Department of
ELECTRICAL & COMPUTER ENGINEERING
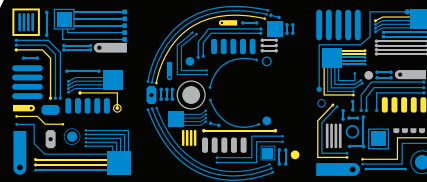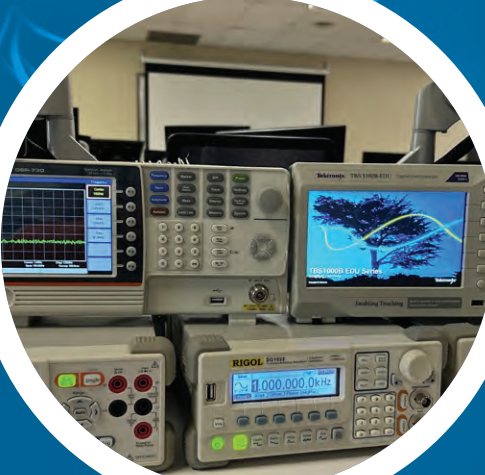
ELECTRICAL, COMPUTER, AND CYBERSECURITY ENGINEERING

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

A LOOK INSIDE

THE UNIVERSITY OF
ALABAMA IN HUNTSVILLE

A MESSAGE FROM
ALEKSANDAR MILENKOVIC

Welcome to the 2023 edition of the Electrical and Computer Engineering Department Newsletter. I am humbled and honored to serve as the new ECE Department Chair. Dr. Laurie Joiner will serve alongside me as the Associate Department Chair and we assumed our positions in January 2023. I use this opportunity to give big thanks to Dr. Tommy Morris, who made a number of improvements during his service as the Interim Department Chair in 2022.

Our vision is to explore, discover, create, and communicate knowledge to foster technological, economic, and social advancement of the State of Alabama, the nation, and the world, while educating individuals in the areas of electrical, computer, and cybersecurity engineering.

We offer three ABET-accredited degrees at the undergraduate level: Electrical, Computer, and Cybersecurity Engineering; four degrees at the Masters level: Electrical, Computer, Cybersecurity, and Software Engineering; and two degrees at the Ph.D. level: Electrical and Computer Engineering. We are committed to educating graduates who are well-prepared to excel in technical and leadership roles in our profession. In the last reporting period, 130 undergraduates earned their B.Sc. degrees, 24 students earned master's degrees, and 7 earned Ph.D. degrees from the ECE Department. Our graduates are shaping the world by designing hardware and software components used in modern robotics, satellites, unmanned aerial systems, automobiles, and medical devices; by developing next generation computers and networks and tools of scientific discovery; or by securing and defending cyber-physical systems and critical national infrastructures.

In research we strive to engage researchers at all levels: undergraduate students, graduate students, and faculty to address important challenges faced by the industry and the society and to push boundaries of what is known today in the areas of electronics, communications, controls, antennas, computing and network systems, and cybersecurity. Our world class faculty includes multiple winners of the prestigious CAREER award from the National Science Foundation, three IEEE fellows, one APS fellow, and one SPIE fellow.

As a Department, we strive to provide a nurturing environment for the continued professional advancement of our students, staff, and faculty. We serve our local, professional, and broader communities through our professional service, summer camps, continual education opportunities, and outreach activities.

We have big plans for the future of the Department: to improve our curriculum and in-class and outside class experience for our students; to increase the number of students and the number of faculty; to grow our research expenditures; and to further engage our local, national, and global communities. The University remains committed to being a preeminent research institution. We are excited to share news with you about a groundbreaking ceremony held on April 14th, 2023 for a new 80,000 square foot Raymond B. Jones Engineering building.

Please take a moment to explore other pages in this Newsletter. We welcome new members to our team: Dr. Avimanyu Sahoo, Assistant Professor; Mr. James Williamson, Lecturer; and Ms. Mary Nutial, Senior Staff Assistant. We honor the service of Dr. Sam Yoo, who retired in December of 2022 after more than 21 years of service to the Department. We brag about successes of our seniors and their mentor Mr. Dennis Hite. They made a difference in the world through their senior design projects. Here, I will single out one project that engineered an automated chlorine dispenser that is a part of the system that will provide potable water to community members in Sabana Larga, Nicaragua. We celebrate achievements of our outstanding students and our faculty. We are proud of Dr. Tommy Morris, the Director of the UAH Center for Cybersecurity Research and Education (CCRE), who received the 2022 Cybersecurity Education Achievement Award at the National Cyber Summit held in October. We also share exciting news about teaching laboratory improvements.

If you are interested in learning more about the exciting opportunities available in our Department, please visit our website or contact us directly. To our prospective undergraduate and graduate students, come and join us – you will receive a world-class education, while building lasting friendships with your peers, our faculty, and staff. To our alumni, the ECE Department is your academic home and we look forward to hearing from you and continuing to build a vibrant and engaged ECE community.

Go Chargers!

Sincerely,

Aleksandar Milenkovic, Department Chair And Professor
Dr. Laurie Joiner, Associate Department Chair, Associate Professor

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

COLLEGE OF ENGINEERING

INDUSTRY ADVISORY BOARD

INDUSTRY MEMBERS:

Leandro Barajas
Dynetics

Ben Denton
Deloitte

Mitch Duke
U.S. Army Corps of Engineers

Michael Hale
Trideum Corporation

Dan Joffe
ADTRAN

Donna Joyce
U.S. Army DEVCOM

Matt Osborne
Raytheon Codex

Terry D. Rolin
NASA

Brian Smith
U.S. Army DEVCOM

UAH MEMBERS:

Mr. Ron Bowman
Dr. David Coe
Mr. Dennis Hite

UAH's Department of Electrical and Computer Engineering offers a full range of accredited degree programs through the Ph.D. level, in addition to separate interdisciplinary master's degrees in software engineering and cybersecurity. Our programs are designed to not simply train students to be users of current technology, but also to educate them so that they actually understand how this technology works. As a result, our graduates can be found throughout the world, actively impacting the industry, governments, and academia.

For more information about our department or to learn more about our degree programs, please visit
www.uah.edu/eng/departments/ece

DEGREES OFFERED:

Bachelor of Science in Computer Engineering (BSCPE)

Bachelor of Science in Electrical Engineering (BSEE)

Bachelor of Science in Cybersecurity Engineering (BSCBSY)

Master of Science in Computer Engineering (MSCPE)

Master of Science in Cybersecurity Engineering (MSCBSE)
(jointly with Computer Science & the College of Business)

Master of Science in Software Engineering (MSSE)
(jointly with Computer Science)

Master of Science in Electrical Engineering (MSEE)

Doctor of Philosophy in Computer Engineering
(jointly with UAB)

Doctor of Philosophy in Electrical Engineering

Donate to the ECE Department

CCRE Director and Research Engineer Honored with Awards at 2022 National Cyber Summit

The University of Alabama in Huntsville (UAH) announced that the Director of the UAH Center for Cybersecurity Research and Education (CCRE), Dr. Tommy Morris, was recognized with an award at this year's National Cyber Summit. In addition, CCRE Research Engineer Steven Forney was honored as well. Dr. Morris received the 2022 Cybersecurity Education Achievement Award, while Forney (UAH), walked away with the 2022 Joe Popinski Cyber Excellence Award.

Dr. Morris was singled out for demonstrating major contributions to the local, state and national cybersecurity community. The CCRE Director founded the Center for Cybersecurity Research and Education at UAH, a part of The University of Alabama System. The UAH CCRE is one of the largest academic cybersecurity centers in the U.S.

"This is a very fitting and well-deserved recognition of Dr. Morris' accomplishments in the cybersecurity field," says UAH Vice President for Research and Economic Development and Professor, Dr. Robert Lindquist.

"I am honored that my contributions to UAH and to the Huntsville community have been recognized," Dr. Morris says. "Of course, I work with a great team and we have done these things together. The best part of my job is helping students launch their careers. I get great satisfaction when I meet a graduate a few years later and hear how well things are going for them."

Forney was lauded for his work in bringing cybersecurity research and education to the Deaf community, mentoring students and supporting various federal and state cybersecurity initiatives in research and education.

"Steven is a dedicated researcher who has earned this recognition," says CCRE Assistant Director Jesse Hairston. "He has shown exemplary service, providing cybersecurity content and outreach to Deaf and hard-of-hearing students across the nation."

"Being able to communicate with my CCRE team in American Sign Language (ASL) is what I enjoy the most about my job," Forney notes. "It was an honor and privilege to receive this award, it could not have been done without excellent support from my CCRE team."

The National Cyber Summit (NCS) is the nation's premier cyber security-technology event, offering educational, collaborative and workforce development opportunities for industry visionaries and rising leaders. The NCS brings together senior attendees from commercial and defense companies from around the country, and the 2022 event was held last month in Huntsville, AL.

▶ (L-R) UAH Vice President for Research and Economic Development and Professor, Dr. Robert Lindquist; Director of UAH Center for Cybersecurity Research and Education, Dr. Tommy Morris; UAH President, Dr. Charles L. Karr.

▶ CCRE Research Engineer, Steven Forney.

Research to Improve Solid State Drives Earns UAH's Dr. Ray a $650,000 NSF Career Award

New research to make future computer solid state drives (SSDs) more resilient, durable and energy-efficient has attracted a five-year, $650,000 National Science Foundation Faculty Early Career Development Program (CAREER) award for Dr. Biswajit Ray of The University of Alabama in Huntsville (UAH), as well as the interest of two manufacturers.

Dr. Ray, an assistant professor in the Department of Electrical and Computer Engineering, is the director of the Hardware Reliability and Security Laboratory at UAH, a part of the University of Alabama System. Three doctoral students – Matchima Buddhanoy, Md Raquibuzzaman and Umeshwarnath Surendranathan – are working on related topics in the lab and the award provides support for two graduate research assistants.

"My work will allow system designers to create new memory management functions that go beyond the algorithmic techniques and assess the memory health in real-time to optimize its reliability and performance," says Dr. Ray.

"I have a partnership with Western Digital and Infineon Technologies," he says. "They are very much excited on the outcome of the project. They will provide technical mentorship and related resources for the success of the project."

The research aims to develop new software-based storage management techniques that can double the lifetime of SSDs. Currently, system designers rely largely on algorithmic functions to manage the data integrity and reliability of storage media.

"It is quite challenging to measure physical properties of memory bits using digital-only interfaces of commercial-off-the-shelf memory chips, but we will develop novel testing methods to probe the physical properties of memory bits using standard user mode commands," Dr. Ray says.

"We will also formulate new system functions for system integrators to more efficiently utilize the physical properties of memory bits and create new functions for enhancing the security and reliability of future storage solutions," he says.

The project is expected to enable near-term disruptive data-intensive applications for artificial intelligence and enable predictive analytics using low-end computing platforms operating in extreme environments, such as nuclear environments and space, where flash drives are attractive due to their light weight, high density and small size.

"One of the challenges with space and the nuclear environment is the radiation effects that corrupt stored information," Dr. Ray says. "The project will enhance the radiation tolerance of the flash base storage solution through intelligent error management techniques that can be implemented through a firmware solution."

Flash memories as the main building blocks of SSDs are rapidly evolving, Dr. Ray says.

> Dr. Biswajit Ray's research is in partnership with Western Digital and Infineon Technologies.

"I find recent technological developments very exciting," he says. "Manufacturers are releasing chips that can hold over 1.33 terrabits of information, and these chips are three-dimensional structures with storage cells placed in multiple layers."

The quest for larger capacity and faster non-volatile memories needs to include research about energy-efficiency, security and the privacy of the information stored, Dr. Ray says.

"The project addresses these issues through intelligent memory management techniques which can be implemented through software-based solutions in the storage firmware," he says. "We will evaluate these techniques on state-of-the-art-flash memory chips."

UAH CCRE Chosen to Receive FBI J. Edgar Hoover Memorial Scholarship

The University of Alabama in Huntsville (UAH), a part of The University of Alabama System, announced that the UAH Center for Cybersecurity Research and Education (CCRE) has been chosen to receive the FBI J. Edgar Hoover Memorial Scholarship.

The CCRE was selected by the Huntsville Chapter of the Society of Former Special Agents of the FBI to receive the J. Edgar Hoover Memorial Scholarship of $5,000. The scholarship check was presented at the annual conference Business Meeting on Oct. 15 at the Westin Resort in Huntsville.

"J. Edgar Hoover, long-time Director of the FBI, believed strongly in law enforcement education and worked throughout his career to promote such," says the President of the Society of Former Special Agents of the FBI, Inc., Dennis Lormel. "It is in his honor that this scholarship is named."

The scholarship was presented to eight UAH students and CCRE employees to support certification training, testing voucher and training books. The recipients included:

- ▶ Tiffany Dinh
- ▶ Isabelle Brown
- ▶ Timothy McCorry
- ▶ Aislinn Hamill
- ▶ Vincent Dinh
- ▶ Brianna Hawkins
- ▶ Anthony McGee
- ▶ Sydney Powell

UAH President, Dr. Charles L. Karr, and UAH Director for the Center for Cybersecurity Research and Education, Dr. Tommy Morris, were both in attendance, along with the scholarship honorees.

The Society of Former Special Agents of the FBI is a private 501(c)(7) nonprofit formed in 1937 as a fraternal, educational and community-minded organization composed of former FBI Special Agents. The organization boasts nearly 8,500 men and women members, organized in eight regions, with 120 chapters, offering a variety of services and benefits to its members.

▶ *UAH President Charles L. Karr celebrates with CCRE Director Tommy Morris and scholarship recipients.*

UAH Team's New Technique Protects Data on Solid-State Drives from Radiation

A new method of radiation-resistant computer data storage called watermark storage that's been developed by a University of Alabama in Huntsville (UAH) professor leading a student team has direct applications in the nuclear power and space industries.

"Data-driven analytics are growing exponentially for space and nuclear environments," says Dr. Biswajit Ray, an assistant professor of electrical and computer engineering at UAH, a part of the University of Alabama System.

He says the new storage system doesn't rely on an electronic charge for NAND flash storage, as traditional data drives do. NAND stands for the "not and" type of flash memory, which is in common use. Interestingly, the watermark storage method requires no new components.

"We adeptly use the breakdown mechanism of a transistor's oxide layer to imprint information on the same commercial off-the-shelf memory cells," Dr. Ray says. "This technique is more resistant to irradiation damage compared to the traditional charge-based technique."

He's been working with Kannan Grant, director of UAH's Office of Technology Commercialization, on a pending patent for the new technology.

Radiation tolerance is typically characterized as cumulative total dose, as expressed in units of rad(Si). So, how radiation tolerant is watermark data storage?

"We have tested the chips up to 100 krad(Si) and we find clear benefits using our method compared to the traditional charge based method," Dr. Ray says. Just one krad is 1,000 rads, a strong enough radiation dose to kill a person.

"Our method shows a linear response of the bit error rate with a total dose, whereas the traditional method shows an exponential rise," he says.

While much less data is lost in radioactive environments with the watermark technique, there is a downside. Data writing time is slower than traditional electronic storage, but Dr. Ray says that some of that downside can
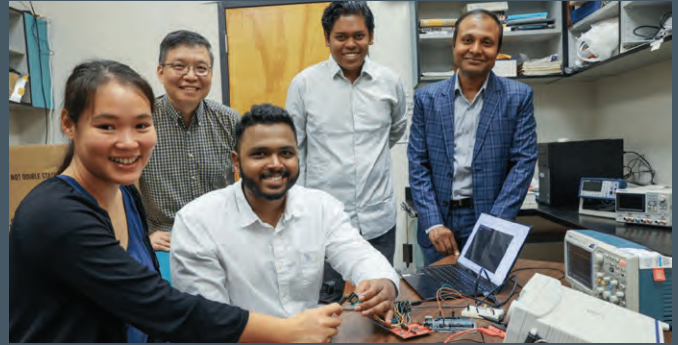
▶ *Dr. Biswajit Ray, right, with students (from left) Matchima Buddhanoy, Sijay Huang, Umeshwarnath Surendranathan and Mondol Anik Kumar in the Ray Research Group lab.*

be minimized if NAND chip manufacturers allow a few additional operations on their chips.

"Writing time for traditional NAND flash media is roughly a few milliseconds per 16kB page, whereas imprinting time in our proposal will be a few seconds," he says. "So, data writing time will increase by about 1,000 times. However, the proposed technique targets those applications where writing will be done only once and hence it will not be a significant bottleneck."

Dr. Ray's electrical and computer engineering student team members in the Ray Research Group, and the co-authors of the resulting research paper, are Matchima Buddhanoy, a doctoral student and the lead author; Sadman Sakib, a recent doctoral graduate now working at Intel; and Umeshwarnath Surendranathan, a doctoral student.

Collaborators and co-authors are Dr. Aleksandar Milenkovic, a UAH professor of electrical and computer engineering, and Dr. Maryla Wasiolek and Dr. Khalid Hattar, principal members of the technical staff at Sandia National Laboratories in Albuquerque, NM.

Sandia provided support with Cobalt-60 gamma irradiation sources and helped conduct the experiments. The collaboration was contractually supported in part by the U.S. Department of Energy's Office of Nuclear Energy through its Idaho Operations Office.

VioClean Product Wins UAH Student Team $8,000 First Prize in Boeing Competition

VioClean, a garment and towel sanitizer that uses a technology being patented by The University of Alabama in Huntsville (UAH) has won a student team first place and $8,000 in the recent Boeing New Business Challenge, an annual event hosted and facilitated by the College of Business.

"Our technology capitalizes on the germicidal properties of UV-C light to reduce bacteria to a level that does not cause foul odors in the towel or garment," says Memphis native Andrew Zelinka, a mechanical engineering senior at UAH, a part of the University of Alabama System.

"Once sanitized, our product also has the ability to warm whatever is inside and apply a fresh scent for an all-around pleasant user experience," he says. "Our sanitizer can be used for towels, everyday clothing, shoes, etc."

The team has developed a working prototype, and its test results show that UV-C light kills over 99.9% of bacteria in fabric after 20 minutes of exposure. Team members see a major market for VioClean in the current towel warmer market.

"Within that market, we intend to establish ourselves in the residential segment first and then branch into commercial applications like spas, barber shops, hotels, etc.," Zelinka says.

The UV-C technology was invented by Kailyn Grant while she was dual-enrolled at UAH in fall 2021; Dr. Aubrey Beal, an assistant professor of electrical and computer engineering; and Dr. Tanya Sysoeva, an assistant professor of biological science. Currently two patents are pending through UAH's Office of Technology Commercialization with the United States Patent and Trademark Office.

"We see the Boeing Challenge as a first step in raising investment dollars," Zelinka says. "The OTC is already talking to a couple of local companies and entrepreneurs who have shown an interest in commercializing this technology."

Team members are Zelinka; Ethan Punch, an electrical engineering senior from Thibodaux, LA and Layla Jeries, a biological sciences junior from Huntsville.

▶ *VioClean, a garment sanitizer, recently won the Boeing New Business Challenge. From left in the top row are technology developers Dr. Aubrey Beal, Dr. Tanya Sysoeva and Kailyn Grant. From left in the bottom row are competition team members Andrew Zelinka, Ethan Punch (with the product) and Layla Jeries.*

Girls in Science and Engineering Day Returns to UAH
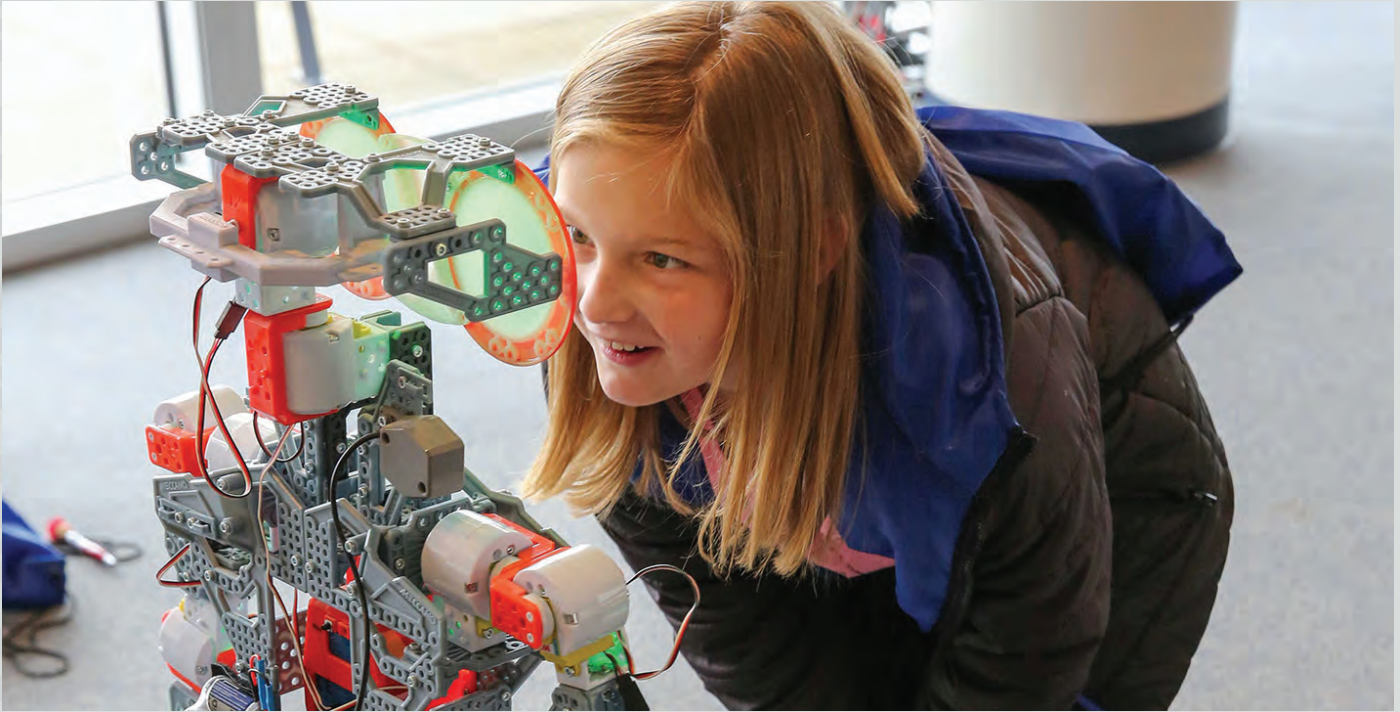
▶ *A participant in Girls in Science and Engineering Day at UAH examines the inner workings of a project featured as part of the robotics STEM workshop.*

Following a four-year absence, Girls in Science and Engineering Day returned on April 2, 2022, at The University of Alabama in Huntsville (UAH), a part of the University of Alabama System. This popular program brings together rising third through fifth grade girls from across North Alabama for science, math, engineering and technology activities.

UAH Interim President Chuck Karr welcomed the group and encouraged them to dream big and to work hard to achieve their goals. Two hundred registrants rotated through four different STEM workshops in groups of 11 to 14 girls. These workshops were organized and led by university faculty, local industry volunteers and UAH campus student groups.

Workshop topics featured the breadth of STEM fields and included propulsion and the principles of flight, robotics, extraction of DNA, making ice cream with liquid nitrogen,

using a wind tunnel to demonstrate flight, programming, cybersecurity and more.
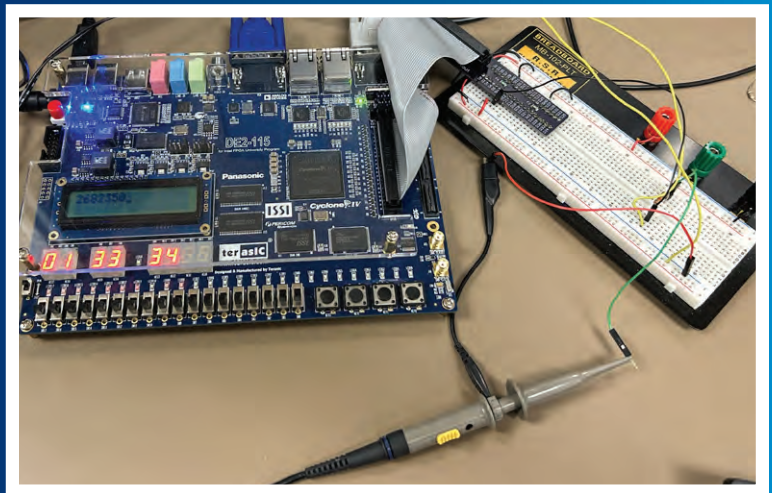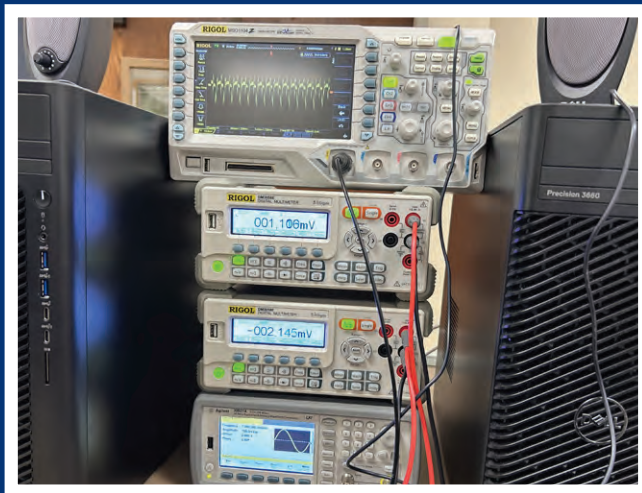
Lisa Bates, Senior Principal Engineer, Systems Engineering at Raytheon Technologies, spoke with the participants at snack time about her own journey in professional STEM. The girls took home bags of goodies donated by Lockheed Martin, Gray Analytics, Boeing, Talon Engineers, Aerojet Rocketdyne, Jacobs and Women in Defense.

The planning committee is already working on next year's events which will include a fall event for rising third and fourth grade students and a spring event for rising fifth and sixth graders.

This event was made possible by the financial support of Raytheon Technologies, Gray Analytics, Thompson Gray, Northrop Grumman and the Tennessee Valley chapter of Women in Defense.

LAB UPDATE

The Advanced Digital Logic Design Lab has been expanded and moved to ENG 228. New PCs have been installed featuring 12th Gen Intel i7-12700K processors, 32GB of RAM, 1TB NVMe SSDs, and dual 24" monitors. Additionally, new AV equipment has been installed in the lab featuring 8 ceiling speakers and a laser projector. This lab supports the courses CPE 324 Advanced Logic Design Lab and CPE 423/523 Hardware/Software Co-design using Altera terasIC DE2-115 development boards featuring Altera 60-nm Cyclone IV E FPGAs.

Interactive Light Show for Huntsville Botanical Garden
Team Members: Steven Byrd, Savanah Flaherty, Trey Thompson, Tristan McCarver
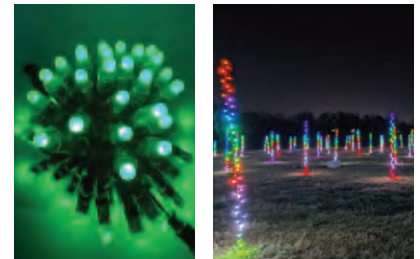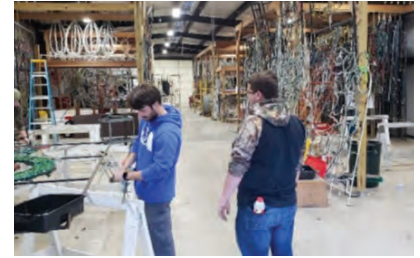**Faculty Advisor:** Mr. Dennis Hite
Sponsors: Huntsville Botanical Garden

This team, the Chargin RGB's, created an Interactive Light Show for the Huntsville Botanical Garden. Key design requirements of the light show that the team addressed included:

- Lights should be controlled through PIR motion sensors,
- Lights should interact with large crowds,
- A system should be movable and replicable, and
- A system should engage guests as they control the lights.

This light show experience features 100 light poles and 8 passive infrared motion sensors. When a visitor walks past one of the 8 sensors, the sensor activates a light show unique to that sensor. Walking past each of the 8 sensors, a new light show theme displays on the poles, creating a magical light show experience.

Chaos in Motion
Team Members: Kayla Cochran, Matthew DeSanctis, Brett Kilgore, Cory Long
Faculty Advisor: Mr. Dennis Hite

This project's goal is to produce a chaotic pendulum. The problem being addressed is that chaotic behavior can only be demonstrated effectively through means of mathematical modeling or circuitry. A chaotic pendulum increases its momentum with each oscillation, rather than reducing it. It is also an electrical and mechanical device whose movement is unpredictable. A physical chaotic device is capable of synchronizing to similar physical chaotic devices. This synchronization is very valuable for research into communication theory. In addition, the existence of an electromechanical device with chaotic behavior allows for an explanation of chaotic behavior without requiring a very high level of prior knowledge. Chaotic systems are deterministic, but are so sensitive to initial conditions that prediction is often outright impossible.

The team designed and built a pendulum attached to an electric motor and an analog rotary encoder to collect the pendulum data. The motor was driven by a chaotic oscillator that consisted of a negative resistance behavioral op-amp and accompanying circuitry. The negative resistance op amps changed the direction of the motor based on the data from the signum function to create their chaotic pendulum.

Automated Chlorine Dispenser for Sabana Larga, Nicaragua
Team Members: Nicole Barnes, Noah Girkin, Mary Stewart, Audrey Simms
Faculty Advisor: Mr. Dennis Hite
Sponsors: Engineers Without Borders

Sabana Larga faces a critical issue of access to potable water for all of its community members. This issue occurred following a severe tropical storm to the village; leaving the community with a broken water distribution system and insufficient supply of water. The community of Sabana Larga has asked EWB (Engineers Without Borders) to design and implement a new water system. This incorporates source development, water distribution, water storage, and water treatment. During the assessment trip to select a new water source, the testing revealed E. coli in the new source.

The ECE team designed and built an Automated Chlorine Dispenser (ACD). The ACD includes sensors for monitoring the water quality, a control panel that communicates key information to the users, and a modulating ball valve to dose the correct amount of chlorine needed to treat the water.

Radars for Inspiring Science and Engineering (R.I.S.E.)
Team Members: Makenzie Fogle, Demarco Burgess, Rachael Stewart, Jennifer Zheng
Faculty Advisor: Mr. Dennis Hite

This team's project was to develop a pulsed radar system. The handheld, affordable, engaging, and user-friendly radar system is designed to be used in the rolling STEM lab to motivate high school students in exploring careers in Electrical Engineering.

Key design considerations were how to design a radar system capable of detecting targets within a 1-meter radius that will fit within a 2 foot by 2-foot area. To address this challenge, the team configured a system which included a Adalm Pluto Software Defined Radio.

Hite's Informational Technological Experience (H.I.T.E.)
Team Members: Derek Bunn, Desi Burrows, Jessie Davidson, Bobby Kallush, Ronald Seagrave
Faculty Advisors: Mr. Dennis Hite

Electrical Engineering enrollment has been on the decline, resulting in an increased need for electrical engineers in the workforce. By informing high school students about what Electrical Engineering is really like while also offering them a fun interactive experience with the trivia game, the goal is that more students will be inclined to choose Electrical Engineering as their major. This is accomplished by providing informative questions related to Electrical Engineering to students who play the game, while also interacting and engaging with the students through humorous questions, animated characters and scenes, and popular sounds and songs.

Some of the main design features included that the games had to be easily transportable, should use 3D interactive content, and provide a diverse range of questions with information and topics regarding Electrical Engineering. 3D characters and custom-made sounds were also included in H.I.T.E.
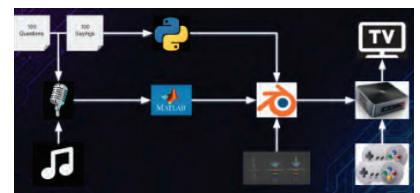
DOCTOR OF PHILOSOPHY (PH.D.) GRADUATES

SAI SUSHEEL PRANEETH KODE, Electrical Engineering
Dissertation: Development of Aerospace Sliding Mode Control Toolbox: Relative Degree Approach with Resource Prospector Lander and Launch Vehicle Case Studies
Advisor: Dr. Yuri Shtessel

RAJESH RAYALA JAYASHEELAREDDY, Electrical Engineering
Dissertation: Accuracy Improvement of Dynamic Sensors Measured Input Reconstruction Using Sliding Mode Observers
Advisor: Dr. Yuri Shtessel

SIDDHARTH SANKAR DAS, Electrical Engineering
Dissertation: Analysis of Stability Margins in a Class of Nonlinear Systems
Advisor: Dr. Yuri Shtessel

TANZEELA MITHA, Electrical Engineering
Dissertation: Adaptive Element Spacing Synthesis Technique in Phased Array Antennas
Advisor: Dr. Maria Pour

JOSHUA ROBBINS, Electrical Engineering
Dissertation: Discovery of Counter IADS Swarming Autonomy Behaviors with Machine Learning
Advisor: Dr. Laurie Joiner

MASTER'S GRADUATES

MATTHEW ADAMS, Electrical Engineering
Thesis: Excitation of the Dominant Transverse Electric Mode of a Microstrip Patch Antenna Using a Coplanar L-Strip Feeding Technique
Advisor: Dr. Maria Pour

IAN SMALL, Electrical Engineering
Thesis: Additively Manufactured Low Power Wireless Sensors for Environmental and Respiration Monitoring in Space Applications
Advisor: Dr. Emil Jovanov

WILLIAM WATSON, Electrical Engineering
Thesis: Future-Proofing the MIT Coffee Can Radar
Advisor: Dr. Audrey Beal

JOHN CHAMPAGNE, Electrical Engineering
DONALD CORBETT IV, Electrical Engineering
GALVIN GREENE, Electrical Engineering
KENDRA HALL, Electrical Engineering
EMILY KARRH, Electrical Engineering
PATRICK LEE, Computer Software Engineering
JULIA LISAC, Computer Engineering
JESSICA LOBRANO, Computer Engineering
DOUGLAS MARR, Computer Engineering
SARA MEADOWS, Electrical Engineering
JONATHAN OSTROSKY, Electrical Engineering
MATTHEW OSTROSKY, Electrical Engineering
JASON PARKER, Cybersecurity Engineering
JACOB REEVES, Computer Engineering
ANDREW RICHARDSON, Cybersecurity Engineering
ROBERT ROTH, Computer Engineering
MAXIMILIAN SCHALK, Computer Software Engineering
CHRISTIAN SCHENCK, Computer Engineering
JOHN SIMMONS, Cybersecurity Engineering
JAMES SMALLWOOD, Electrical Engineering
NICHOLAS STRONG, Computer Engineering
MATT SZELISTOWSKI, Electrical Engineering
CHRISTOPHER TAYLOR, Computer Software Engineering

2022
COLLEGE OF ENGINEERING
OUTSTANDING FACULTY MEMBER

Dr. Biswajit Ray
PROFESSOR

SERVICE & FACULTY AWARDS

These awards are in recognition of faculty who go beyond the ordinary requirements of their jobs.
THANK YOU FOR MAKING A DIFFERENCE FOR OUR STUDENTS AND DEPARTMENT!

SERVICE AWARDS

James D. Foreman
LEAD COMPUTER SYSTEMS ENGINEER
20 Years of Service

Aleksandar Milenkovic
PROFESSOR
20 Years of Service

Seyong-Moo Yoo
PROFESSOR
20 Years of Service

COLLEGE OF ENGINEERING 2022 NATIONAL ENGINEER'S WEEK, OUTSTANDING STUDENT AWARDS

CALEB WONG, Computer Engineering
CADEN YARBROUGH, Cybersecurity Engineering
MARIAH FLINT, Electrical Engineering

2022 HONORS DAY OUTSTANDING ECE STUDENT AWARDS

NATALIE TAGGART, Computer Engineering
ANNA BRUTON, Cybersecurity
MICAH TSENG, Electrical Engineering

STUDENT AWARDS

These awards are in recognition of students who go beyond the ordinary requirements.
THANK YOU FOR MAKING A DIFFERENCE!

SCHOLARSHIP FOR SERVICE AWARDS

Timothy Alhorn
Julien Chalkley
Holden Goff
Tatiana Kontoulakos
Timothy McCorry

Neil Ollenburger
Andrew Pender
Nathaniel Pendergrast
Jacob Roper
Dawson Smith

DEFENSE CYBER SCHOLARSHIP AWARDS

Victoria Kennedy
Thomas Morrow
Serra Nolan

Jacob Padgett
Kincaid Wedgeworth

STUDENT SCHOLARSHIP AWARDS

Mary Makima and Lester M. Ross, Sr. Scholarship in Engineering
M D RAQUIBUZZAMAN, Electrical Engineering

DoD SMART Scholarship Award
JEREMIAH DRISCOLL, Cybersecurity Engineering

NEW ECE FACULTY & STAFF
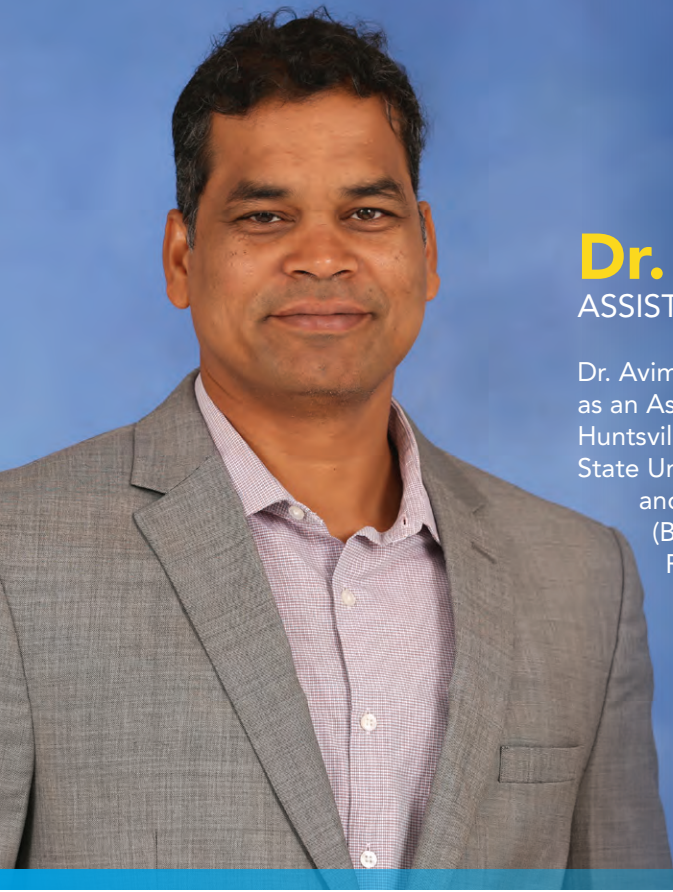
Dr. Avimanyu Sahoo
ASSISTANT PROFESSOR

Dr. Avimanyu Sahoo joins the Electrical and Computer Engineering Department as an Assistant Professor. Prior to joining the University of Alabama in Huntsville, Dr. Sahoo was an Associate Professor (mechatronics) at Oklahoma State University, Stillwater, OK. He received a Masters of Technology (MTech) and Ph.D. in Electrical Engineering from the Indian Institute of Technology (BHU), Varanasi, Ind and Missouri University of Science and Technology Rolla, MO, U.S.A., in 2015.

Dr. Sahoo's research interest includes learning-based control and its applications in cyber-physical systems, electric machinery health monitoring, lithium-ion battery pack modeling, diagnostics, and prognostics. Currently, his research focuses on developing computation and communication efficient distributed intelligent control schemes for cyber-physical systems using approximate dynamic programming.

WE WELCOME
OUR NEWEST CHARGERS!

Mr. James Williamson
LECTURER

Mr. James Williamson joins the Electrical and Computer Engineering Department as a Lecturer. Mr. James Williamson has been teaching at University of Alabama in Huntsville since he was a graduate teaching assistant in the Department of Computer Science. He received a B.S. in Math and Computer Science in 2017 and a Master of Science in Cybersecurity in 2018. Prior to joining UAH as a lecturer, he worked as a Software Analyst for Intergraph PP&M (now Hexagon) and as a Cyber Analyst for Davidson Inc. He was also a radio operator in the U.S. Army once upon a time.

Ms. Mary Nutial
SENIOR STAFF ASSISTANT

Mary Nutial joins the ECE Department as a Senior Staff Assistant. She supports faculty and staff by managing the finances and procurement for the department, along with many other related duties.

Having an industrial engineering background, Mary feels right at home working with the ECE Department. Given her many years of experience working within industry supporting manufacturing, operations, and product development, Mary has become a real asset to the team.

THANK YOU AND CONGRATULATIONS TO
OUR NEWEST RETIREE!

Dr. Seong-Moo Yoo
PROFESSOR

Dr. Yoo has had a distinguished 26 years of service in academia. He joined UAH in 2001 and has published over 100 journal articles and conference proceedings papers in the areas of mobile ad hoc network routing and security, malware detection and analysis, cryptography, and parallel computer architecture. While at UAH, he advised twelve doctorate and nine master's (thesis option) students. He was a U.S. Fulbright Scholar to Kyrgyzstan in 2015-2016. He was a Summer Research Faculty from the Oak Ridge National Lab in 2005, and was a Fulbright Scholar to Kazakhstan in 2008-2009. Dr. Yoo is also a lifetime member of IEEE and a member of ACM.

UAH Breaks Ground on New 80,000-square-foot Raymond B. Jones Engineering Building

A groundbreaking ceremony was held on April 14, 2023 for a new 80,000 square foot engineering building. The facility, will provide cutting-edge resources to support the largest college at UAH, comprised of more than 2,850 students, as well as 90 faculty and staff.

The building will be named the Jones Engineering Building after Raymond B. Jones, past chairman of the UAH Foundation. Raymond B. Jones was president of G.W. Jones and as CEO oversaw numerous engineering design and municipal projects in Huntsville before his passing in July 2022. He received an honorary doctorate from UAH in recognition of his tireless support of the university.

Huntsville and North Alabama comprise both the fastest-growing region of the state and a high-tech hub with a continual need for a highly educated STEM labor force. The new Jones Engineering Building will feature modernized, world-class research and collaborative teaching facilities that will ensure UAH continues to meet the state's workforce needs.

▶ Conceptual view of the UAH College of Engineering Building. Renderings are conceptual and subject to change. All projects are subject to the approval of the University of Alabama System Board of Trustees.

▶ Raymond B. Jones, civic leader and past chairman of the UAH Foundation.

Courtesy Raymond B. Jones family

▶ University of Alabama System Board of Trustees, UAH Foundation, Representatives of local and state governments, members of the military, members of the family of Raymond B. Jones, community leaders and UAH faculty, staff and students break ground for the new Raymond B. Jones Engineering Building.

New Maker's Space Coming to ECE Department in Summer 2023

The ECE department is creating a new maker's space to allow students to further explore the discipline of engineering and develop their talents. The new space will feature 2 MakerBot Sketch 3D printers, a full soldering and rework station, a test station with standard test equipment as well as data acquisition capabilities, a Windows development station, and a MacOS/iOS development station to allow students to develop for as many platforms as possible. There will be Raspberry Pis, Arduinos, FPGA Evaluation Boards, and many other platforms to allow students to experiment. All software available in the ECE labs will also be available in the space. The space will be available for students to use starting in Summer 2023.
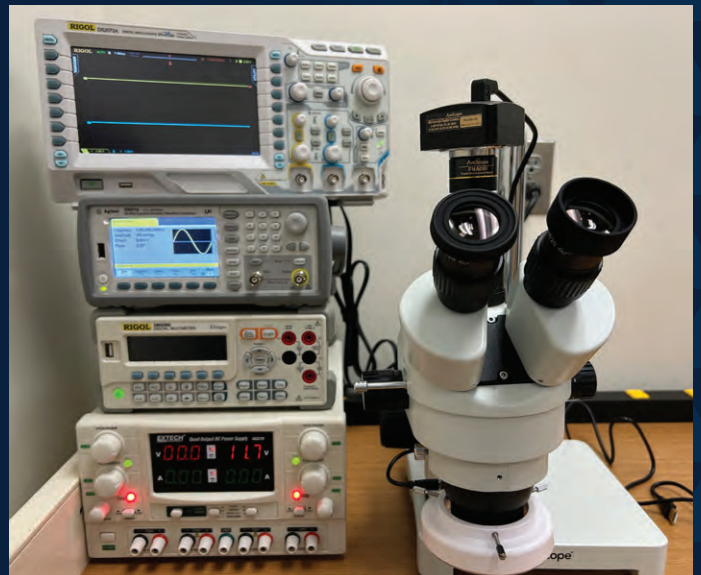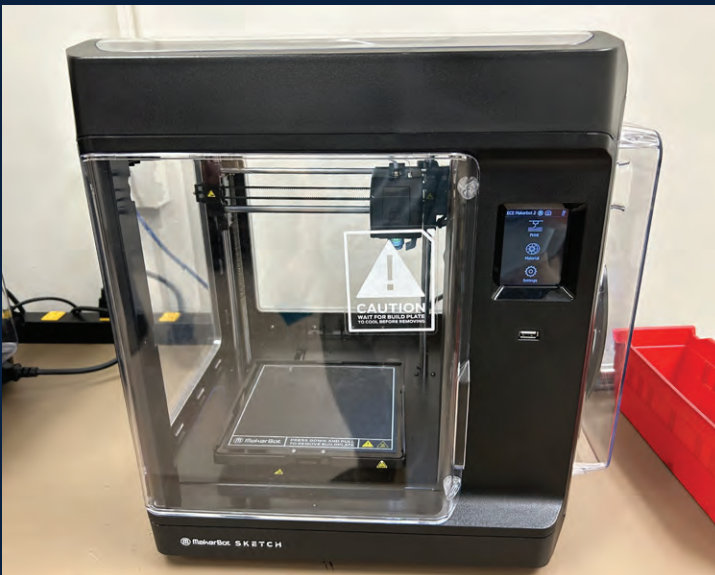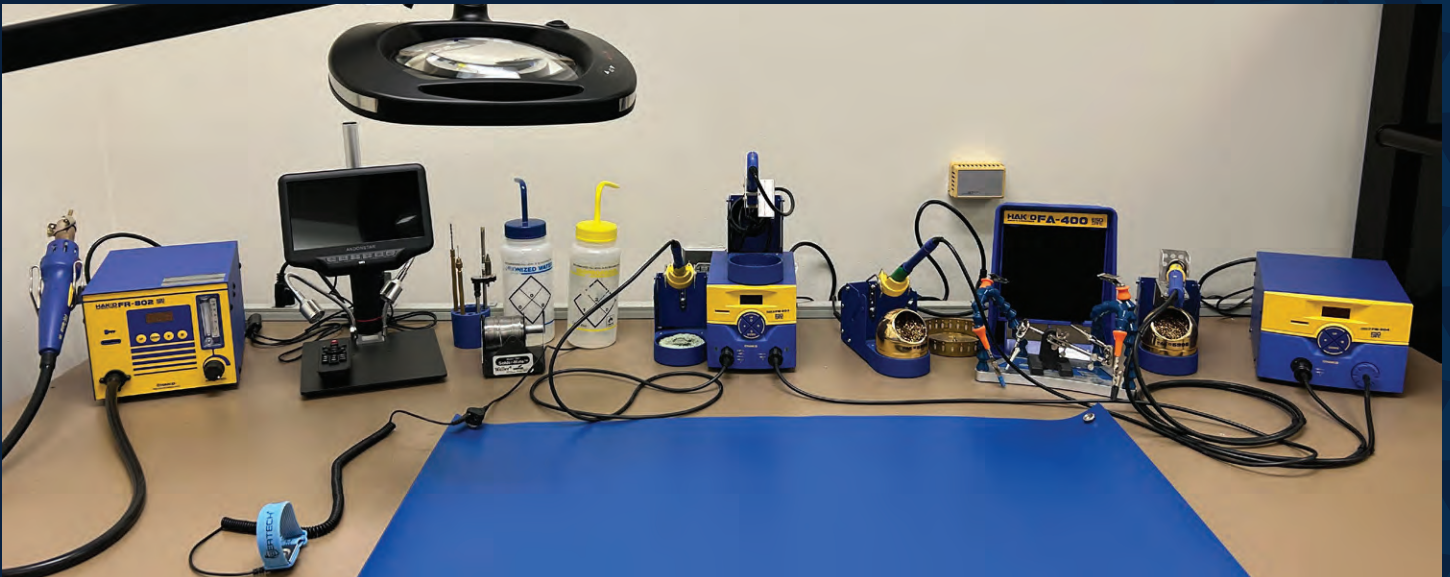
Institute for Electrical and Electronics Engineers

2022 IEEEE SoutheastCon Attendees – Mobile, AL

▶ *Lily Compher, Isaiah Mason, Karrington Bettis, Fernando Guerrero, Landan Rainey, Blake Kelly*

UAH Electric Vehicle Club

The UAH Electric Vehicle Club is a project-oriented engineering design club dedicated to exploring the possibilities of electric vehicles. They work on projects ranging from outreach to full vehicle conversions. Inquire at **uahev@uah.edu**.

2023 Eta Kappa Nu Inductees

Eli Brothers
Derek Bunn
Mary Claire Corell
Aiden St. Hilaire
Ethan Hoben
Seth Schmidt
Jonathan Vandine
Hugh Vessels

COLLEGE OF ENGINEERING
301 Sparkman Drive
Engineering Building, Room 102
Huntsville, AL 35899

PART OF THE **University of Alabama System**