Fall 2016

ECE Professor Awarded Two Grants in Computer Hardware Security by the National Science Foundation

The National Science Foundation awarded two research grants in 2016 to Dr. Fareena Saqib for implementation of two projects. They are titled "HAT: Hardware based Authentication and Trusted-Platform-Module Functions for Internet of Things" and "HACE Lab: An On-Line Hardware Security Attack and Countermeasure Evaluation." The HAT Project addresses the need for hardware-oriented capabilities and mechanisms for protecting the increasingly vulnerable microelectronic devices and systems in the internet of things (IoTs). The growing integration and reliance on remote and mobile devices for personal, commercial, military, and industrial uses in the IoTs is driving the need for improved security and trust in cyber-physical systems beyond the capabilities of software development. Resource-constrained devices create additional vulnerabilities and increase opportunities for malicious adversaries to steal private information, subvert systems, destroy property, and in extreme cases cause the loss of human life.

The HACE project is focused to help encourage adoption of a curriculum aimed at training students with skills in various aspects of hardware security and trust including trustable hardware, counterfeit detection, security primitives, side channel attacks and countermeasures, reverse engineering, etc. The goal is aimed at establishing a set of hardware security courseware and enabling adoption of this courseware at several institutions through the development of an Online Hardware Security Attack and Countermeasure Evaluation (HACE) Lab. The project is being implemented in conjunction with the University of Florida.

ECE student Awarded Merten Scholarship to Support Doctoral Studies

Greg Lovell, a PhD student in electrical engineering was recently awarded a Lawrence and Margaret Mertens Endowed Fellowship. His work involves creating multiplexing/de-multiplexing fiber optic architectures to increase spectral efficiency in the hopes of demonstrating terabit communication speeds. Lawrence Mertens worked with the university's founding president, Jerome Keuper, during the early days of the space program at the Cape. He was an electrical engineer who worked for years on the Cape and was later named chief scientist at RCA. He served as an adjunct professor of oceanography at Florida Tech, as well.

New Computer Architecture Laboratory Developed for Undergraduates
A new computer architecture laboratory for undergraduates has been developed to include significant hands-on learning in association with ECE 4551 Computer Architecture. The course has traditionally used a lecture-based model of instruction to cover topics in instruction set design, processor design, handling of exceptions, pipelining, memory hierarchy, and I/O interface design. Starting in Fall 2016, the course was modified to include a significant hands-on learning model where students become familiar with a modern processor architecture. The course now emphasizes lab-based instruction using the ARM instruction set architecture, which is widely popular today. ARM is being used in most cell phones and in today’s most popular embedded devices, such as Nintendo 3DS, the iPhone 3G, and some Android phones.

To this end, the Digital Electronics Laboratory (room 357EC) has been equipped with 20 new (third generation) Raspberry Pi, which include a 1.2GHz 64-bit quad-core ARMv8 CPU. To facilitate student use, the lab has also been equipped with a network (including new wireless router and switches) that enables students to work remotely on projects without having to be present in the lab. These enhancements were made possible by funds received from Rockwell Collins, Inc. to increase the emphasis in embedded systems in the department of Electrical and Computer Engineering at Florida Tech.

Yuancheng Xu Awarded Walter M. Nunn Jr. Scholarship to Study Electromagnetics

Yuancheng Xu, a PhD student in the ECE Department has been awarded the Walter M. Nunn Jr. Scholarship. This scholarship will help support Xu’s work, which focuses on infrared antennas, detectors, and waveguides. The work includes finite element analysis and utilizes complex near-field measurements as a means of assessing optical properties of these structures. Xu’s work was crucial to a National Science Foundation project in which impedance matching of infrared and optical antennas was studied, leading to the first published measured input impedance of an optical antenna. Dr. Nunn was a faculty member of the ECE Department who taught a wide range of courses in electromagnetics from 1969 to his passing in 2004. The scholarship fund was started in 2007 in honor of his legacy.

Speech Database Made Available for Researchers via the Linguistic Data Consortium

Dr. Kepuska contributed the Noisy TIMIT database to the Linguistic Data Consortium catalog at the University of Pennsylvania. TIMIT is a corpus of phonemically and lexically transcribed speech of American English speakers of different sexes and dialects. TIMIT was designed to further acoustic-phonetic knowledge and automatic speech recognition systems. It was commissioned by DARPA and developed in conjunction with many sites, including Texas Instruments and Massachusetts Institute of Technology, hence the corpus name. Dr. Kepuska’s version is designed to simulate audio utterances for different noise levels and different types of noise. The Linguistic Data Consortium (LDC) is an open consortium of universities, libraries, corporations and government research laboratories. It was formed in 1992 to address the critical data shortage then facing language technology research and development.

ECE Faculty and U.S. Air Force Combine Efforts to Spur Research

Florida Institute of Technology and the Air Force Technical Applications Center (AFTAC) have entered into a three-year research and development agreement that will tap the university’s renowned computer science and engineering expertise to help strengthen the center’s data processing and analytics capabilities.

Under terms of the Cooperative Research and Development Agreement, or CRADA, AFTAC will provide subject matter expertise in nuclear monitoring and nuclear event detection, and Florida Tech will
perform research in data science, high-performance computing, information assurance, and geophysical and materials modeling and simulation.

The CRADA will enable the Air Force to leverage Florida Tech’s academic expertise to research and develop innovative analysis methods and algorithms to address critical mission needs, particularly as AFTEC migrates to cloud computing architecture.

"By engaging the CRADA process, we hope to enable 'best value' solutions for the Air Force," said Glenn Sjoden, AFTEC’s chief scientist. And the agreement will spur research among faculty members and their students focused on real-world technical challenges, even as Florida Tech participants benefit from interacting with Air Force scientists, engineers and facilities. "The sharing of ideas, expertise and information between Florida Tech and AFTEC will broaden the knowledge of faculty members and bolster Florida Tech’s tradition of hands-on learning for students," said Florida Tech President and CEO T. Dwayne McCay. "We look forward to the discoveries and developments the next three years will bring.

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ECE Graduate Wins the College of Engineering Outstanding Alumnus Award

Doug M. Schuler P. E. won the College of Engineering Outstanding Alumnus Award for 2016. He received his Electrical Engineering degree from Florida Institute of Technology in 1972 and MS in Management from FIT’s Redstone Arsenal campus in Huntsville, Ala. in 1991. He began his career with Stone & Webster Engineering Corp. in Boston and currently works for Westinghouse Corp. Canton, Mass. as a Senior Controls engineer and Computer Control Specialist. He previously worked for Chicago Bridge & Iron.

Doug is currently a Controls Specialist on four AP1000 next generation nuclear plants being constructed in China. He has been a Lead Engineer and Project Supervisor on five gas co-generation power projects in the U.S. and in Canada, a Project Engineer and Lead on a gas refinery in Algeria for Sonatrach and one in Texas for Texaco. He was an Electrical Controls engineer on five new nuclear projects designed and built in the U.S. and Taiwan and a Design Specialist working with the U.S. Nuclear Regulatory Commission analyzing engineered safeguards systems for nine operating nuclear plants.

Doug continues to be an active and supportive member of the FIT community. In 2013 he generously established the Douglas M. Schuler Endowment that funds an Electrical and Computing Engineering scholarship. He is a Member of the College of Engineering Advisory Committee, the Secretary for the Greater Boston Alumni Chapter and is a current member of Alumni Board of Directors. As an enthusiastic alumnus, has invested in Senior Design Projects, and is a major donor to the Student Design Center providing means for equipment, tooling, and supplies. Doug grew up in New York City and chose FIT because of his interest in Aerospace and FIT’s proximity to Kennedy Space Center.

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Database of Florida ECE Professors Created to Facilitate Research Collaboration

Dr. Kozaitis attended the annual meeting of Electrical and Computer engineering Department Heads from the State of Florida held at Embry-Riddle Aeronautical University. There, he spearheaded an effort to make it easier for ECE faculty in the Florida to collaborate on research projects. Florida ECE faculty member’s affiliations, research interests, and other information can now be found here.

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Briana Cantos Completes Summer Internship at JPL

Working at the NASA Jet Propulsion Laboratory (JPL) this summer was a dream come true. I first learned about JPL during the spring semester of my freshman year when the Electrical Flight Systems group supervisor, Alejandro Jimenez, was looking for students to interview. I had the amazing opportunity to have my first interview with JPL. Even though I didn’t get selected that year, I determined to get better and maintained my connection with Mr. Jimenez by inviting him as a guest speaker for the Florida Tech IEEE student branch, where I was the president for this last year. One year later, from my first interview, I was extended an offer to join the Electrical Flight Systems group to work on the Europa Clipper project.

As an electrical engineering student, I had never been exposed to a world of space exploration. The Europa Clipper spacecraft project is traveling to Jupiter’s moon Europa to search for signs of water and potential life. It was overwhelming, but exciting, in the first few weeks to understand all the work it takes to bring together a spacecraft like the Europa Clipper. Being an electrical flight system engineering intern, I gained an appreciation for the immense amount of communication it takes to get people from different
subsystem groups like Power and Telecommunications, and also all the science instrument groups, to work together.

At the beginning of my internship, my supervisor Alejandro Jimenez told our group of interns to work hard at our individual project tasks, but to go out and network as much as we could. I really took this as a personal challenge to learn more about how JPL functions as organizations and hear why people loved to come to work every day. Before my internship, I thought most of the people that worked at JPL had attended elite schools like MIT and Caltech. Throughout my interactions with the employees, I learned about their journeys and was surprised to learn that they were not so different from my own story. JPL’s internship program offered many technical presentations, facility tours, and networking opportunities. I gained an amazing networking mentor, Eddie Gonzalez, who inspired me to believe in myself and to acknowledge that my passion for my work is powerful. Overall, it was fun getting to learn how so many specialized groups come together to design and build a flight project that is making history.