Agilent’s $20M Software Donation Helps Give Students an Edge in the Job Market

Thanks to a $20 million design software donation from Agilent Technologies, UA engineering students have a new tool to help get them certifiably ready for the work world.

As part of its RF and Microwave Industry-Ready Student Certification Program, Agilent has donated Agilent EEsof Electronic Design Automation, or EDA, software for UA students to download onto their personal computers.

“Experience with the software will give students an edge in the job market,” said Kathleen Melde, professor in the department of electrical and computer engineering, who regularly uses Agilent products in her labs and classes.

“Our goal is to prepare our students to be industry ready, and this certification program helps students gain the recognition they need to stand out to employers,” she said. “This program makes our students more competitive, and eventually helps them get the jobs they want.”

The program identifies, acknowledges and rewards top students for meeting certain requirements that qualify them as industry-ready in RF, or radio frequency, and microwave fields. To participate in the program, universities must demonstrate the use of Agilent software and tools in the curriculum.
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Students use Agilent tools, such as the N9923A FieldFox vector network analyzer, to measure a prototype PIFA antenna.

Achievements

Agilent University Program Manager John Kikuchi said it was a natural fit for the University of Arizona because of its classroom use of Agilent design tools.

"The University of Arizona represents the best of innovation, teaching and research," he said. "Some of the future's greatest innovations will come from today's UA graduates, and we are excited to provide this service to a university that is already working to prepare students for the industry."

The certification program requires students to pass an RF and microwave design course and lab, complete a required number of hours using Agilent EESof software, receive a professor nomination, and demonstrate aptitude in a final hands-on test. To be eligible for certification, students must be in the top 15 to 20 percent in their class. Once certified, students' names go on a list for industry professionals seeking employees.

Melle said she has been using Agilent products since she began teaching for the UA in 1996. She is a believer in hands-on learning and knows the importance of students mastering the use of industry-standard tools to stand out in a competitive job market.

"When you have a chance to implement what you learn in the classroom, it solidifies your knowledge," Melle said. "If a student can leave here with a wide variety of skills, it ultimately gets them where they want to go. Agilent tools help us get the students where they want to be."

Agilent is a longtime supporter of the University of Arizona Department of Electrical and Computer Engineering Department.

"Agilent is a great supporter of our department, and that support goes far beyond this donation," said Tamal Bose, ECE department head. "Agilent has donated equipment in the past, funds research projects, serves on advisory boards, and works closely with our faculty and students. We are very thankful for their support."

For more information about Agilent's student certification program, visit agilent.com.

Laity spends much of his spare time volunteering at Xerocraft Hackerspace, a do-it-yourself space that provides innovators with the room and resources to create. He also often stops by the UA's Institute of Electrical and Electronics Engineers chapter to check in on the student club that he once led as president.

“One of my proudest accomplishments in college has been turning the club into ECE's own little maker space that supports many students in their class work and senior projects," Laity said.

Laity interned at Marcus Engineering while he was a student at the University of Arizona and is now an electrical engineer with the company.

"We are so proud to have Robbie as part of the team. He's a brilliant and generous engineer," said Marcus, a UA alum who earned his undergraduate degree in electrical engineering in 1999 and his doctorate in biomedical engineering in 2006. "Recognition like this proves that we are doing the right things as a community to grow and maintain top talent."

Lairy was on the Senior Design Project team that won Best Overall Design at the UAs 11th annual Engineering Design Day. The team designed a robotic fish with the purpose of teaching aquarium visitors about underwater environments.

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Many stories in this print edition have been edited for length. To read the full stories please visit ece.arizona.edu.
All Eyes on International Cybersecurity

As pervasive cyberservices, like cloud computing, revolutionize the way we communicate and do business, working together to know when and how hackers will strike and collaborating with other nations to prevent and defend against cyberattacks is becoming more and more essential to keeping our world safe.

The Second Franco-American Workshop on CyberSecurity, held on Jan. 20 and 21, 2014 at the UA, gave more than 40 participants a comprehensive look at the state of cybersecurity threats and solutions and was a big step in the direction of international understanding.

Highlighting ongoing cybersecurity efforts and research in the United States and Europe, the workshop helped identify the evolving threat landscape, suggested new approaches for security, and explored ways to better equip everyday computer users with workforce skills to combat cybersecurity attacks.

Alongside industry experts and faculty from the University of Illinois at Chicago and France’s University of Lyon, UA faculty presented research about resilient cloud services, securing smart grids, and human-centric predictive analytics of cyberthreats, among other topics.

Experts from IBM and Cloud Security Alliance added to the discussion with presentations about training students and helping everyday computer users think differently about online safety.

Motivations for cyberthreats and sophistication in creating these threats are rapidly evolving, said Sadu Bajekal, IBM senior technical staff member. Hackers are taking advantage of the human factor and becoming even better at attacking the everyday user.

Said Salim Hariri, ECE professor and director of the UA National Science Foundation Center for Cloud and Autonomic Computing, “In order to understand all threats regarding cybersecurity, it is critical to collaborate with industry partners like IBM and Cloud Security Alliance, who help us have a fuller picture.”

UA researchers identified three research areas — data security, resource management and resilient service-oriented architectures — on which they will work with the University of Lyon.

“It is my hope that we will have more collaborations with our partner universities, and this workshop allows us to strengthen those ties,” said Hariri, who directs the cybersecurity training project AzCyPert, a portal for teaching students and educators about cybersecurity and part of the AZSecure project.

AZSecure, a scholarship-for-service program that will support about 40 students over the next five years, and HackerWeb, which focuses on understanding cyberattackers via social media analytics, are among the newest UA cybersecurity projects. Both are funded by the National Science Foundation.

Workshop sponsors included the Partner University Fund, UA NSF Center for Cloud and Autonomic Computing, NSF Cybersecurity Scholarship for Service, and the University of Illinois Cooperative Information Systems and Organizational Research and Services Lab.

Metaphorical Maps to Detect Suspicious Computer Activity

In another UA cybersecurity research project, ECE computer science researchers are working on a $3.6 million cybersecurity project, funded by the Office of Naval Research, to develop dynamic maps that visualize suspicious activity on computer networks.

ECE faculty members Loukas Lazos and Shrinivasan Ramasubramanian are among the researchers creating the visualization system, a metaphorical geographic map, so to speak.

Salim Hariri, ECE professor and director of cybersecurity training project AzCyPert, leads workshop participants in a lecture about UA cybersecurity projects.

Joining Forces to Understand Motives Behind Cyberattacks

The ECE’s Loukas Lazos and Jerry Rozenblit, University Distinguished Professor and Raymond J. Oglethorpe Endowed Chair, are teaming with primary investigator Brint Milward, the Providence Service Corporation Chair in the School of Government and Public Policy, and fellow co-investigator Ronald Breiger, a sociology professor, to integrate cyberdata forensics with human-centric social network analysis.

In short, the team is developing models of cyberattack characteristics, classifying adversarial groups, and using social network science to analyze those groups.

“We’ll thus be able to liken cyberattacks as symptoms and the adversarial groups as the disease, and integrate cyberdata forensics with human-centric social network analysis tools under a common framework,” Rozenblit said. “Clearly, cybersecurity is essential for protecting our interests in almost all realms of everyday life.”

The research will contribute to future counter-strategies, Milward said.

“Tracing where these attacks come from when they’re bounced off computers all over the world is extraordinarily difficult, and the best you can do is trace them back to a country,” he explained. “The ideal would be to move beyond that to identify the groups and their motives. A second best solution may be to identify the attackers by the kind of attack they carry out.”
Making the World a Safer Place
Multimillion-Dollar DOD Research Grant Tackles Encryption Challenges

Six researchers at four universities, including the UA College of Engineering’s Mark Neifeld and Ivan Djordjiev, have won a multimillion-dollar Department of Defense award to explore quantum key encryption methods far more advanced than cryptography technology in use today.

The five-year project, “Fundamental Research on Wavelength-Agile, High-Rate Quantum Key Distribution (QKD) in a Marine Environment,” is a combined effort between the University of Illinois at Urbana-Champaign, the project lead; Duke University; Boston University; and the UA.

Quantum key distribution uses quantum mechanics to guarantee secure communication. It enables two parties to automatically produce a shared random secret key known only to them, which can then be used to encrypt and decrypt messages sent over a standard communication channel.

Traditional key distribution security methods leave communications networks vulnerable to cyberattack because those doing the attacking can figure out how to crack the complex mathematics underpinning these methods. Quantum key distribution, however, uses light particles. According to the laws of quantum physics, such encryption keys are inherently secure.

“To date, QKD has only been effectively implemented using optical fibers with low secure key rates,” said Neifeld. “When we succeed at this project, we will have a secure method of communication through the air between ships and planes.”

Neifeld was selected for his achievements in computational imaging, compressive sensing and applications of information theory. He has been a guest editor for the SPIE newsletter, co-chaired the Visual Information Processing Conference and served as a member of the SPIE executive committee, among other leadership roles.

Neifeld, who joined the ECE faculty in 1991, has published more than 115 papers in peer-reviewed journals and obtained several patents from his research.

Research Highlights
Volume Holographic Imaging System for Ovarian Cancer Detection Reaches Milestone

Professor Raymond Kostuk and his research team have developed a bench-top version of an instrument capable of detecting ovarian cancer, a disease often referred to as the “silent killer” because it presents no symptoms until it is highly advanced.

The volume holographic imaging system, which shows promise for detecting ovarian cancer in situ, uses specialized holographic components in a microscope to generate images capable of detecting subtle tissue microstructure changes as well as fluorescent biochemical signatures.

Now the research team is working on a miniature endoscopic version that further enhances imagery, achieves even greater contrast and is capable of reliably diagnosing ovarian cancer in real time during noninvasive laparoscopic procedures and screenings.

New Center Supports Next-gen Wireless Broadband Research

The UA’s Broadband Wireless Access and Applications Center, or BWAC, has received $1.6 million in funding from the National Science Foundation to research next-generation wireless technology.

“Current technologies and methods are far behind what can be done,” said Fink, who is working with Tech Launch Arizona to patent the new technology and license it to retail implant developers.

Only a handful of companies and research institutions worldwide are developing retinal implants, which stimulate surviving retinal cells in people who have lost their sight due to common degenerative diseases, such as macular degeneration and retinitis pigmentosa. Implant patients can usually detect the presence of light, but the images they perceive are very low resolution.

Taken in its wider context, Fink believes this same methodology of neural stimulation could be applied to paralysis, deep brain stimulation, and other uses beyond vision.
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- ECE-led center to research next-gen wireless technologies.
- International cybersecurity conference comes to UA.
- Professor adapts breast cancer screening device for bomb detection.

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