

CONNECTIONS

A man and a woman are standing in a grassy field, smiling for a photo. The man is wearing a black and grey striped t-shirt and glasses. The woman is wearing a blue patterned top, sunglasses, and a light blue bag. In the background, there is a large, historic stone castle with a flag on top, situated on a grassy hill under a blue sky with white clouds. A large tree is on the left side of the frame.

ADVENTURES IN CARDIFF

Iowa State ECpE students spent the summer at Cardiff University in Wales, researching magnetics through International Research Experiences for Students, funded by the National Science Foundation. Pictured: ISU seniors Johnathan Germick, electrical engineering, and Taylor Yeazel, materials engineering.



Greetings from the Department of Electrical and Computer Engineering at Iowa State University. Our campus is quieter with fewer students taking classes, but we are still busy here in Coover Hall.

In this issue of Connections, we spotlight the first students to receive scholarships from the National Science Foundation (NSF) S-STEM grant mentioned in our last issue. Other highlighted student achievements include Neelam Prabhu-Gaunkar receiving an IBM Ph.D. Fellowship Award for the second year in a row, electrical engineering senior Brendon Geils being selected for a Future Founders fellowship and Ph.D. student Yuming Zhuang advancing to the finals in a doctoral thesis award contest. On our cover, you see ISU students who are studying in Cardiff, Wales, this summer, working on magnetism research. ECpE is expanding beyond Iowa and even the United States!

We also recognize our faculty for their recent work. Professor Long Que was awarded a grant for his research in mimicking 3D models of the brain, and Professor Srikanta Tirthapura was awarded a faculty position title at the Kingland Faculty Recognition Ceremony. We are proud of Assistant Professor Meng Lu, who received the prestigious NSF CAREER Award, and Professor Manimaran Govindarasu, who co-authored a published article on cybersecurity. Our hardworking faculty are being honored for their achievements, and they continue to work through the summer months.

Finally, as always, we feature our respected alumni, some of whom I have had the honor of meeting with recently on my trips around the country. I visited with amazing alums from coast to coast, in northern California, Chicago and Pennsylvania, and I heard so many memorable stories on my journeys. We are excited to share these stories with you in the future — stay tuned.

Our alumni pool has recently expanded to include new 2017 graduates. Congratulations and best of luck to these electrical, computer and software engineering majors who received their diplomas and are now entering the workforce and academia. We also remember those we have lost, including David Altenbernd, Morris Mericle and John O'Brien. These alumni made an enormous impact on Iowa State and the lives of their co-workers, friends and family, and their legacies will not be forgotten.

I hope you enjoy this issue of Connections. Have a nice summer, and keep in touch! We'll see you in the fall.

Ashfaq Khokhar

Palmer Department Chair in Electrical and Computer Engineering
Iowa State University

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Summer 2017

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\$4 million grant gives opportunities to women in STEM fields

BY CHRISTINA CREEL



Back row (L-R): Claudia Athens, Erin Elsbernd, Chandler Chockalingham, Sarah Huber, Madison Jacobsen, Smruthi Sandhanam. // Front row (L-R): Lauren Arner, Erica Clark, Rachel Shannon, Lindsey Sleeth.

This year, Iowa State University received nearly \$10 million from the National Science Foundation (NSF) to help improve diversity in science, technology, engineering and mathematics (STEM) fields. Within Iowa State's Department of Electrical and Computer Engineering (ECpE), \$5 million over the next five years will go toward creating 272 individual NSF Scholarships for students from Iowa State, Des Moines Area Community College (DMACC) and Kirkwood Community College, with an emphasis on promoting diversity.

This semester marks the first cohort of students benefiting from S-STEM. Ten women were selected based on a combination of student involvement, diversity, a short written essay and financial need. While gender is not a

requisite for this scholarship, ECpE uses S-STEM as leverage to create more diversity in the field.

"Some of the best jobs today are in STEM fields. I think it is important that women feel that they belong," Sarah Huber, a senior in electrical engineering and one of this year's recipients, said. "Women have the opportunity to help the world, create what they imagine and support themselves financially for a better future. There should be nothing about science, technology, engineering or math that is gender specific."

In conjunction with the scholarship, students have been participating in a leadership course led by Associate Professor Joseph Zambreno and Professor Diane Rover. This course will allow them to build a module for the upcoming

Taking the Road Less Traveled conference hosted by Iowa State's Program for Women in Science and Engineering (WiSE). The scholarship recipients also will be connected with young alumni, professors and industry professionals to continue their advancement in the field.

Rover spoke on her optimism for the creation of groups like this.

"Diversity is an important aspect, but just one aspect," Rover said. "With these grants, we are creating a more inclusive and creative environment for teaching and learning in the department. Diversity via increasing numbers from different groups will have little impact by itself, nor will it be achieved, if we don't change other things in the department. These grants are helping us change things." ■

KHOKHAR NAMED PALMER DEPARTMENT CHAIR

BY KRISTIN CLAGUE



Ashfaq Khokhar, chair of Iowa State University's Department of Electrical and Computer Engineering, was officially named Palmer Department Chair at the College of Engineering Medallion Presentation Ceremony on March 30. Dean Sarah Rajala and Associate Dean


Arun Somani presented the official medallion to Khokhar.

"We cannot achieve our land-grant mission of providing a high-quality education, conducting groundbreaking research that addresses society's greatest challenges and serving Iowa and the world

without having outstanding faculty leaders," Rajala said, before awarding Khokhar his medallion.

The title Palmer Department Chair in Electrical and Computer Engineering began as the Palmer Professorship, established in 1986 through a \$1 million gift from Barbara and James Palmer who graduated from ISU in the 1940s, with James earning a degree in electrical engineering. In 2010, it was expanded to the chair position with additional earnings from the endowed faculty position.

"Endowed chairs and professorships are key to our academic excellence," Rajala said. "They allow us to recruit and retain outstanding faculty members like Ashfaq Khokhar, who help us achieve the level of excellence for which we strive."

Khokhar's appointment at Iowa State began at the first of the year. Previously, he was chair of the Department of Electrical and Computer Engineering at Illinois Institute of Technology. Before that, he was a professor and director of graduate studies in the Department of Electrical and Computer Engineering at the University of Illinois at Chicago. Khokhar was named an Institute of Electrical and Electronics Engineers (IEEE) Fellow in 2009. 

GRANT AWARDED TO ECpE PROFESSOR FOR RESEARCH IN MIMICKING 3D BRAIN MODELS

BY CAITLYN McCREIGHT


The 2017 Presidential Interdisciplinary Research Seed (PIRS) grant has been awarded to Iowa State University Electrical and Computer Engineering Professor Long Que and Genetics/Development and Cell Biology Professor Donald Sakaguchi for their research in mimicking 3D brain models. Out of 21 proposals, Que and Sakaguchi's project, Prototyping of an Automated Microsystems for In Vivo-Mimicking 3D Brain Models, was chosen and will be funded in the first year at \$26,525.

"This is a grant we plan to use to develop a microchip, to fabricate mini brains," Que said. "Of course, we try to make it as close as possible to mimic the real brain, but this is just a start. We want to eventually use this chip to do research on the brain. This can save money and can improve the efficiency."

This is just one of the brain-related projects Que is currently working on. The other two deal with researching single neurons under magnetic stimulation. Funded by a National Science Foundation (NSF) grant, Que's

team is trying to understand if the magnetic fields can be used to treat brain-related disease and developing a diagnostic chip to detect biomarkers for Alzheimer's disease.

Que is happy and grateful to receive this money and hopes it will help them achieve some initial results to help them apply for larger grants.

"I am very interested in this type of research because many researchers are using different methods to provide a platform to treat brain-related diseases, so hopefully we can contribute something," Que said. 



Professor Srikanta Tirthapura (right) poses with Former University President Steven Leath (left) at the recent Kingland Faculty Recognition Ceremony. Photo by Christopher Gannon.

TIRTHAPURA RECEIVES NEW TITLE: KINGLAND PROFESSOR OF DATA ANALYTICS

BY CHRISTINA CREEL

Iowa State University Electrical and Computer Engineering Professor Srikanta Tirthapura's career has spanned two decades and taken him across the country and around the globe. More recently, his work in the field of big data has earned him recognition from Kingland, a data processing group based in Clear Lake, Iowa. Tirthapura was awarded a medallion and a Kingland faculty position title, Kingland Professor of Data Analytics, on May 2 at the Kingland Faculty Recognition Ceremony at Iowa State's Memorial Union.

Tirthapura's career began at the Indian Institute of Technology Madras where he earned his Bachelor of Technology in Computer Science. From there, he went on to Brown University to earn his Ph.D. in Computer Science. He started working at Iowa State in 2002, and after his tenure, he went to work as a consultant for industry giant Oracle. It was at Oracle that Tirthapura experienced the excitement of big data — not just collection, but interpretation of the data.


"At Oracle, there was so much talk about how data is growing, how you can't find better ways to manage it," Tirthapura said. "At this point, it's cheap enough to store a whole bunch of data. Now, getting information out of it is a completely different story. That's how I ended up working in this big data area."

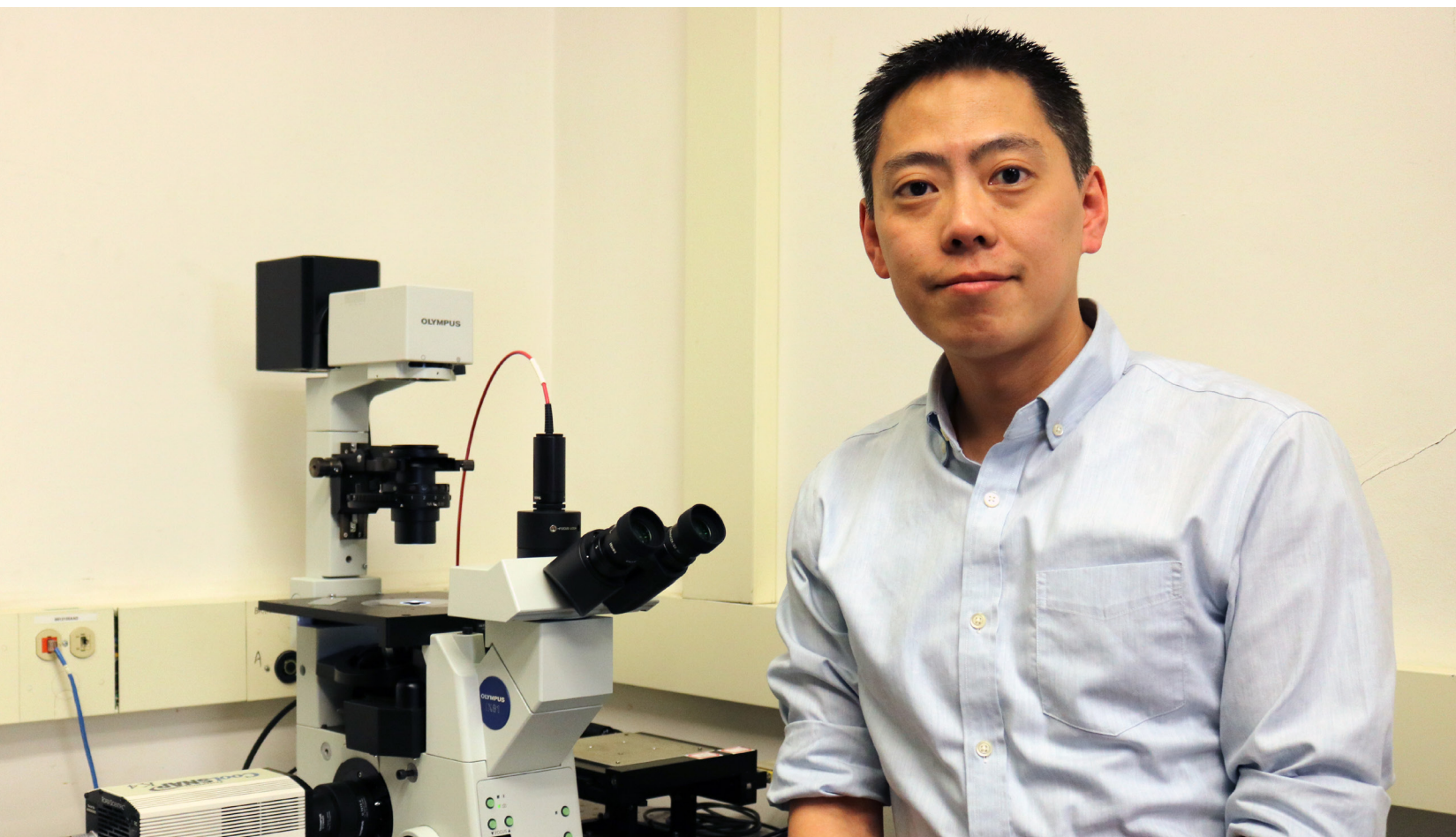
Since then, he has been a visiting engineer at Laserlike, Inc., and a visiting researcher at Microsoft Research. Tirthapura received the IBM Faculty Award in 2013 and 2014 for his work at Iowa State, and he now works with scalable algorithms and software for management of big data. All of this adds up to getting real information out of enormous amounts of data collected. In the future, he hopes to relate big data to real life applications like healthcare analytics and data security.

The recent award from Kingland recognizes Tirthapura's dedication to researching and teaching in big data and is accompanied by \$1.5 million in scholarships from the company for

students pursuing careers in the field. Day to day, the Kingland professorship will help Tirthapura better his courses relating to data analysis, create new courses and provide the flexibility to explore new research areas for which funding has not already been secured.

Former University President Steven Leath commented on the award: "We are so grateful for the generosity of Kingland and David [CEO and chairman] and Deb Kingland in supporting Iowa State," said Leath. "These scholarships and named faculty positions will benefit Iowa State students studying data analytics, entrepreneurship and business administration. Knowledge in this area is in demand both here in Iowa and around the world."

Tirthapura credits his immense success to his colleagues, graduate students and collaborators both within and outside the university. 



LU RECEIVES PRESTIGIOUS NSF CAREER AWARD

BY KRISTIN CLAGUE

Meng Lu, assistant professor with Iowa State University's Departments of Electrical and Computer Engineering (ECpE) and Mechanical Engineering, has received the National Science Foundation's CAREER award for a project that aims at developing the next generation diagnostic technology using an engineered paper strip. The technology has the potential to drive down the cost of the health care system. The five-year award will fund Lu's group to pursue the interdisciplinary research through 2022. The National Science Foundation (NSF) grants CAREER awards, some of the most competitive honors from the organization, once a year to standout junior faculty members who positively represent the mission of their department through their teaching and research. According to the NSF website, "Such activities should build a firm foundation for a lifetime of integrated contributions to research and education."

With his award-winning proposal, "We will establish a low-cost, high sensitivity, multiplexed, rapid sensor paradigm, in conjunction with a new readout modality that can perform

biomarker analysis for clinical disease diagnostics," Lu said. In other words, he hopes to bring state-of-the-art diagnostic technology to patients' homes and help physicians collect healthcare information efficiently in times of need.

"We make the special paper, so-called photonic paper, that integrates photonics and microfluidics on a porous material found in most papers,"

Lu said. "It allows point-of-care or bedside detection so the patient doesn't have to go to a hospital. The procedure can be performed by the patient at home." The photonic paper-based biosensors would detect multiple disease biomarkers found in human body fluids to provide timely warnings and would work well for people with limited access to resources, such as deployed members of the military, astronauts or those living in developing countries. The sensor is disposable and low in cost, which also makes it practical for use anywhere, and it can be modified for detecting hepatitis, tuberculosis, HIV and cancer.

According to Lu, "To date, the poor sensitivity and high cost are still the key challenges prohibiting a practical point-of-care

“Such activities should build a firm foundation for a lifetime of integrated contributions to research and education.” //

diagnostic test based on quantifying low-abundance disease biomarkers.”

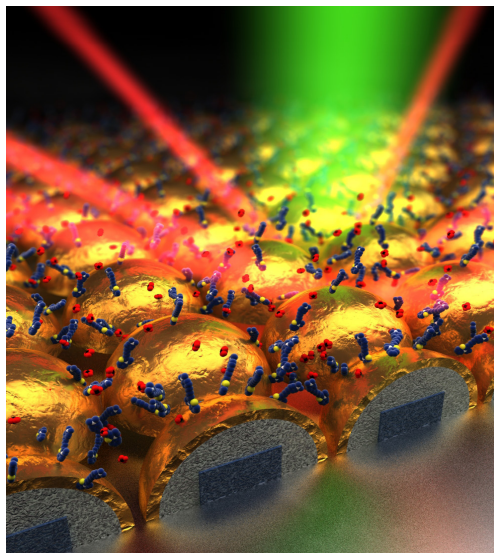
Lu's group is working with Douglas Jones, professor of Iowa State's College of Veterinary Medicine, and John McClelland of MTEC Photoacoustics, Inc., to address these challenges. Lu hopes to work with doctors and physicians in clinics.

“We are working with MTEC Photoacoustics to pursue the new biosensing mechanism. We collaborate with Professor Jones — they send us their sample, and we do the test,” Lu said. “So far, we are not allowed to do the patient test. That's why we will do more collaborations, which is funded in part by NSF, to optimize the photonic paper.”

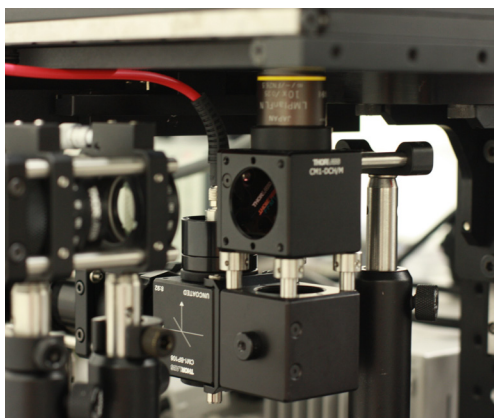
Because this is a CAREER award, Lu is honored not only for his current proposal but also for the entirety of his time spent at Iowa State. He began working at ISU in January 2013, teaching Electrical Engineering 332: Semiconductor Materials and Devices and Electrical Engineering 432/532: Microelectronics Fabrication Techniques. He then took on the Mechanical Engineering course ME 370: Engineering Measurements and Instrumentation. Now, Lu is developing a course for Electrical and Biomedical Engineering, called EE/BME 450: Biosensing, which relates to his research; the course teaches students how to design, evaluate and commercialize biosensors.

Outside of the classroom, Lu is the principal investigator for ISU's Laboratory of Integrated Optical Sensors (LIOS), which sponsors research for undergraduate and graduate students from electrical engineering, mechanical engineering and material science. These researchers work with Lu on projects in the field of photonics, nanofabrication and biosensors. The funding from the CAREER award will go toward more research opportunities for Lu and his graduate students, as well as toward education and outreach for K-12 and undergraduate students and those in Midwestern agricultural communities and of underrepresented minorities. Lu has authored and co-authored more than 80 journal and conference papers, as compiled on the LIOS website. He credits his graduate students for their help, too, with the research and with the recognition from NSF.

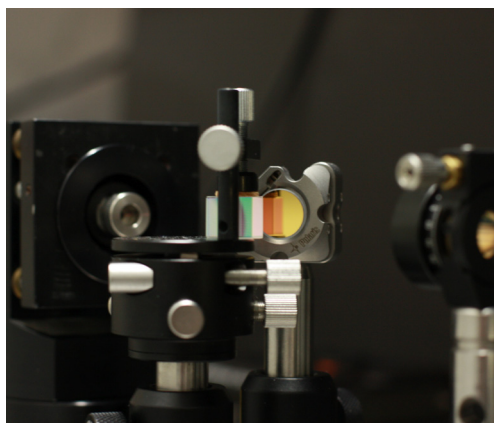
“My students are fantastic, and they work hard,” Lu said. “The results of their work helped me secure the award.” ■



Schematic diagram of a plasmonic nanolaser. The nanolaser can be exploited to detect small molecules.



Detection setup used for the study of a nanofluidic high-Q resonator biosensor.



A portion of a compact optical spectrometer being built in Lu's lab.

DEPARTMENT HEADLINES

ISU ECpE GRADUATE PROGRAMS NATIONALLY RANKED

This past March, U.S. News and World Report ranked graduate programs from around the United States. Iowa State University's Department of Electrical and Computer Engineering (ECpE) was ranked on the list, along with other ISU engineering departments.

The computer engineering program tied for 46th overall and tied for 26th among publics, which was an improvement from the previous year when they were tied for 54th overall and 31st among publics. The electrical engineering program tied for 42nd overall and tied for 24th among publics, a drop from the previous year, when they tied for 38th overall and tied for 22nd among publics.

“In a highly competitive field, electrical engineering and computer engineering programs at Iowa State are consistently being ranked by U.S. News among the top 50 in the nation,” ECpE's Palmer Department Chair Ashfaq Khokhar said. “This is a testament of the quality of the instruction and research in cutting-edge research areas.”

GOVINDARASU CO-AUTHORS ARTICLE ON CYBERSECURITY

In February, Electrical and Computer Engineering Mehl Professor Manimaran Govindarasu was a contributing author of the published article “Cybersecurity of the power grid: A growing challenge.” The piece was first published on The Conversation, a website publishing news from the academic and research community, and discusses the emerging threat to the U.S. electricity grid's cybersecurity.

The grid has become more dependent on computers and data-sharing, and this article looks at different approaches to manage the grid's safety.

After being published on The Conversation, the article later appeared in USNews.com and GCN.com and was featured in the American Society for Engineering Education newsletter.



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ADVENTURES IN CARDIFF

BY CAITLYN McCREIGHT AND
KRISTIN CLAGUE

Pictured above (L-R): Students Sierra Semel, Yana Aleksandrova, Taylor Yeazel, Henry Garcia, Johnathan Germick and Samuel Greene, shown here at Caerphilly Castle, have spent the summer at Cardiff University in Wales, researching magnetics.

Studying overseas is an opportunity some college students are lucky to have — 1,636 Iowa State University (ISU) students studied abroad during the 2016-17 school year — but sometimes engineering students have schedules that don't allow for extra traveling. This summer, however, four ISU engineering students applied and were selected to spend six weeks researching in Cardiff, Wales, putting the "study" in study abroad.

These students, Yana Aleksandrova, Johnathan Germick, Samuel Greene and Taylor Yeazel, along with two students from Virginia Commonwealth University, were chosen based on their academic performance and previous experience in research and coursework. They were interviewed and selected for International Research Experiences for Students (IRES): US/UK Multidisciplinary Collaboration in Magnetism, funded by the National Science Foundation (NSF). Distinguished Professor David Jiles, Affiliate Assistant Professor Ravi Hadimani and Associate Scientist Cajetan Ikenna Nlebedim lead the research group, with Jiles as principal investigator (PI) and Hadimani and Nlebedim as co-PIs. Hadimani is also an assistant professor and director of the Biomagnetics Laboratory with the

Department of Mechanical and Nuclear Engineering at Virginia Commonwealth University (VCU). These students from both ISU and VCU worked with Cardiff University's Magnetism and Materials Research Group at the Wolfson Centre for Magnetism.

According to the group's website, magnetism technology has a major impact in areas such as renewable energy, electrical supply and energy efficiency. Research at the Wolfson Centre focuses on several areas related to the production, characterization and application of magnetic materials.

"The research that I am doing at the Wolfson Center has introduced me to an area of magnetism research that is more mathematical and theoretical than the research I do at Iowa State," said Greene, a senior in materials engineering at ISU. "I had approached magnetic materials from a materials point of view, but this internship has given me an opportunity to learn about the electrical engineering side of the field."

Because the students are studying overseas, they have gained a perspective outside of what is found in Ames, Iowa.

"Learning so much about magnetism, along with getting to experience a

different culture, has been the best part," said Aleksandrova, a junior in computer engineering at ISU. "The culture is very different [in Cardiff]. People are more relaxed, they aren't really in a rush, and the work ethic is completely different... It is a good mixture of work, but also plenty of time to explore."

Henry Garcia, a junior in mechanical engineering at VCU, agreed.

"My biggest surprise was the stress-free living they embrace here," he said. "Everyone seems to be happy and not overstressed with work. They spend a lot of time bonding with each other, and there are many social events with Ph.D.s and academics."

During their free time, the students have traveled to Edinburgh, Scotland; London, England; Munich, Germany; Dublin, Ireland; Rome, Italy; Iceland; and Croatia; and some have plans to travel more after they complete their research, before coming back to the U.S.

"The most fun thing I have done this trip was traveling to Munich for my birthday," Garcia said. "I met up with a friend from the States... He works for BMW as an engineer, and we got together with some of his BMW coworkers. Munich was an incredible city."

The students have also enjoyed their "home" country of Wales.

"The first weekend we were here, the final for the [Union of European Football Associations] Champions League tournament was being held in Cardiff, which gave us the chance to mingle with tens of thousands of people who came to the city for the match," Greene said.

The group has traveled together, seeing more of Wales outside of Cardiff.

"The best memory I have from this trip is traveling to Worm's Head in west Wales," said Sierra Semel, a sophomore in mechanical engineering at VCU. "We went there as a group for the day and were able to walk to an island only accessible during low tide. It was one of the most beautiful places I have ever been, and it was a great bonding experience with the other students in the program."

Because the students come from two different schools, a highlight of the trip was meeting each other and living and working together. All six students are sharing one six-bedroom "flat" in Cartwright Court, a residence hall at Cardiff University.

"I think the best thing has been the two-hour dinners the six of us have spent together," said Yeazel, a senior in materials engineering at ISU. "We laughed and got to know each other. Within the first three

days, we already felt like a family, and people had no idea we had all just met."

This bonding has helped the group to achieve their personal research goals, giving them skills they can take back to the U.S. as they continue their education.

"I did not have too much familiarity with nanoparticles before I left, and now I know so much about them," Yeazel said. "Most interesting to me is that these nanoparticles we made can be used to treat cancerous tumors by injecting them to the site and applying an external magnetic. This project is beneficial to my future, as nanoparticles are becoming increasingly more researched in the field of materials engineering."

Germick, a senior in electrical engineering at ISU, has also gained research experience he may not have found on campus.

"I have always been interested in combining my interest in neuroscience and electrical engineering, and that is exactly what I am doing here," he said.

The students majoring in mechanical engineering were able to learn and use the program COMSOL Multiphysics, an interactive software environment for modeling and simulating scientific and engineering problems.

"For my project, I am redesigning

the magnetic domain viewer that the lab currently uses. To be able to test out my designs, I needed to learn how to do magnetic modelling. COMSOL is a very useful program for an engineer to learn, and this project gave me the opportunity to do so," Semel said.

Garcia echoed her: "I have learned how to use COMSOL, which is a highly valuable asset, and a door has been opened into an entirely new world of electromagnetism and microwaves," he said. "To be able to say I have worked in multidisciplinary projects that are not part of my major shows that I am versatile and can pretty much do anything."

Overall, the students have done important research over these six weeks, and the overseas adventure will benefit them in the future.

"This research is good exposure to how I can use my major in the real world," Aleksandrova said. "This definitely opened up several doors for me and exposed me to a lot of new things."

Garcia agreed: "This ties into my career, since I can see myself working on various projects, ones that I may know nothing about, but I am willing to learn the material and make it work. Having international experience is so positive, and these experiences will take me places."



Four students from Iowa State University, along with two students from Virginia Commonwealth University, studied at Cardiff University through International Research Experiences for Students, funded by the National Science Foundation. For six weeks this summer, they researched with the US/UK Multidisciplinary Collaboration in Magnetics program. Photos courtesy of Taylor Yeazel.

PRABHU-GAUNKAR SELECTED AS IBM FELLOWSHIP AWARDEE FOR SECOND CONSECUTIVE YEAR

BY KRISTIN CLAGUE

Neelam Prabhu-Gaunkar, Ph.D. student in Iowa State University's Department of Electrical and Computer Engineering (ECpE), was selected as an IBM Fellowship Awardee for the second year in a row.

According to IBM's research website, "The IBM Ph.D. Fellowship Awards Program is an intensely competitive worldwide program, which honors exceptional Ph.D. students who have an interest in solving problems that are important to IBM and fundamental to innovation in many academic disciplines and areas of study."

Prabhu-Gaunkar works in the area of nuclear magnetic resonance (NMR) with David Jiles, distinguished professor of ECpE at Iowa State, and Mani Mina, associate professor of the same department and of Industrial Design.

"Through my research, we are hoping to design a prototype low field unilateral NMR system that would find applications in noninvasive low-cost imaging," she said. "While such systems exist for applications like oil well logging, nondestructive evaluation, etcetera, they have not been implemented in medical systems due to

limitations such as low spatial resolution and measurement artifacts. We are working on possible methods to overcome some of these challenges."

Last year, Prabhu-Gaunkar received the same honor.

"I felt very humbled that we were selected once again," she said. "Last year, I was very excited and encouraged that industries valued our research work and were supporting our research. It is encouraging that former ISU Cyclones (my mentor at IBM, Emily Kinser) and non-ISU colleagues trust our work and our ideas."

The current chair and previous interim chair of the ECpE department are also excited about Prabhu-Gaunkar's repeated success.

"It is wonderful news and a well deserved award. Heartiest congrats," Ashfaq Khokhar, Palmer Department Chair of Electrical and Computer Engineering, said.

Associate Chair Manimaran Govindarasu echoed Khokhar's sentiments.

"Glad to hear this prestigious fellowship was awarded once again to Neelam," he said. "Very well deserving."

Going forward, Prabhu-Gaunkar will



continue her research, and she has big-picture goals for the future.

"I hope to be associated with research in the area of electromagnetism," she said. "I hope in the future our designs and solutions will be used to create portable MRI systems for medical diagnostics worldwide." ■

ECpE SENIOR SELECTED FOR 2017 FUTURE FOUNDERS FELLOWSHIP

BY CAITLYN MCCREIGHT

Anually, the non-profit organization Future Founders selects the top student entrepreneurs in the nation to receive fellowships, which, according to the Future Founders website, "is a selective year-long program designed to accelerate the development of the top student entrepreneurs and young entrepreneurial-minded leaders across the United States." Iowa State University's Brendon Geils, senior in electrical engineering, has been named one of the 17 entrepreneurs selected to participate in the 2017 fellowship.

Geils co-founded Sodima Solutions, which is a chat technology company with a focus on applying artificial intelligence to the communication space. He has also worked on Atlas Fitness, a tool to help personal trainers and gyms engage with their Facebook audience. Geils is spending the summer with Palantir Technologies in London; following graduation in the spring, he will pursue a master's in physics.

"Having the opportunity to work at high-tech companies, I began to understand that the technical challenges were no longer the hardest part," Geils said. "It was the sheer scale and depth of managing such large companies that made it successful. Knowing this, if you have an idea, the least you can do is pursue it on the side to see what happens."

To follow Geils' journey, visit his website at brendongeils.com. ■



Photo courtesy of Brendon Geils.

ZHUANG ADVANCES TO FINALS IN MCCLUSKEY DOCTORAL THESIS AWARD

BY CAITLYN McCREIGHT



Each year, doctoral candidates in electrical and computer engineering from around the world compete in the Test Technology Technical Council E. J. McCluskey Doctoral Thesis Award Contest. The award serves to promote impactful doctoral student work and provides students with the exposure to the community and prospective employers.

Iowa State University's Yuming Zhuang, doctoral candidate in electrical and computer engineering (ECpE), competed in the semi-final Institute of Electrical and Electronic Engineering (IEEE) VLSI Test Symposium (VTS), the first round of competition, in April. Zhuang's presentation qualified him for the International Test Conference (ITC), the final round of the contest, which will take place in Fort Worth, Texas, Oct. 31 through Nov. 2, 2017.

"My research focus is being able to accurately and cost effectively test the continually higher performance Analog-to-Digital Converters (ADCs). Our goal is to relax the requirements in the industry and in the IEEE standards," Zhuang said. "Currently, we have a lot of stringent requirements that require high precision test instruments. This can take up a lot of time and money, so we are trying to design alternative strategies to reduce test cost and time, while maintaining the test efficiency."

Zhuang faces several challenges, such as non-coherent sampling, generating the ultra-pure sinusoidal signal, relaxing the precise control over amplitude and frequency of the input stimulus and linearity performance of the high precision ADCs.

Zhuang, who has been working on this research since he began his doctoral pursuit, became interested in electronics at a young age. Though not yet familiar with the technical side of electronics as a child, he gradually grew interested and wanted to know how to design instruments and make them work.

"My adviser told me that in order to fully understand the procedure of integrated circuits (ICs), you need to know not only the design but also the test side, so you can have a thorough understanding overall," Zhuang said.

Iowa State ECpE Professor Degang Chen is Zhuang's research adviser and is much more of an expert in this field, according to Zhuang. This is the first time this research group has won the first round of the McCluskey Doctoral Thesis Award Contest, qualifying them for the finals.

"I am proud to have been the first one to go this far. It means a great deal to me and a reward for my own research work and my adviser," Zhuang said. "It also helps Iowa State make its name in the industry and academia, which means a lot for the whole research group and the university."

The contest is made up of four different semi-finals (U.S., Asia, Europe and Latin America). At each semi-final, a jury composed of industrial experts determines four winners, and those chosen will compete against each other in the finals.

"All those selected are all strong candidates," Chen said. "It's a pretty intensive competition, and to be selected is a good reflection on the quality of his [Zhuang's] production."

Zhuang is finalizing his doctorate and says there is still work left to do. He and Chen are preparing new research ideas to pursue and hope to see results.

"If we were to win, it will push us to higher standards. I've been doing this for five years now, so we already have a lot of research work done, and this award will definitely push us to go farther," Zhuang said. "This will let people see the importance of our work and also gains a good reputation for Iowa State." ■



CHECKING IN: COMPUTER ENGINEERING ALUMNI BRITTANY AND JACK TUOHY

In our last issue, the Tuohys were featured in our "Leaving Their Legacies" alumni section. They sent us an update, and we couldn't resist turning their short story into a full feature.

BY CAITLYN McCREIGHT

Brittany and Jack Tuohy began their journey together at Iowa State University, both earning degrees in computer engineering. While they didn't meet until the end of their freshman year, Jack recognized Brittany from classes they had together.

"We were in chemistry together, so I invited Brittany to eat lunch with me. We had several lunches together, but unfortunately, Brittany had forgotten my name halfway through lunch one day," Jack said. "Apparently, I didn't leave a strong first impression."

However, Brittany said he was fun, charming and very sweet. Thankfully, Jack didn't give up. Since then, they have spent many of life's milestones together.

Iowa State has a tradition that to become a true Iowa Stater, one must be kissed under the campanile at midnight.

"We tried campaniling several times, but there was always a couple who beat us there," Brittany said. "On the night of Feb. 13 of our senior year, we were the first couple to claim the spot, and Jack

proposed at midnight."

Before getting engaged, Brittany was one of the co-founders of ISU's Game Development Club, which she is happy to see is growing today. She also enjoyed being a teaching assistant and hopes to become a professor after a few more years of professional experience.

"Through all of college, Jack and I were lab partners almost every semester. The project we enjoyed the most was senior design," Brittany said. "We worked on the chipophone project that was a synthesizer that played chiptune sounds, similar to what you would hear on a Nintendo Entertainment System."

In the summer of 2013, Jack and Brittany both interned at Microsoft in Washington. Jack was in the Xbox Live Division, and Brittany was working in Microsoft Business Solutions.

"It was a fun summer and very challenging, but we knew we wanted to come back to Minnesota to be closer to family," Brittany said.

Getting back to their last year of college,

Brittany and Jack had very different philosophies about job hunting. Brittany wanted a job secured before graduation, and by November, she accepted a job at 3M in Minnesota. However, Jack wanted to be patient and find the right job.

Soon enough, Jack accepted an offer at Self Esteem Brands. Jack works as a software engineer, and about a year ago Brittany joined the team as a software support engineer. To them, it feels like they're lab partners once again.

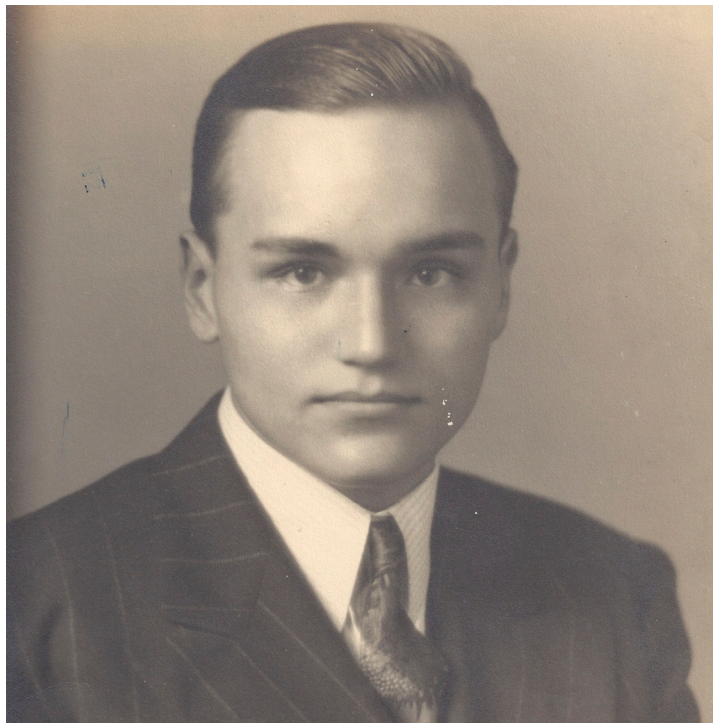
Throughout their lives, they have experienced many accomplishments together. Brittany has created her own limited liability company (LLC) and works part-time as a computer science tutor. However, their newest accomplishment arrived in February, when they became parents to their son Owen. Brittany and Jack hope he grows up to be a Cyclone just like mom and dad.

"He won't be forced into a career of software engineering, but he will definitely learn how to program computers at a young age," Brittany said. ■

CELEBRATING THE LIFE OF ECpE ALUMNUS DAVID ALTENBERND

BY CHRISTINA CREEL

Left: David Altenbernd's high school graduation photo.
Right: David and Floy Altenbernd at their 50th wedding anniversary. Photos courtesy of Chris Altenbernd.



David Altenbernd held many titles in his lifetime: Father, Cyclone, World War II veteran, radar expert and philanthropist. But to summarize his life in just a few titles would not do justice to the great adventure that started at Iowa State University.

Born in Muscatine, Iowa, in the winter of 1921, Altenbernd was destined to inherit his family construction business. But before that, he decided to attend Iowa State to major in electrical engineering. Little did he know, by enrolling in electrical engineering at ISU during the time of the WWII draft, he was also enrolling himself in an “Ultra High Frequency Techniques” course. Along the way, he would meet his wife, Floy, a journalism major at Iowa State.

This “Ultra High Frequency Techniques” course was created to keep students out of the WWII draft by enlisting them domestically. The content of the course is what would roughly translate to radar today. They learned how to transmit data, how to repair radar equipment, how wavelengths work and more. Upon graduation from Iowa State, Altenbernd was sent to Syracuse, N.Y., along with his classmates to complete his training. From there, he was sent to Okinawa, Japan, in preparation for an invasion that was replaced by the 1945 atomic bombings. Due to his background in construction, Altenbernd ended up spending most of his time in Japan rebuilding the city after the bomb destruction.


When he returned to the States, Altenbernd settled down

in his hometown of Muscatine. He and his wife raised four children, Richard, Chris, Patricia and Peggy, and David ran the family construction business while Floy taught art at the public school. At the age of 51, Floy and David decided their adventures weren't over. They sold the family construction business and joined the Peace Corps, and they spent the next 30 years in Africa and Haiti helping build communities.

Altenbernd's son, Chris, who left Harvard University in the 1960s to volunteer in Mississippi during the Civil Rights Movement, recalls his father's great philanthropy.

“I always thought that my volunteering to serve in the Civil Rights Movement in the sixties in Mississippi may have caused my dad and mom to join the Peace Corps,” Chris said, “but he [David] went to Africa because of the qualities of his character that he taught to me. I was merely the student, even though I thought I might have been the teacher.”

Floy and David volunteered for the rest of their lives after returning from Haiti and Africa. They even volunteered in Louisiana after Hurricane Katrina well into their eighties.

Floy passed away in May 2016, and David passed this past January of 2017. In the couple's last years, they added potters to their list of titles. In one last cherry on top of the wild adventures of their lives, the couple's ashes will be housed in an unusual urn: A cookie jar that they crafted themselves. And though they are gone, the legacy of their volunteerism lives on through their children and the lives they impacted. 

IOWA STATE SAYS GOODBYE TO PAST FACULTY AND ALUM MORRIE MERICLE

BY CAITLYN McCREIGHT

When Morris H. Mericle died on Jan. 23, 2017, in Santa Clara, Calif., Iowa State University's Department of Electrical and Computer Engineering (ECpE) lost a distinguished alum and faculty member. Morris was a beloved professor, as well as an admirable father and husband. During his time at Iowa State, Morris received his bachelor's, master's and doctorate degrees, and he was a professor in the electrical engineering department for 30 years.

Morris was born in Toledo, Iowa, on March 26, 1925. He began his college career in 1943, but he was commissioned by the U.S. Naval Academy in 1944 and served in World War II. Mericle later graduated from ISU in 1947; he went on to receive his master's in 1956 and his doctorate in 1963, both in electrical engineering.

"My recollection is that Morrie Mericle and I took some of the same basic electrical engineering courses together back in 1941 and 1942. With World War II intervening, our paths parted for many years until 1986, when I returned to ISU as an adjunct professor in ECpE," Emeritus Adjunct Professor Glenn Hillsland said, when recalling his memories of Morrie. "I then met Morrie again over a cup of coffee in the coffee shop in Coover Hall. Morrie was a very practical-minded guy who effectively applied knowledge gained in academia to solving problems out in the world of blood, sweat and tears."

Morris first became interested in electrical engineering in the winter of 1936. In a personal essay Morris wrote for the Ames Historical Society, he reminisces on the struggles his family faced after they lost their Toledo home to foreclosure. As Christmas approached,

Morris was living in a tiny house with his parents, grandparents and his two younger siblings. Though his mother had told him not to expect anything for Christmas that year, Morris' father couldn't resist getting him something.

"It was then I saw what [his] jacket had been hiding: An eight-and-a-half erector set, the largest size. It had probably cost \$14, a huge amount at that time. A prudent person could eat for two weeks on \$14," Morris wrote, as he recalled the memory. "Only later did I learn that my dad had originally bought me a five-and-a-half erector set, only to learn from our neighbor that their son would be getting the seven-and-a-half set. It was then that my dad took my present back and exchanged it for the best erector set offered. I think he needed to give it as much as I needed to get it."

Eileen Mericle, who has been married to Morris for 57 years, looks back at her late husband's years at Iowa State as a fun time. According to Morris, many of the faculty members and professors would play jokes and pranks on each other. Eileen remembers one story when someone put a weather balloon in another person's office, and it exploded when they opened the door.

"Morrie was an unforgettable character. He was a great storyteller, whether he was talking about his time in Alaska, in the Chicago steel mills or just adventures around Ames," Emeritus Professor Terry Smay said, recalling his memories of Morris. "He had a long and adventure-laden life, and I remember him fondly."

During his time as an associate professor at Iowa State, Morris taught control theory, along with Distinguished Emeritus Professor Grover Brown. Morris also taught electronics and was among the most popular faculty members, according to Emeritus Associate Professor Tom Scott.

"He often socialized with students

Below: Morris H. Mericle. Photo courtesy of University Archives.



in evenings as well as working hours. Students regarded him as a friend, not just a task master," Scott said.

However, Morris did not only spend his time teaching. He spent many years working for Republic Steel, the Corps of Engineers, Lockheed (now called Lockheed Martin) and Autonetics.

After he retired, Morris enjoyed his days traveling with his wife around the country visiting old friends. They ultimately resided in Silicon Valley, Calif., but have had an Ames, Iowa, phone number for the last 55 years, which they insisted the phone company let them keep after their move out of the state.

"He was a fantastic father, best father there ever was. He was crazy about his daughters, and they were crazy about him," Eileen said.

Eileen also said their two daughters looked up to him very much, and one got a degree in electrical engineering and worked as an electrical engineer for the U.S. Navy. The other is a vice president of Adobe in Silicon Valley.


"He wanted his legacy to be his children, and that turns out to be true,"

Change was constant, and Morrie embraced it.

Eileen said.

Eileen has set up a tax-deductible memorial in Morris' name. Any contributions may be made to the ECpE Department, Coover Hall, ISU, Ames, Iowa, 50011.

A graveside service was held on July 3 at ISU Cemetery, and guests traveled from across the country to memorialize Morris.

"Morrie was the historical bridge between Veteran WWII faculty and GI-bill grad student TAs for newbies like me. His embellished stories about their unique idiosyncrasies and moments were colorful and hilarious," Emeritus Professor Dick Horton said. "Our time together spanned 30 exciting years, during which the solid-state analog and digital electronics era began and was quickly followed by the microprocessor and personal computer era. Change was constant, and Morrie embraced it." 



Morris with wife Eileen and family. Photo courtesy of Dick Horton.

Remembering ECpE alumni John O'Brien

BY CAITLYN McCREIGHT


John O'Brien passed suddenly on March 31 in Los Angeles, Calif. O'Brien, who graduated from Iowa State University, was born in Davenport, Iowa, in 1969 and grew up in Indianola, Iowa, where he was involved in track and cross country. He graduated from Indianola High School in 1987 and was his class valedictorian.

O'Brien received a bachelor's degree in electrical engineering in 1991 from Iowa State University, and his master's and doctorate in applied physics from California Institute of Technology in 1993 and 1996, respectively.

He began his career at the University of Southern California in 1997, where he was a professor and did research on nanophotonic and photonic crystal devices. In 2006, he was promoted to full professor of electrical engineering, and he joined the dean's office

as senior associate dean for academic affairs. In 2011, he was appointed as the first USC Viterbi School of Engineering Executive Vice Dean.

During his career, O'Brien received the Presidential Early Career Award for Scientists and Engineers in 1999 and received the 2000 National Science Foundation Career Award.

Memorial contributions may be made to the Western Dominican Province, an order close to O'Brien's heart, at www.opwest.org/donate or 5877 Birch Ct., Oakland, Calif., 94618. 



John O'Brien died March 31, 2017, in Los Angeles, Calif. He was 48 years old. Photo courtesy of Brian Morri, 211 Photography.



Have a story to share? Connect with us on social media or contact our Communications Specialist, Kristin Clague, at kclague@iastate.edu.

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Pictured

Coover Hall and ECpE
Building Addition, featuring
the moth statue, a symbol of
the legend behind the term
"computer bug."

