significant advancements in power systems engineering and renewable energy integration resilience and sustainability. The NASA-funded project integrates real-world data from electrical fault signatures—often caused by power line failures—with high-resolution Earth observation data, including imagery from PlanetScope CubeSats, to model fire ignition risks. This innovative approach utilizes a power-hardware-in-the-loop grid emulator, allowing the team to simulate and evaluate the effects of real-world vegetation-caused electrical faults on power system measurements and analyze their behavior under different conditions. The collected data trains advanced machine learning algorithms to assess ignition probabilities in near real-time, thus refining traditional fire danger indices and offering precise models for wildfire risk assessment. This data is processed through advanced machine learning algorithms to assess ignition probabilities in near real-time, thus refining traditional fire danger indices and offering precise models for wildfire risk assessment. The result is an advanced tool for near-real-time wildfire risk map updates by powerline fault status informing wildfire risk maps, aiding both utilities and emergency services in improving fire prevention strategies.

In contrast, the NSF project focuses on V2G technology, wherein ESBs can store energy and discharge it back into the grid during peak demand or emergencies. This approach not only enhances grid stability resilience during natural disasters but also presents a more sustainable alternative to traditional backup power systems.

By enabling a bidirectional flow of energy between the grid and vehicles, the project aims to advance energy storage solutions while reducing greenhouse gas emissions. By facilitating a dynamic flow of energy between the grid and vehicles, the project aims to improve energy storage solutions while reducing greenhouse gas emissions. The research involves co-designing technological solutions with local civic partners to ensure the technology meets the specific needs of Oklahoma communities vulnerable to climate-induced power disruptions.

Meanwhile, the USDA project explores agrivoltaics, which combines solar photovoltaics (PV) with agriculture to optimize land use for both energy production and farming. This dual-use system has considerable economic and environmental potential for rural communities, although it also presents technical challenges, such as integrating PV systems with traditional farming methods and analyzing the effects on crop yields. The project emphasizes hands-on student research, focusing on how to design agrivoltaic systems that bolster rural economies while advancing renewable energy objectives. This community-driven project provides students with practical experience in cutting-edge technologies, essential for addressing the intertwined issues of food security and energy sustainability in rural settings. This collaboration between institutions allows students to gain practical experience in cutting-edge technologies, essential for addressing the intertwined issues of food security and energy sustainability in rural settings.

THE IMPACT

▶ The broader impacts of these projects extend significantly across the OSU community, the state of Oklahoma and potentially to other regions with similar challenges. The NASA project's integration of new data products and machine learning into wildfire risk management enhances risk assessment accuracy and equips local utilities and fire departments with valuable tools to respond more quickly and effectively to potential hazards. The NASA project's integration of real-time data and machine learning into wildfire risk management not only enables faster responses to potential hazards but also provides valuable tools for local utilities and fire departments. This capability can be a game-changer for regions like Oklahoma, where a mix of urban and rural landscapes makes wildfire management particularly challenging. Additionally, the collaboration between university researchers, forestry services and power companies enhance the practical applicability of research findings, paving the way for improved fire prevention and management strategies.

This NSF project contributes to enhancing community resilience against climate and environmental instabilities, which directly benefits public health by reducing emissions from traditional energy sources. For Oklahoma communities, this means a more resilient power grid capable of withstanding extreme weather events, along

with reduced reliance on fossil fuel-based backup systems. The project's engagement with local schools, governments and utility companies not only provides a practical demonstration of V2G technology but also serves as a model for other regions seeking to enhance energy resilience. Additionally, the active involvement of OSU students and faculty offers valuable research and learning experiences, enriching the university's academic environment.

Similarly, the USDA-funded project has a profound impact on rural Oklahoma by addressing workforce gaps in energy and agricultural sectors, particularly among underrepresented groups. By embedding students in real-world rural environments, the project not only equips them with critical skills but also strengthens the ties between OSU and local communities. This initiative demonstrates how academic research can be directly applied to enhance rural economies, providing a sustainable model for other regions facing similar challenges. Agrivoltaics, as an area of focus, presents an opportunity to boost economic prospects for rural farmers while promoting renewable energy practices, thus supporting both local economic development and environmental sustainability.

Collectively, these projects position OSU as a leader in applying advanced technological solutions to pressing societal and environmental challenges. By fostering interdisciplinary collaboration and addressing real-world needs, they offer a blueprint for how academic institutions can work with civic partners to create resilient, sustainable communities.



THE TECHNICAL OBJECTIVES ACROSS THESE PROJECTS REPRESENT SIGNIFICANT ADVANCEMENTS IN POWER SYSTEMS ENGINEERING AND RENEWABLE ENERGY INTEGRATION RESILIENCE AND SUSTAINABILITY.



DR. WEIHUA SHENG

PREMISE

► Professor Weihua Sheng leads two interdisciplinary research projects funded by Oklahoma Center for Advancement of Science & Technology and the CEAT Engineering Research and Seed Funding Program. Collaborating with experts like Dr. Yongwei Shan from the School of Civil and Environmental Engineering and Drs. Guiping Hu and Mohammad Fili from the School of Industrial Engineering and Management, Sheng focuses on integrating artificial intelligence into municipal infrastructure management and healthcare systems. One project, supported by a \$37,858 OCAST grant, aims to enhance a sewer management platform using AI. The other, a \$25,000 ERSF grant, supports research on robot-assisted cognitive training for individuals at risk of Alzheimer’s. These projects highlight OSU’s dedication to combining AI with practical applications to improve urban infrastructure and personalized healthcare.

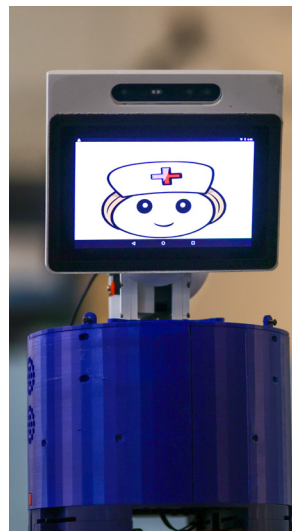
RESEARCH GOALS

► For infrastructure management, Sheng’s project focuses on enhancing an existing sewer data platform with AI-driven virtual assistants that use Large Language Models to facilitate natural language interaction. The project aims to streamline access to sewer asset data, using methodologies from companion robotics to improve natural language processing capabilities. In parallel, the healthcare-focused research project introduces a robot-assisted system using Reinforcement Learning algorithm to tailor cognitive training programs for

individuals at risk of Alzheimer’s disease. The robot adapts exercises based on real-time user data, making cognitive training more personalized. Both projects apply advanced AI techniques to solve practical challenges, showing the power of AI in various aspects of human life.

THE IMPACT

► Both research projects carry substantial implications for Oklahoma and broader society. The AI-enhanced sewer management system promises more efficient maintenance, reducing costs and risks of system failures, with the City of Stillwater serving as a testing ground. The success of this platform could be a model for other cities looking to modernize infrastructure management. The cognitive training research addresses a critical public health challenge, offering a new approach to slowing cognitive decline in at-risk populations, which is crucial given the increasing prevalence of Alzheimer’s disease. Both projects give valuable training opportunities to OSU students in AI, robotics and healthcare technology, equipping them to address complex real-world problems. Both projects not only strengthen OSU’s research capabilities but also support OSU’s goals of advancing technological development, positioning the university as a leader in AI-driven solutions for societal challenges.



BOTH PROJECTS APPLY ADVANCED AI TECHNIQUES TO SOLVE PRACTICAL CHALLENGES, SHOWING THE POWER OF AI IN VARIOUS ASPECTS OF HUMAN LIFE.



DR. YING ZHANG

PREMISE

► Assistant Professor Ying Zhang leads a pioneering project with a \$1.1 million subaward from a \$6 million grant funded by the National Science Foundation. The project, titled “Accelerating Community-Centric Energy Transformation through AI-Driven Digital Twinning for Climate-Aware Resilience,” aims to transform energy systems by integrating advanced technologies like artificial intelligence and digital twins to promote climate resilience and equitable solutions. Zhang collaborates with an interdisciplinary team of experts in data science, climate modeling, AI, sociology and energy policy. The project focuses on developing tools and datasets that enhance community-centric platforms and decision-making, particularly benefiting underserved populations. Through these efforts, the project seeks to accelerate progress toward a sustainable, resilient and equitable energy future in line with the nation’s goal of achieving net-zero emissions.

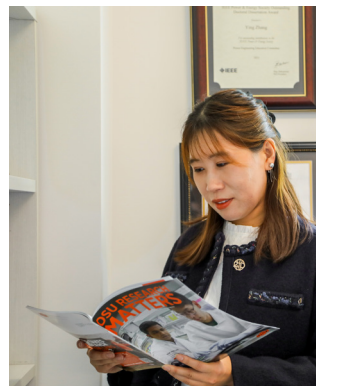
RESEARCH GOALS

► Technically, the project leverages AI-driven digital twins—virtual models that replicate real-world energy systems. These digital twins allow researchers to simulate and evaluate various strategies within the energy-climate context. The OSU team, led by Zhang, aims to use these models to optimize energy consumption, integrate renewable sources more effectively and strengthen the

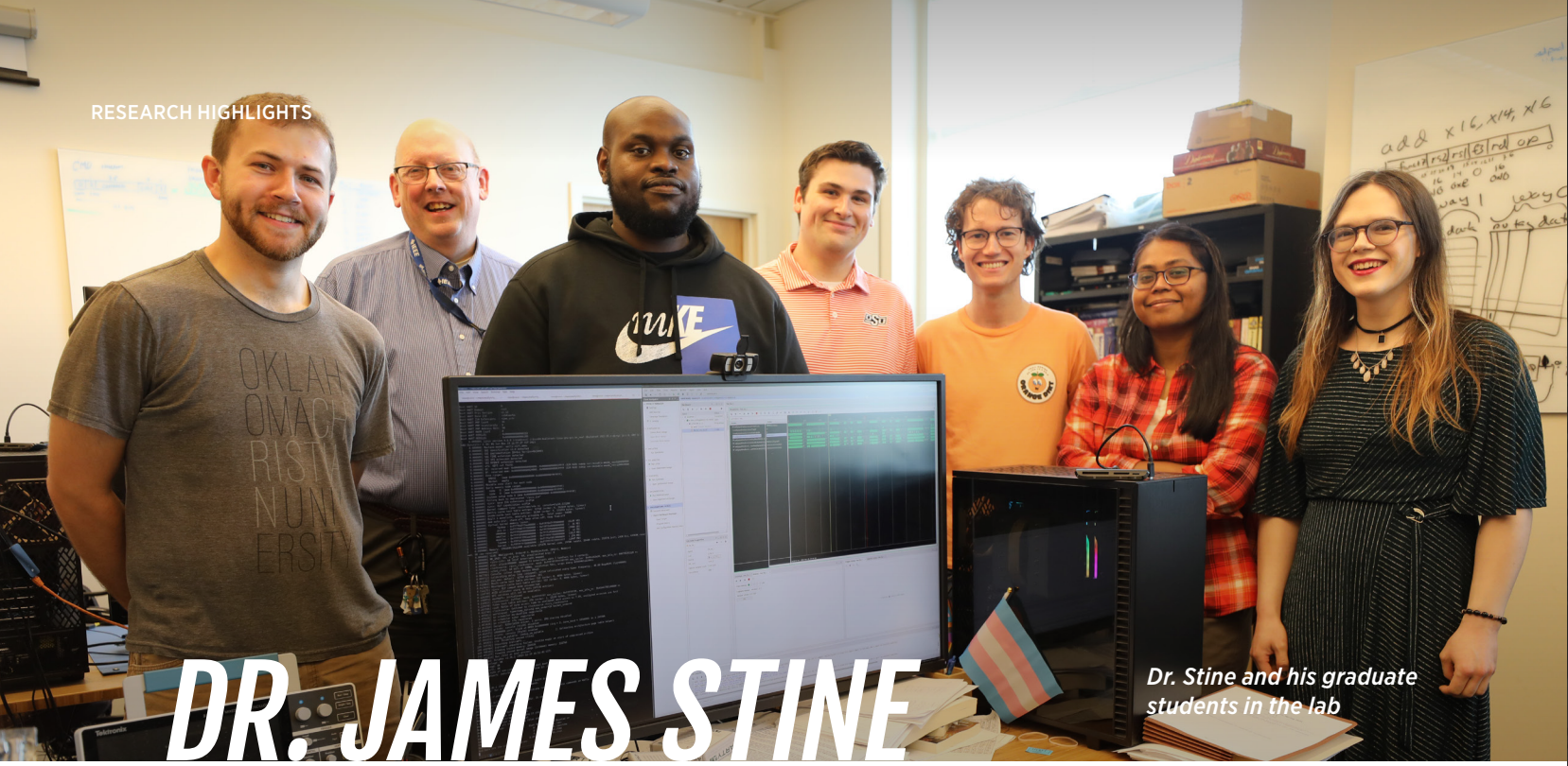
resilience of energy systems against climate variability. The project uses large language models to analyze extensive datasets generated through these simulations, offering deep insights that can inform energy policies at both local and national levels. A distinctive aspect of this project is its focus on not only technological innovation but also the societal and policy implications, ensuring that communities play an active role in adopting these advancements. This integration of AI, data science and policy insights aims to find effective strategies for energy system design across diverse climate scenarios, ultimately contributing to more adaptive and intelligent energy infrastructures.

THE IMPACT

► The broader impacts of this project extend to community engagement, workforce development and STEM education, especially in minority and underserved communities. Partnering with the Oklahoma Louis Stokes Alliance for Minority Participation, the project provides valuable research opportunities for undergraduate and graduate students, preparing them for careers in a global, tech-driven workforce. Beyond fostering new STEM talent, the project also looks to increase awareness of renewable energy’s benefits in local communities, promoting sustainable practices that support long-term resilience. For OSU and the state of Oklahoma, this project strengthens the university’s role in leading climate-conscious energy research, offering solutions that can serve as models for communities across the nation.



THE PROJECT LEVERAGES AI-DRIVEN DIGITAL TWINS—VIRTUAL MODELS THAT REPLICATE REAL-WORLD ENERGY SYSTEMS.



DR. JAMES STINE

Dr. Stine and his graduate students in the lab

PREMISE

► Professor James Stine leads innovative research focused on Very Large-Scale Integration architectures and digital design. Stine earned his Ph.D. from Lehigh University and has since established himself as an expert in low-power, high-performance computing systems. He specializes in the design and optimization of energy-efficient computer architectures, making significant contributions in computer arithmetic, digital circuit design and application-specific integrated circuits. His latest project, funded by a \$653,812 grant from the Air Force Research Laboratory, focuses on the “Evaluation and Implementation of High-Performance Computation and Security in Low-Power VLSI Computer Architectures.” This research looks to address critical challenges in power consumption and security, particularly within advanced computing systems.

THE TECHNICAL GOAL OF THIS PROJECT REVOLVES AROUND THE DEVELOPMENT OF VLSI ARCHITECTURES THAT ARE BOTH COMPUTATIONALLY EFFICIENT AND SECURE.

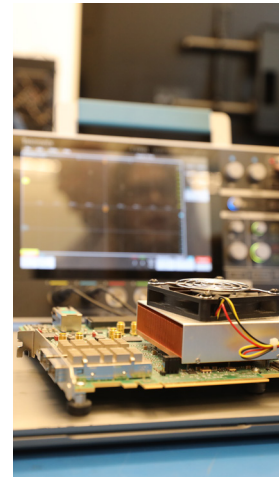
RESEARCH GOALS

► The technical goal of this project revolves around the development of VLSI architectures that are both computationally efficient and secure while minimizing power usage—key concerns in modern computing environments, especially in military and defense applications. Stine’s work explores innovative designs and methodologies to meet the needs of future low-power VLSI systems, integrating computational strategies with robust security features. This research aims to provide new solutions to the power-performance trade-off, a central issue in VLSI design, particularly as computer chips

continue to become more compact. The project focuses on creating architectures that can deliver high-speed computation while maintaining low energy consumption, making them ideal for scenarios where both processing power and energy efficiency are crucial, such as in embedded systems and defense applications.

THE IMPACT

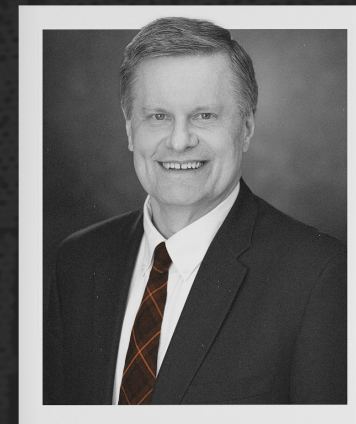
► The broader impacts of Stine’s research extend beyond academic contributions. This project will involve training students at OSU, providing them with hands-on experience in cutting-edge VLSI design and computer architecture research. By working on real-world problems funded by AFRL, students will gain valuable skills, preparing them for future roles in industries where high-performance, energy-efficient systems are critical. This practical training will position students to meet the demands of the tech industry, making them competitive in the job market. Additionally, the project is part of OSU’s ongoing leadership in advanced VLSI research, furthering the institution’s reputation as a center of excellence in computing technologies. By fostering collaboration between academia and industry, Stine’s work contributes to bridging the gap between theoretical research and practical applications, driving advancements in secure and energy-efficient computing.



Dr. Joseph Campbell

Dr. Joseph Campbell grew up in Oneonta, New York, in the late 1950s to 1960s. Campbell attended a JK-9 school, a part of the State Teachers College at Oneonta, where he experienced the development of new teaching methods, tremendous freedom and building life long friendships.

Campbell’s interest in electrical engineering began at age 5 when his father, after teaching a lesson on electricity, brought home the materials used. Curious, Campbell played with the supplies and quickly lit a lamp, sparking his passion for electronics. In high school, he apprenticed under Chief Engineer Bart Bonney at radio station WSRK FM, where they built a five-channel Gates Stereo Statesman console and a new stereo studio.



Campbell was drawn to Oklahoma State University to pursue his Ph.D. because of a National Security Agency Speech Research Symposium held there in the 1980s. At the symposium, Dr. Rao Yarlagadda invited Campbell to attend OSU to earn a Ph.D. in electrical

engineering. Soon, Campbell received an NSA Fellowship, which allowed him to pursue his Ph.D. anywhere he wanted to go. Yarlagadda was a brilliant scholar and Regents Professor, renowned for his work in time-series analysis and speech processing, who was also incredibly kind, patient and inspiring. This solidified his decision to attend OSU.

Before moving to Stillwater, Campbell attended Rensselaer Polytechnic Institute, where he earned his bachelor’s degree in electrical engineering and ultimately met his wife, Shawn. Campbell credits his achievements to his wife of 44 years, daughter Elizabeth and husband Mark, daughter Emily and husband Florian, grandson Lucien, his parents, aunt and uncle, and those who have passed.

Yarlagadda glowingly welcomed Campbell’s family into Stillwater and arranged for them to stay at Professor John and Janet Conrey’s home during his sabbatical in addition to providing a nice office on the top floor of Engineering South. They developed a transformative relationship while Campbell pursued his Ph.D. and published a landmark article on voice

coding used in NSA’s 3rd generation Secure Terminal Unit in Yarlagadda’s Digital Signal Processing journal. He completed his Ph.D. at Oklahoma State in December 1992.

Campbell’s time at OSU was full of research, building relationships and family, and extracurriculars. In 1991, Campbell joined OSU’s W5YJ Amateur Radio club; he became one of the first to earn a no-code Technician Class Amateur Radio License. On special occasions, Campbell and Yarlagadda spent meaningful times together discussing life lessons and enjoying the world’s best pecan pie at The State Room. Yarlagadda encouraged Campbell to publish a few chapters of his thesis as a Proceedings of the IEEE journal article- it now has over 2,700 citations.

In 1992, Campbell was awarded “Best Dissertation” across all OSU colleges. In 2022, he was awarded MIT Lincoln Laboratory’s prestigious Technical Excellence Award. Campbell’s career continues to focus on developing and transitioning numerous emerging technologies to advance our nation’s security.

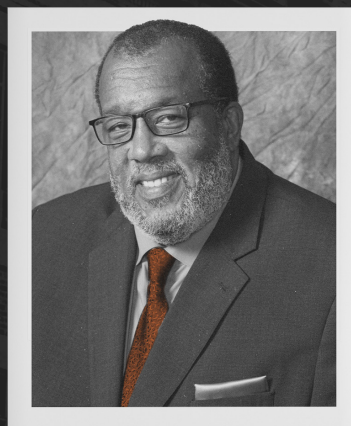
His professional career began in 1979 at NSA, where he developed new modem and speech compression algorithms, leading to highly secure communications over ordinary phone lines through Federal Standards 1015 and 1016 Voice Coders. His OSU Ph.D. thesis focused on voice-based biometrics for personal identification. In 2012, at MIT Lincoln Laboratory, he worked with the Defense Advanced Research Projects Agency to develop new technologies for detecting illegal activity and human trafficking, featured on 60 Minutes. He later led the AI Technology and Systems Group, focusing on language, multimedia and cyber challenges critical to national security. Recently promoted to Laboratory Fellow, Campbell now leads an AI study for advancing national security technology.

“Later in your careers, try new things, reinvent yourself ahead of world changes, mentor staff, and advise Ph.D. students. There’s almost nothing more rewarding than helping others succeed.”

Derek Gates

Derek Gates was born in England in 1957 and lived there for six years due to his father's deployment in the United States Air Force. After moving back to Oklahoma, the Gates family lived in Tulsa where he would eventually attend Edison High School. Gates earned a bachelor's degree in electrical engineering from Oklahoma State University in 1980.

Gates met his late wife, Scharyl Swinton, while at OSU living in Bennett Hall. They have two children, Allison and Chutney. Gates' now fiancé is Dr. Dale Flenyol.



Growing up, Gates enjoyed science, math and reading the most. His desire to become an engineer was a natural decision as he looked up to his father, who was an electrical engineer, and the ability he had to provide for the family. OSU was always perceived by Gates as a great engineering university.

Gates began at OSU in the summer of 1975 at the age of 17. "I think I got everything

out of the school that I could get," Gates reflected.

After graduation, Gates received multiple job offers due to the high demand for engineers. He chose a career in the oil and gas industry, starting at Cities Service Oil and Gas in Tulsa, where he worked on power design for refineries. After three years, a company merger led to his layoff. Gates quickly found a new position at Amoco Production Company in Tulsa, designing seismic equipment. Seven years later, he moved to Dresser Engineering, where he designed electrical power for gas plants and refineries and became a licensed Professional Engineer. After another merger and layoff, Gates decided to start his own firm while searching for a new job.

Gates built a private engineering firm, D.W. Gates Engineering Services, in North Tulsa in 1992. He continues to be well-known for technical skills. Gates is grateful for taking this opportunity and the growth he has had because of it. Since founding, Gates consistently hires OSU students as both summer

interns and full-time employees at his firm. His firm has provided engineering services for OSU buildings such as the Colvin Center, Math Science Building, the OSU bus terminal, and many other locations. At the OSU Institute of Technology Center Gas Compressor Building, Gates' company designed the complete mechanical/electrical and plumbing design systems in 2012.

Gates' firm specializes in a variety of areas, and the projects are seen across Tulsa. In 2015, they completed the city of Tulsa LED street lighting on I-44 from Riverside to Memorial. In 2018, they designed the new LED lighting at the Will Rogers and Central High School football stadiums. D.W. Gates Engineering also partners with Oklahoma Department of Transportation to relocate overhead utilities. The Pawhuska rodeo ground and Chandler Park field house, both designed by Gates, feature the two largest photovoltaic solar collector systems in Oklahoma. Finally, on Tulsa Route 66, they provided power design to the Gateway Structures.

For the last 20 years, Gates has been a member of the OSU Black Alumni Association where he generously donated to the OSU Black Alumni Golf Tournament, scholarships through the association and direct donations. Today, Gates is passionate about helping future generations build technical skills, so they can have a successful and fruitful career and life. Gates is an active member in K-12 outreach by speaking to students and encouraging their consideration of OSU engineering program.

Gates, an avid fisherman and gardener, also enjoys playing and coaching tennis when he is not working. He is constantly looking for ways to help those around him.

"Make the world better for the next group. My goal is to be known as a professional, a decent person, and a good engineer."



Dr. Guoliang Fan's journey at OSU began in 2001 when he joined as an assistant professor after completing his Ph.D. from the University of Delaware. Over the years, he has received numerous accolades, including the NSF CAREER award, Halliburton Excellent Young Teacher award, and the OSU Regents Distinguished Research Award. His professional achievements include co-editing a book, authoring many journal and conference papers, and supervising many Ph.D. and M.S. students.

During his 23-year career at Oklahoma State University, Fan never imagined that he would be interim department head of the School of Electrical and Computer Engineering. With his experience, passion and innovative ideas though, Fan had several within the department encouraging him to take on the role. Seven months in and Fan is enjoying the opportunity to help his department thrive and accomplish new goals.

"Serving as Interim Head of ECE from February to October 2024 has proven to be one of the most rewarding and fulfilling experiences in my career," Fan said.

His vision for ECE is encapsulated in three core principles: Engage, Communicate and Empower – collectively referred to as the "ECE spirit."



Fan notes the goal for engagement is providing various platforms and initiatives to foster interactions that bring individuals together to be more informed and involved.

Communication encourages the exchange of ideas and experiences leading to open dialogue resulting in meaningful conversations and effective mentorship.

Finally, empower is to focus on offering opportunities and support for members to pursue their passions, and enhance their professional and technical skills.

Fan's leadership philosophy

"I EMBRACE THE PRINCIPLES OF SERVANT LEADERSHIP, WHICH FOCUS ON PUTTING THE NEEDS OF OTHERS FIRST," FAN SAID.

This philosophy echoes Simon Sinek's words, "Leadership is not about being in charge. Leadership is about taking care of those in your charge."

FAN'S LEADERSHIP IS DRIVEN BY THE 3I STYLE AND 3T VALUES:

3I STYLE:

Interaction:
Encouraging mentorship and collaboration across all levels.

Integration:
Bringing together diverse skills and perspectives to solve complex challenges.

Innovation:
Using resources creatively to find fresh solutions.

3T VALUES:

Teamwork:
Believing that collaboration leads to stronger outcomes.

Transparency:
Promoting open communication for a healthier work environment.

Trust:
Building trust as the foundation of effective leadership.

MAJOR INITIATIVES FOR THE ECE DEPARTMENT

Several of these key initiatives have already been implemented to foster a supportive and dynamic environment for both faculty and students.

► **Faculty Mentorship Program:** Recognizing the importance of mentorship, Fan has established a structured program where senior faculty members mentor junior colleagues. Fan dedicates \$10,000 per year to this program as an incentive. This initiative aims to provide guidance, support and professional development opportunities, ensuring a healthy and collaborative departmental culture.

► **ECE GTA Training Day:** A comprehensive training day for graduate teaching assistants, which includes workshops and sessions designed to enhance teaching skills and provide GTAs with the tools they need to succeed in their roles, was offered for the first time this year. By funding this training using Fan's Vogt Professorship Fund, the GTAs can be awarded scholarships, which in turn helps with recruitment.

► **ECE Miller Research Scholars:** Each year \$20,000 will be set aside to support students doing research with faculty. This year, the first 10 scholars were awarded \$2,000 each, allowing them to become engaged in the program and do something they enjoy beyond the classroom.

► **ECE Vogt Lunchtime Colloquium:** This monthly free lunch event will feature faculty speakers discussing their research in a non-technical way. The goals are to let students see what the faculty is working on and building a community environment.

► **GRTA Program:** Under this initiative, ECE will provide a 1:1 match to faculty members recruiting Ph.D. students through the Miller Fund in the OSU Foundation. GRTA students will primarily work as research assistants in their first year and transition to GTA roles in their second year. This proposal, approved by the ECE Graduate Program Committee, will take effect in 2025.

► **Committee Restructuring:** Fan plans to restructure the department's committees to be more student focused. The new structure includes separate committees for undergraduate and graduate programs, awards and scholarships, and curriculum development. This change ensures that each committee can concentrate on specific areas, leading to more effective and targeted initiatives.

► **Monthly Meetings with Student Leaders:** To maintain open lines of communication, Fan plans to hold regular meetings with leaders from student organizations such as IEEE and HKN. These meetings provide a platform for students to voice their concerns, share ideas and collaborate on departmental activities.

STATE OF THE ECE DEPARTMENT

Under Fan's leadership, the ECE department is poised for growth and success. The department boasts a strong faculty team, with several members recognized for their outstanding research and teaching contributions. Enrollment numbers are on the rise, with a notable increase in the number of students pursuing degrees in computer engineering.

CHALLENGES AND OPPORTUNITIES

While the department has made significant strides, Fan acknowledges the challenges ahead. Faculty retention, graduate enrollment and cultural integration are key areas that require ongoing attention. However, with a clear vision and a commitment to excellence, Fan is confident that the ECE department will continue to thrive and make impactful contributions to the field.

Fan's initiatives reflect his dedication to creating an engaging, communicative and empowering environment for all members of the ECE community. As the department moves forward, these initiatives will play a crucial role in shaping its future.



Dr. Guoliang Fan speaking with students at the ECE Vogt Lunchtime Colloquium

Dr. Gary Yen

CELEBRATING A LEGACY OF EXCELLENCE

Dr. Gary G. Yen, Regents Professor, will be stepping down from his full-time faculty role by the end of the year. Yen has been a dedicated member of the OSU community since January 1997, serving the university for a remarkable 28 years. Throughout his time at OSU, he has guided 25 students to their M.S. degrees and 16 students to their Ph.D. dissertations, while also supervising 23 postdoc researchers from around the world. His outstanding contributions were recognized within the OSU system through multiple awards, including the 2000 Outstanding Young Faculty Award, the 2004 Outstanding Faculty Award from the Halliburton Foundation, the 2009 Regents Distinguished Research Award and the 2014 Lockheed-Martin Aeronautics Education Teaching Award.

In the academic arena, Yen has been honored with visiting chair professorships at many prestigious institutions worldwide. Professionally, Yen has made significant contributions as an associate editor for several prestigious IEEE journals. Notably, he was the founding editor-in-chief of the IEEE Computational Intelligence Magazine from 2006-2009, which currently boasts an impact factor of 9.0. Additionally, he was elected President of the IEEE Computational Intelligence Society for the 2010-2011 term, serving a membership of over 9,000 globally and was a Distinguished Lecturer for multiple terms from 2012-23. His achievements also include the Best Paper Award from the 2000 American Control Conference, the 2011 Andrew P. Sage Best Transactions Paper Award and the 2013 Meritorious Service Award from the IEEE Computational Intelligence Society.

Yen's professional honors include being named a Fellow of IEEE (2009), IET (2012) and IAPR (2022). He has published five textbooks, the most recent in 2023 titled

Evolutionary Deep Neural Network Search—Fundamentals, Methods, and Recent Advances, as part of the Springer Nature Series.

His scholarly output includes over 200 journal papers, primarily in IEEE transactions, and 150 peer-reviewed conference papers, including several in leading AI and machine learning conferences. His impact in the field is clear in his citation metrics, 11,955 citations and an H-index of 55 in Scopus.

It is worth noting that Yen's most cited research has come when he applied his extensive background in complex optimization tasks to the problem of designing state-of-the-art deep neural networks. These deep networks have fueled the current AI renaissance, but it requires significant expertise to manually design the task-appropriate architectures for these complex models. Yen and his team have developed an automatic deep network architecture design method using genetic algorithms. Their techniques have produced architectures that match the results obtained from networks that have been hand-crafted by experts. This technology will provide excellent deep network models for individuals and small businesses who may not have access to experts in architecture design.

Beyond research, Yen has been a vital part in the School of ECE, teaching a broad range of courses from undergraduate core classes to advanced graduate-level courses. He has consistently been recognized as one of the top instructors. He also held leadership roles in several committees, contributing significantly to both undergraduate and graduate education in the department.

In short, Yen has been an influential scholar and educator, leaving a lasting legacy at OSU through his nearly three decades of dedicated service. His presence will be deeply missed by colleagues and students.



The ECE administrative team pictured from left to right: Francisca Bolin, Kristal Soderstrom-Junkens, Curtis Ross, Dr. Guoliang Fan, Ryan Mouser, and Richard Prenzlou

ECE appreciates its staff

► **THE SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING** is deeply grateful to our dedicated staff, whose unwavering commitment is crucial to the department's daily operations. Their hard work fosters a positive and pleasant working environment. We are fortunate to have a talented and strong team supporting the department's routine activities and ensuring the head stays informed on key matters. We would like to recognize the following team members: Francisca Bolin, Administrative Associate, who handles essential accounting tasks, payroll and administrative support; Kristal Soderstrom-Junkens, Senior Academic Advisor, who is actively engaged in the professional and academic growth of our students; Ryan Mouser, Lab Coordinator, who manages laboratory operations, oversees technical training, provides IT support and handles equipment procurement; Richard Prenzlou, Senior Administrative Support Specialist, who assists faculty and staff with tasks such as scheduling and travel arrangements; and Curtis Ross, Senior Accounting Specialist, who ensures smooth financial management by maintaining records and processing invoices. Together, their expertise and dedication cultivate a thriving community where students and faculty can flourish. We extend our heartfelt thanks to all staff members for their invaluable contributions.

ECE thanks Dr. Jeffrey Young for his service as department head

► **THE SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING** expresses its deepest appreciation to Dr. Jeffrey Young for his nearly nine years of outstanding leadership as Department Head. During his time in this role, Young played a key part in the successful renovation of Engineering South, enhancing the facilities for both faculty and staff and creating a state-of-the-art learning environment. Notably, under his guidance, ECE fulfilled its \$500,000 financial commitment to CEAT before occupying the renovated space, leaving the department free of any debts. His tenure also saw the induction of at least one CEAT Hall of Fame member each year, totaling 10 inductees, along with five Lohmann Medalists, the highest honor awarded from the college to CEAT alumni. In addition, the department achieved a significant milestone in research funding, surpassing \$3 million in research expenditures in fiscal year 2024 for the first time in a decade. Young also worked closely with the OSU Foundation, securing over \$7 million in donations, including \$305,000 from the Martin Family Foundation for "green" energy engineering initiatives. His efforts have also fostered academic excellence among students and faculty alike. Young's leadership and vision have left an enduring legacy within ECE, and we extend our heartfelt thanks for his remarkable service.



Dr. Jeffrey Young



The School of Electrical and Computer Engineering receives equipment donations from General Electric

► **DRS. HAMID NAZARIPOUYA AND HANTAO CUI** received an equipment donation from General Electric for the School of Electrical and Computer Engineering to enhance hands-on learning in renewable energy integration and distribution. The donation includes hardware and software that will allow for greater control and monitoring of the lab's existing wind turbines, solar arrays, converters and energy storage systems. Blaine and Laura Bunch, Oklahoma State University alumni and GE representatives, were instrumental in this generous donation and in getting the equipment up and running.

This new equipment will enrich the educational experience for students by providing real-world applications for course projects, undergraduate research and capstone designs. The Renewable Energy Laboratory's mission is to equip students with the knowledge and skills necessary to make a meaningful impact in the field of renewable energy.

Fall 2024
Scholarships

\$101,270

Spring 2025
Scholarships

\$49,271

Total
Scholarships

\$150,541



21.3
H-index Average

60,710
Scopus Publication Citations

over
\$731 thousand
FY2024 Research Grant Awards

over
\$12 million
In Grants Under Management

over
\$3 million
FY2024 Research Expenditures

PROFESSIONAL SOCIETY FELLOWS

IEEE

**CHUCK
BUNTING**

IEEE

**GARY
YEN**

IEEE

**JEFFREY
YOUNG**

OSA

**WEILI
ZHANG**

ENDOWED CHAIRS,
PROFESSORSHIPS AND
FELLOWS

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BUNTING**
BELLMON
CHAIR

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CHAIR

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YOUNG**
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CHAIR

**GUOLIANG
FAN**
VOGT
PROFESSOR

**JOHN
HU**
JACK GRAHAM
FELLOW

**JOHN
O'HARA**
NAETER/
PSO PROFESSOR

**HAMIDREZA
NAZARIPOUYA**
DISTINGUISHED
FELLOW OF ECE

ENROLLMENTS

| | |
|--------|-----|
| BSEE | 239 |
| BSCpE | 249 |
| MengEE | 10 |
| MSEE | 15 |
| PhD | 38 |

GRADUATIONS

| | |
|--------|----|
| BSEE | 64 |
| BSCpE | 26 |
| MengEE | 3 |
| MSEE | 5 |
| PhD | 5 |

8 PROFESSORS

9 Assistant PROFESSORS

2 Associate PROFESSORS

5 STAFF

1 Assistant PROFESSOR OF PRACTICE

3 Adjunct FACULTY MEMBERS

135 new
Freshmen



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- Lynn T. Miller Electrical and Computer Engineering Endowment: 26-81200
- Electrical and Computer Engineering Laboratory Equipment Fund: 26-87700
- Electrical and Computer Engineering Next Generation Fund: 26-00980



**MAIL TO: SCHOOL OF ELECTRICAL &
 COMPUTER ENGINEERING**

Oklahoma State University
 200 Engineering South
 Oklahoma State University
 Stillwater, OK 74078

ECE Office: 405-744-5151

► **THE SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING** appreciates the generous donations given by its constituents to support ECE's educational infrastructure and to fund ECE student scholarships. Each donated dollar amount for student scholarships—large or small—can make a big difference in assisting ECE students with their educational goals and career aspirations. Other contributions are used to purchase state-of-the-art equipment and computers for student experiences in laboratories, which are the cornerstone of engineering education. We cannot stress enough the importance of the various cash gifts that we receive to the success, growth and health of our programs. Furthermore, we are committed to being good stewards of all monies entrusted to us. Should you wish to invest in our school and need more information, please do not hesitate to contact us.

GUOLIANG FAN

Department Head of Electrical & Computer Engineering

