Georgia Tech ECE Ph.D.s and Postdocs Accept Faculty Positions around the World

Talk with any faculty member and he or she will say that interviewing and getting hired into an academic faculty position is a challenging experience, even in the best job markets. Since many universities froze hiring due to COVID-19 earlier this year, that process became even tougher.

In the School of Electrical and Computer Engineering (ECE) at the Georgia Institute of Technology, ten current Ph.D. students, newly minted Ph.D. graduates, and postdoctoral fellows/associates have been hired into faculty positions, despite these difficult circumstances. Seven have been hired by universities in the United States, while three have accepted positions in Saudi Arabia, Chile, and Turkey.

"We are extremely proud of our Ph.D. students, recent Ph.D. alumni, and postdocs and all of their accomplishments," said Magnus Egerstedt, the Steve W. Chaddick School Chair of ECE. "We wish them all of the very best at their new university homes and in all that they choose to pursue in the future."

In a world that needs the expertise of engineering and science faculty more than ever, here are ten new additions to academia, all hailing from the Georgia Tech School of ECE.

Abdullah Alamri

Abdullah Alamri graduated with his Ph.D. in spring 2020 after working in the Power Systems Control and Automation Laboratory since 2015. He started

working this summer as an assistant professor in the Department of Electrical Engineering at the Islamic University of Madinah, located in Madinah, Saudi Arabia.

The title of Alamri's thesis is "Reliability Analysis Methods for Power Systems with Substantial Penetration of Renewable Generating Resources." Focused on reliability and generation adequacy of present-day power systems, Alamri's thesis developed reliability assessment models of power systems with wind farms and/or solar farms. The models provide probabilistic descriptions of wind farm/solar farm electric power output, and three different methods for computing the generated power probability distribution function of a wind farm or a solar farm were proposed and implemented.

Alamri was advised by A.P. Sakis Meliopoulos, who holds the Georgia Power Distinguished Professorship in ECE. Meliopoulos said that Alamri's work is fundamental in understanding and quantifying the uncertainty associated with variable, or non-controllable, power generation, such as wind and solar. "As the penetration levels of wind and solar into modern power systems increase, the reliability and associated costs for maintaining a certain reliability level are greatly affected," Meliopoulos said. "Mr. Alamri's work provided rigorous mathematical models and computational procedures to quantify the reliability of the system and enable optimization of planning strategies for modern systems."

Ningyuan Cao

Ningyuan Cao graduated with his Ph.D. in summer 2020 after working in the Integrated Circuits and Systems Research Laboratory since 2015. In fall 2021, he will join the Department of ECE at George Washington University as an assistant professor. The university is located in

Washington, D.C.

The title of Cao's thesis is "Circuit and Algorithm Design to Enable Edge Intelligence." His work aims to bridge the gap between Internet of Things (IoT) intelligence and hardware constraints via technical innovations. In particular, Cao aims to enhance intelligence, robustness, and trust of the human-IoT eco-system via circuit/algorithm co-design. His research has been highlighted in a number of technical media articles including *EE Times* and *Wired*.

Cao was advised by ECE Professor Arijit Raychowdhury, who said that Cao will be an excellent researcher and will succeed in academia. "Ningyuan is curious, eager to work on new problems, but doesn't compromise on rigor," Raychowdhury said. "He has been interfacing with a number of semiconductor companies as a part of his graduate work, and I am sure that it has taught him to be careful and successful in selecting problems that will have an impact."

Adam Charles

Adam Charles graduated with his Ph.D. in ECE in 2015 and recently completed a postdoctoral fellowship with the Princeton Neuroscience Institute at Princeton University in New Jersey. He began working as an assistant professor this summer at the Department of Biomedical Engineering at Johns Hopkins University, located in Baltimore, Maryland.

The title of Charles' thesis is "Dynamics and Correlations in Sparse Signal Acquisition." Many advances in technology over the past few decades, such as in robotics, medical devices, and scientific analysis, have relied on the increasing ability to mathematically describe and exploit the intrinsic relationships that exist in data collection. This work bridges the gap between two important data relationships: sparsity and dynamics. Sparsity

is the concept that a large, complex dataset admits a simple mathematical representation with a small number of independent features, while dynamics is the smooth evolution of our world through time that creates regularities in sequential data-points. Charles' resulting algorithms and theory have broad usage in practical applications, including improving the resolution of airborne imaging systems, algorithmic advances that improved on the state-of-the-art for tracking objects in complex temporal data, and theoretical explorations on the computations that can be performed by ever-pervasive recurrent neural network models.

Charles was advised by ECE Professor Christopher Rozell. He said that Charles made innovative technical contributions, focused on activities to develop himself professionally, and invested in collaborative relationships with his colleagues to advance everyone's work. "This foundation served Adam well as he broadened his skillset in his postdoc work to be uniquely positioned to address some of the most pressing problems at the intersection of neuroengineering and data science," Rozell said. "It was no surprise that he was very successful on the job market and is embarking now to start his own lab in one of the best environments in the world for his research area. I couldn't be more proud of Adam, and I am excited to see the way he leads our field over the next generation."

Thinh Doan

Thinh Doan recently completed a two-year postdoctoral fellowship with both ECE and the H. Milton Stewart School of Industrial and Systems Engineering (ISyE). Doan joined the Bradley Department of ECE at Virginia Tech this fall, where he is an assistant professor.

Doan earned his Ph.D. in ECE from the University of Illinois at Urbana-Champaign in 2018, and shortly afterwards, he came to Georgia Tech to do

postdoctoral work on how multiple agents can collaboratively learn how to behave in their environment when communication between them is contained. This work is a mix of optimization, control, and communications.

Doan was advised by Justin Romberg, the Schlumberger Professor of ECE, and by Siva Theja Maguluri and Ganghui (George) Lan, assistant professor and professor respectively in ISyE. Romberg said that Doan's time at Georgia Tech was a fantastic success. "In his two years here, Thinh not only published many papers in top applied mathematics journals and computer science conferences, he was also a tremendous mentor to my graduate students in ECE," Romberg said. "He will make an excellent faculty member."

Felipe A. Larrain

Felipe Larrain is graduating with his Ph.D. this summer after working in the Kippelen Research Group since 2014. This fall, he joined the Energy and Environmental Engineering Department as an assistant professor at the Universidad Adolfo Ibáñez, located in Santiago, Chile.

The title of Larrain's thesis is "Physics and Engineering of Organic Solar Cells: Electrical P-type Doping with Phosphomolybdic Acid." The objective of Larrain's proposed research was to simplify the fabrication of organic solar cells and limit their environmental impact by optimizing a new electrical doping mechanism. The solution-based electrical doping technique leads to a dramatic simplification of the device architecture of organic solar cells, decreasing the device fabrication cost while keeping the promise for roll-to-roll, large-area, and high throughput manufacturing.

Larrain was advised by Bernard Kippelen, who holds the Joseph M. Pettit Professorship in ECE. "I am extremely thankful to Felipe for his contributions to our research group during his Ph.D. at Georgia Tech and am delighted

that he has decided to select an academic career and become a scholar," Kippelen said. "I am convinced that he will have an incredible impact on future generations of students, especially Latino students."

Barry Muldrey

Barry Muldrey graduated with his Ph.D. in summer 2019 after working in the Low-power, Adaptive, and Resilient Systems Laboratory and then conducted postdoctoral research in the Integrated Computational Electronics Laboratory. He joined the Department of ECE at the University of Mississippi in Oxford, Mississippi this fall as an assistant professor.

The title of Muldrey's thesis is "Algorithms for Post-Silicon Validation and Debug of Radio-Frequency, Analog, and Mixed-Signal Circuits and Systems." The problem of validating and verifying the correctness of analog/RF circuits and systems is of critical importance due to their widespread deployment in sensing, control, and communication applications. Novel machine-learning assisted algorithms were developed for automatically modeling and validating behaviors of physical designs across the global space of possible excitations to such systems. A key contribution in Muldrey's thesis was developing the ability to diagnose design inconsistencies (or "bugs") down to individual modules to enable rapid design debug and yield ramp-up.

Muldrey was advised by ECE Professor Abhijit Chatterjee for his doctorate and collaborated with ECE Professor Jennifer Hasler on postdoctoral work in her lab. Between Hasler and Chatterjee, they have 11 Ph.D. graduates who are engineering faculty members. "Barry was always looking beyond horizons to push his abilities in so many domains; he is multi-faceted and multi-talented," Chatterjee said. "It is a great accomplishment for him to get the academic position he always wanted. He is well-positioned to excel in

so many areas, and I wish all the best to Barry."

Nader Sehatbaksh

Nader Sehatbaksh is graduating with his Ph.D. this summer after working in the Electromagnetic Measurements in Communications and Computing Laboratory since 2014. He joined the Department of ECE at the University of California at Los Angeles (UCLA) this fall as an assistant professor.

The title of Sehatbaksh's thesis is "Leveraging Side-Channel Signals for Security and Trust." His research is focused on finding new methods to discover, model, and mitigate unintentional information leakage, known as side-channels, from modern computers. His work aims to leverage side-channel signals for useful purposes–like profiling, intrusion detection, and establishing trust–to improve the security and/or performance of resource-constrained devices such as embedded and cyber-physical systems.

Sehatbaksh was co-advised by ECE Associate Professor Alenka Zajic and Computer Science Professor Milos Prvulovic. Zajic noted that faculty positions at schools like UCLA, a top 20 institution in the United States, are highly competitive even in regular years. "Such faculty positions were exceptionally scarce during COVID-19, when most schools have frozen hiring," Zajic said. "Securing this position is a testament to Nader's exceptional research accomplishments and other academic achievements, and also to the great training he obtained at Georgia Tech."

Beren Semiz

Beren Semiz is graduating with her Ph.D. this summer after working in the Inan Research Lab since 2016. She begins her career as an assistant professor this fall in the Department of Electrical and Electronics Engineering (EEE) at Koc University, located in Istanbul, Turkey.

The title of Semiz's thesis is "Digital Biomarker Discovery for Non-Invasive Health Monitoring with Acoustic and Vibration Signals." There is a compelling need for novel modalities which can employ continuous and non-invasive health monitoring outside the physical confines of the clinic. Consequently, there is a new emerging class of biomarkers, **digital biomarkers**, which are measures collected through connected digital tools, generally across multiple layers of hardware and software. Semiz's work in this area proposes the use of wearable acoustic and vibration measurements to derive digital biomarkers, which can be used together with existing medical information to assist in clinical decisions.

Semiz was advised by ECE Associate Professor Omer Inan, who said that being hired as an assistant professor at Koc University is impressive and demonstrates how highly her research activities and plans are regarded internationally. It is a leading Turkish university and was the highest ranked university in Turkey in 2018, according to the *Times Higher Education World University Rankings*. "Beren has conducted highly innovative and exciting research while here in my group at Georgia Tech, bridging the disciplines of acoustics and vibration measurements from the body and digital health," Inan said. "I am confident that she will be a successful independent PI at Koc, and will allow their Department of EEE and College of Engineering new opportunities to collaborate with medical schools and hospitals in Istanbul, addressing some of the most pressing health challenges facing the world today."

Sahil Shah

Sahil Shah graduated with his Ph.D. in ECE in 2018 and is currently a postdoctoral associate at Caltech in Pasadena, California. He will begin working as an assistant professor in spring 2021 in the Department of ECE at the University of Maryland at College Park.

The title of Shah's thesis is "Low-Power Computation using FPAA for Wearable Devices." His thesis presented foundational work demonstrating multiple low-energy system applications, particularly directions in embedded machine learning. The application of this work could potentially transform a number of portable and wearable devices, including medical devices. Shah's work proved that these applications were shown to be robust to environmental factors, such as temperature fluctuations. He also developed techniques to self-repair these approaches as they were being used.

Shah was advised by ECE Professor Jennifer Hasler, who said that Shah has a bright future ahead of him in academia and in his particular field. Nine of her Ph.D. graduates hold tenured engineering faculty positions, and Shah is now the tenth to enter academia from her group. "Sahil's excellent accomplishments both in teaching and research will continue to enable him to make a great impact as a faculty member at the University of Maryland, particularly in the area of wearable personal and medical devices," Hasler said.

Swamit Tannu

Swamit Tannu has worked in the Memory Systems Lab since 2014 and will graduate with his Ph.D. in ECE during fall 2020. In spring 2021, he will begin his career as an assistant professor in the School of Computer, Data, and Information Sciences at the University of Wisconsin at Madison.

The title of Tannu's thesis is "Compiler and Runtime Support for Near-term Quantum Computers." His thesis work looks at software techniques to improve the fidelity of near-term quantum computers. It also looks at cryogenic processor and cryogenic memory systems for designing scalable quantum computers.

Tannu was advised by ECE Professor Moinuddin Qureshi, who said that Tannu is the third student from the Memory Systems Lab who is headed to academia. His past ECE advisees in academia are Jian Huang at the Department of ECE at the University of Illinois at Urbana-Champaign and Prashant Nair at the Department of ECE at the University of British Columbia, Vancouver. "I am super proud of all of Swamit's accomplishments, including him joining the University of Wisconsin, which is considered one of the strongest CS departments," Qureshi said. "Swamit has been an incredible student, who chartered his own path and made strong research contributions in the emerging area of Quantum Computing. He also has a natural flair for teaching and mentorship, making him ideal for academia."