

WINTER 2024

UAH Magazine

A PUBLICATION OF THE UNIVERSITY OF ALABAMA IN HUNTSVILLE



Celebrating
The University of Alabama in Huntsville
**55 YEARS OF
EXCELLENCE**

ACADEMICS

NURSING STUDENTS PRACTICE REAL-LIFE
DISASTERS WITH HELP FROM DRONES

RESEARCH

RESEARCHERS MAKE SIMPLER, LESS COSTLY
NANOGENERATOR WITH LIMESTONE PUTTY

CAMPUS

NUTRITION, WELLNESS PLAN AIMS TO
STRENGTHEN, SUPPORT STUDENT-ATHLETES

CHARGER PREVIEW

Check out the UAH experience at **CHARGER PREVIEW** on February 24 or June 8!

High school juniors and sophomores and their families can:

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- ▶ Learn valuable information about the admissions process.
- ▶ Take a student-led campus tour and visit our suite-style residence halls.
- ▶ Attend an academic browsing fair.
- ▶ Enjoy a complimentary meal with UAH students.

Registration is required. The deadline to sign up for the February 24 session is Wednesday, February 21.

The next Charger Preview is set for Saturday, June 8. Registration information will be coming soon.

INDIVIDUAL CAMPUS TOURS

Individual campus tours can be scheduled on most weekdays at 9 and 10 a.m. and 1 p.m. at uah.edu/visit. Email visit@uah.edu for details.

VIRTUAL CAMPUS TOURS

You can also experience UAH through our virtual campus tour at uah.edu/admissions/virtual-visits.

SOCIAL MEDIA

Engage and connect with us daily by following our Admissions Office on social media:



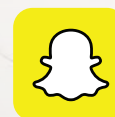
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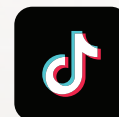
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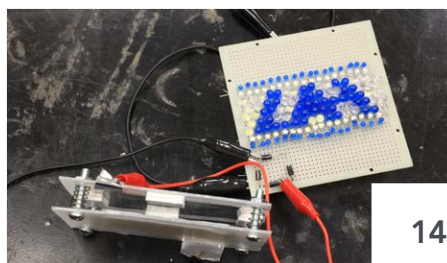
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UAH turns 55

Join us as we highlight the people, achievements and milestones of our history since we became an autonomous university



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UAH Magazine

UAH Magazine brings together our academic accomplishments, innovative research projects, extracurricular organizations and alumni into one engaging source for all things UAH.

If you would like to receive a hard copy of this issue of UAH Magazine or be added to our mailing list to receive future issues, please contact omc@uah.edu.

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VICE PRESIDENT FOR STRATEGIC COMMUNICATIONS

Kristina Hendrix

CONTENT COMMUNICATIONS AND OPERATIONS

Elizabeth Gibisch, Ann Marie Martin, Russell Nelson, Takara Bullock

CREATIVE SERVICES

Pedro Rodriguez, Shalanda Edwards-White, Isabel Castañeda, Rylie Livingston, Michael Mercier

DIGITAL COMMUNICATIONS

Andrea Thompson, Jody Precise, David Heenan, Todd Page

ADMINISTRATIVE ASSISTANT

Donna Hancock



UAH turns 55: Celebrate The University of Alabama in Huntsville's past, present and future in 2024

The University of Alabama in Huntsville (UAH) officially became an autonomous university within The University of Alabama System on June 16, 1969 – 55 years ago in 2024. Throughout this year, UAH will highlight historic milestones and achievements as well as celebrate the many people who have contributed to its success as it plans for further growth.

UAH originated as the University of Alabama Huntsville Center, which held its first classes on Jan. 6, 1950, with 137 students in the building that later became Stone Middle School. The center offered 10 freshman-level courses. Morton Hall, the first building on today's campus, was completed in 1960.

Today, UAH is a Carnegie R1 top-tier research university with eight colleges, more than 100 areas of study and 17 high-tech research centers. The university achieved a record \$169.5

million in research and development expenditures in fiscal year 2022, and it has a \$615 million annual impact on the state.

UAH is home to a diverse student body of 8,743, hailing from 49 states and 59 countries of origin. These students are serious about their studies: Entering freshmen have an average ACT of 26.7 and an average GPA of 3.92.

Famous alumni include Discovery Channel founder John Hendricks (B.A., history, 1974), astronaut Jan Davis (M.S., mechanical engineering, 1983; Ph.D., mechanical engineering, 1985), HudsonAlpha Institute for Biotechnology cofounder Jim Hudson (M.S., biology, 1987), professional basketball player Josh Magette (B.S., finance, 2000) and "Smarter Every Day" YouTube video producer Destin Sandlin (M.S., aerospace engineering, 2011).



UAH is committed to higher learning and being a community partner for years to come.

– Dr. Charles Karr

MEET OUR LEADERS

UAH has had 10 presidents since the first was appointed in 1970. Each one has moved the university forward in his own unique way.

- Dr. Benjamin Graves – March 16, 1970-Aug. 31, 1978
- Dr. John C. Wright – Sept. 1, 1978-Aug. 31, 1988
- Dr. Louis Padulo – Sept. 1, 1988-Aug. 22, 1990
- Joseph C. Moquin (interim) – Sept. 14, 1990-July 14, 1991
- Dr. Frank Franz – July 15, 1991-June 30, 2007
- Dr. David B. Williams – July 1, 2007-March 31, 2011
- Dr. Malcolm Portera (interim) – April 1, 2011-Oct. 30, 2011
- Dr. Robert A. Altenkirch – Sept. 21, 2011-June 21, 2019
- Dr. Darren Dawson – June 21, 2019-Nov. 30, 2021

Dr. Charles L. Karr is UAH's tenth president. He joined the university on Dec. 1, 2021.

"UAH has made a remarkable impact on our students and the wider community for the past 55 years," Karr says. "Young people choose our university because they want to be educated by the brightest faculty members. Government and community members engage with UAH as they know there are opportunities available through intensive research and collaborative learning. UAH is committed to higher learning and being a community partner for years to come."

GET INVOLVED IN 2024

UAH invites the public to join the year-long 55th-anniversary celebration, especially for the university's signature events, including ChargerCON in the spring and Homecoming/Family Weekend/Alumni Weekend and Charger Tipoff in the fall.

UAH's biggest celebrations always happen when its students receive their degrees. In June 1970, UAH held its first commencement ceremonies in Huntsville for a graduating class of 130. Today, the commencement exercises average 1,200 conferred degrees during the spring and the fall ceremonies.

2024's first commencement ceremonies on May 6 will feature new blue robes and a new mace to mark the anniversary year.

To honor the 55 years in the community, UAH will embark on a fundraising campaign to support the Last-Mile Fund. Established in 2019, this program aims to prevent financial barriers to graduation by providing assistance to upper-level, degree-seeking, undergraduate students who have completed at least 90 credit hours toward their undergraduate degree and whose financial status reflects the greatest need.

UAH offers a university-wide Last-Mile Fund and one specifically for each college. Students work with their college advisors to apply for support. As of Dec. 31, 2023, more than \$445,000 has been raised; 109 scholarships have been awarded; 85 students have graduated, and 21 are currently enrolled with plans to graduate soon.

Find more details at uah.edu/giving/last-mile-fund. ■

UNIVERSITY ANNOUNCEMENTS



Dr. Virginia "Suzy" Young, director of the Research Institute at UAH, was elected to the 2023 Hall of Fame under the Order of Prometheus by the Association for Unmanned Vehicle Systems International (AUVSI) Pathfinder Chapter. Established in 2022, the Hall of Fame recognizes outstanding achievements in the field of uncrewed systems, in addition to advancing community goals within this field. Selection criteria include being an active AUVSI member who has demonstrated "sustained excellence in continuing to foster the education and application of advancements like Autonomy and Artificial Intelligence in the uncrewed mission areas," as well as providing continuing support to the AUVSI Pathfinder mission.



The UAH Distinguished Lecture Series began 2024 with an evening featuring Dr. Ron S. Ross, a fellow at the National Institute of Standards and Technology (NIST), on Jan. 23 at the UAH Student Services Building. Ross's focus areas include computer security, systems security engineering, trustworthy systems, and security risk management. He currently leads the NIST Systems Security Engineering Project, which includes the development of standards and guidelines for the federal government, contractors and U.S. critical infrastructure. He also supports the U.S. State Department in the international outreach program for cybersecurity and critical infrastructure protection. Ross previously served as the task leader for the Joint Task Force, an interagency group that includes the Department of Defense and the Office of the Director of National Intelligence, with responsibility for developing a unified information security framework for the federal government.



The National Centers of Academic Excellence in Cybersecurity has re-designated UAH as a Center of Academic Excellence in Cyber Research (CAE-R). This follows a comprehensive review of cybersecurity-related research activities and outcomes from the students, faculty and research staff involved in computer science and computer engineering doctoral programs and in the UAH Center for Cybersecurity Research and Education (CCRE). The re-designation is approved through academic year 2028. "The CAE-R designation tells employers that our students, faculty and staff are conducting research at the cutting edge of cybersecurity," says Dr. Tommy Morris, director of CCRE. "The designation also tells government agencies that they can come to us for help solving hard cybersecurity problems." UAH is among 79 schools in the U.S. to hold the CAE-R designation as well as one of 48 schools nationally that also hold the Center of Academic Excellence in Cyber Defense designation.

A message from UAH President Charles L. Karr

Celebrating the achievements of our students, faculty and staff is one of the best parts about being president of The University of Alabama in Huntsville.

2024 is an especially exciting time for all of us here at UAH. This is our 55th anniversary as an autonomous university within the University of Alabama System. Our official birthday is June 16, 1969. Not only are we advancing new programs, initiatives and technologies as we do every year, but we are also reflecting on past accomplishments and the people who helped make them happen.

I have the privilege of serving as the 10th president of UAH. The first was Dr. Ben Graves, who held the post from 1970 to 1978. Dr. John Wright followed him from 1978 to 1988. Today, two of the main roads through our campus are named in their memory.

Two other UAH landmarks recall the contributions of past presidents: The residence hall that houses the Honors College is named after Dr. Frank Franz (1991-2007), the fifth and longest-serving UAH president. The central campus greenway honors the eighth president, Dr. Robert A. Altenkirch (2011-2019).

UAH's alumni have been a vital component of our long-term success, and we will highlight several of them during 2024. Many alumni feel like family; some alumni are family.

The late Reva Johnson Bailey was one such alumna. She joined the UAH staff while it was still the University of Alabama Huntsville Center. She worked with our graduate and undergraduate students, especially our international students, while earning her own bachelor's and master's degrees. She was UAH's longest-serving employee when she retired as the UAH registrar in 2000.

When one member of a family chooses UAH, it's not unusual for more to follow, but the Patterson family from Tennessee has embraced UAH like few others. After Albert Patterson received two degrees from UAH, four of his siblings and two of their spouses did likewise for 10 degrees in all.

We want to encourage more Tennessee residents to make UAH their university home away from home. That's why we offer the Tennessee Resident Scholarship Program, open to all Tennessee residents who meet the requirements for a merit or athletic scholarship.

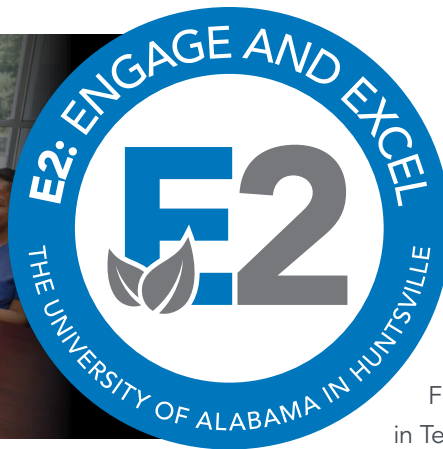
Speaking of Tennessee residents, alumni Amy and Matthew Willson came to the UAH College of Business from separate towns in Tennessee. They met, fell in love and got married. They have so much affection for their alma mater that they donated \$30,000 to the college for an endowed scholarship to help other Tennessee students receive a quality education.

UAH continues to explore ways to prepare our students to fill the employment needs in our community. Two important new degree programs – engineering technology in the College of Science and child, family and community development in the College of Education – do just that. In 2023, we awarded Bachelor of Science degrees to the first graduates from both programs.

We invite our neighbors near and far to join our year-long celebration of the UAH experience, past and present. Come to our lectures, concerts, plays, science and technology fairs, sporting events and more during 2024. And watch us as we work to create an even brighter future for the next 55 years.

Go Chargers! ■

Charles L. Karr



UAH COLLEGE OF NURSING'S E2: ENGAGE & EXCEL BOOSTS LITERACY SKILLS AND MORE TO RETAIN STUDENTS

Nursing programs prepare students to enter a profession where a mistake, such as a misunderstood word, could mean life or death. To ensure its students have the literacy, coping and other skills to thrive in this challenging learning environment, the UAH College of Nursing created E2: Engage & Excel.

This unique-to-UAH program grew out of the needs of a group of highly motivated students who were non-native English speakers. Dr. Karen Frith, dean of the College of Nursing, believed they would make excellent nurses, and she didn't want to lose them. But their English proficiency could have been a barrier.

"These students needed to develop better auditory discrimination and to also have a more intelligible pronunciation when they were speaking to their patients or co-workers," says Evdoxia Tsimika-Chronis, lead instructor for E2.

"If somebody tells you quickly '50 milliliters' and you hear '15 milliliters,' or if you're a non-native speaker with a heavy accent and you're trying to tell someone 50 but the other person

is hearing 15 because the words are not clearly articulated, it can be very dangerous."

The multifaceted support system started with Dr. Andrea Word and Dr. Ryan Cate Gibson, who were affiliated with the Language and Culture Program in the UAH Office of International Services. Later, Tsimika-Chronis joined the program. Cate Gibson's doctoral thesis included the literacy programming that they developed for E2.

Launched in spring 2016, the program initially focused on non-native speakers of English but soon grew to include native speakers. The instructors soon realized that E2 was making a big difference in graduation rates. Not only did students who used E2 services graduate with a B.S. in nursing, but many also completed graduate degrees in nursing.

"Our retention numbers were going through the roof," Cate Gibson says. "The College of Nursing added a doctoral program at that time, and we also provided mentoring and support to their doctoral students who were non-native. We still do that."

The typical retention rate for students who attend E2 sessions is approximately 90% to 95%, according to Frith. Citing research published in *Teaching and Learning in*

Nursing, she notes that this far exceeds typical retention rates of about 50% for non-native English speakers.

The success of E2 brings highly qualified nurses who are bilingual or multilingual speakers into communities that need their care, she says.

E2 clients include undergraduates, graduate-level students and faculty members. Some are recommended for the program; others decide on their own to seek assistance. For non-native English speakers, E2 provides instruction in accent modification, language accuracy, cross-cultural topics in learning and education, and thesis and dissertation presentation assistance. The program gives native speakers the chance to improve their literacies, including but not limited to comprehension of material, retention of information and application of knowledge, and professional behavioral applications.

But E2 offers more than literacy instruction, Cate Gibson says.

"We come at everything from a holistic perspective. It's about how you can balance the needs of your career, your family and your community with your language capacity, your communicative capacity and your engagement. I believe the holistic component is what differentiates the E2 from other support systems used in nursing colleges across the world." ■



UAH AWARDS FIRST DEGREES FROM NEW ENGINEERING TECH AND CHILD, FAMILY, COMMUNITY DEVELOPMENT PROGRAMS IN 2023

UAH awarded Bachelor of Science degrees to the first graduates from two new degree programs in 2023: engineering technology in the College of Science and child, family and community development in the College of Education.

Seven students received their degrees in engineering technology after completing senior design projects sponsored by Blue Origin: Brock Dennison, Taylor Engram, GaTerralyn Heard, Caleb Martin, Adam Mendez and Christopher Wells graduated on May 4, 2023, and Caleb Sorensen graduated on Dec. 11, 2023.

"Our graduates are succeeding in a variety of roles, including design engineer, test engineer, production engineer, sales manager, small business owner, adjunct instructor at Drake State and graduate school," says Dr. Alisa Henrie, clinical assistant professor and director of engineering technology. "These students are motivated to succeed and are grateful for a program that recognizes the value of their previous hard work and knowledge."

Henrie says that UAH started the engineering technology major to better

serve the needs of UAH students as well as fill a growing demand for a technically prepared workforce for the expanding high-tech economy in North Alabama. This applied program lets students explore the integration of engineering principles and modern technology, preparing graduates for jobs in the local automotive, construction, advance manufacturing, aerospace or defense industry.

The Alabama Commission on Higher Education (ACHE) approved UAH's engineering technology program in June 2021.

The College of Education launched the child, family and community development program at the beginning of the spring 2023 semester after receiving ACHE approval in March 2022.

This program gives students the opportunity to work with children, adolescents and their families in a community setting. Its goal is to develop leaders in the field who focus on improving the lives of young children, adolescents and families through high-quality early care and education programs, nonprofit agencies, children's

museums, recreation centers or similar specialized programming.

The program offers two concentrations, both of which were represented in the fall 2023 graduating class of three students on Dec. 11. Ciara White, second from left, received her degree in early learning and family relations, while Tamia Knight, second from right, and Alexis Woods graduated in recreation and community leadership.

"I am delighted to offer this relevant and engaging degree which equips effective leaders who will be at the front line of advocating for, serving and empowering children, youth and families," says Dr. Beth Quick, dean of the College of Education. "We are confident our alumni will play a vital role in shaping a strong and better future in the lives of those whom they serve."

White, who interned at Big Brothers Big Sisters of the Tennessee Valley, has been hired full-time by that agency as its match support specialist. Woods plans to play basketball at Samford University in Birmingham and pursue a master's degree in business administration with a concentration in sports business. ■

UAH COLLEGE OF NURSING HOLDS ANNUAL DISASTER SIMULATION DRILL USING DRONES FOR THE FIRST TIME



A small drone lands in the center of a square defined by four orange cones. Its blades stop spinning. Medical personnel approach and carefully remove the small box attached to its underside. They take the contents to a scene of controlled chaos where nurses are evaluating patients to determine the severity of their injuries.

That drone could have been transporting life-saving medication or supplies, but on this morning, it was playing a role for the first time in the annual disaster simulation drill conducted by the UAH College of Nursing.

The drill tests nursing students' ability to handle real-world public health emergencies that might occur during a tornado or other severe weather event as well as accident-related situations such as exposure to chemical or hazardous wastes, power or gas main leaks, and management of communicable disease outbreaks, which may require quarantine.

Held in and around the UAH Nursing Building, the 2023 fall semester drill featured a hundred or so participants. Dozens of volunteers, including students from local high schools, dressed and applied makeup to portray disaster

victims for the nursing students to treat. Police officers, even a K-9 cop, were on hand to add to the authenticity of the simulation.

Problems are planned into the program, including a kleptomaniac or two swiping supplies, patients raging out of control, and even people dying.

"That's part of the disaster," says Dr. Melissa Foster, clinical assistant professor and community health nursing course manager, College of Nursing. "There's never enough of anything, never enough people, never enough supplies. The only thing there's too many of is victims."

"You want the students to feel a little overwhelmed when it's still in a safe learning environment and it's not going to hurt a patient," says Dr. Kim Budislich, clinical assistant professor and graduate simulation coordinator, College of Nursing.

Any health-care situation benefits from a timely response, and that's especially true in an emergency. Drone technology can save time when it really counts. This is why Dr. Azita Amiri, associate professor, College of Nursing, is a strong advocate of using drones in

health care to improve health equity and health care access.

"Incorporating emerging technologies, such as drones, offers a new perspective to our traditional teaching style," Amiri says.

The UAH Rotorcraft Systems Engineering and Simulation Center (RSESC) collaborated with the College of Nursing to provide unmanned aircraft, custom-built payload module and flight operations. Along with delivering supplies ordered by students during the drill, the drones contributed a real-time video feed of the outdoor triage site and surrounding area to the incident command team located inside the Nursing Building.

"This represents an emerging application for drone first responders to rapidly deliver lifesaving medical supplies and improve emergency situational awareness," says Casey Calamaio, operations lead and research engineer at UAH's Unmanned Aircraft Systems Research Programs, operating out of the Rotorcraft Center. "It is important to train the next generation of technology-enabled nursing professionals in emerging tools at their disposal." ■

DRONES TO THE RESCUE!



UAH RESEARCHER TEAMS WITH INTERNATIONAL PARTNERS IN NATO SCIENCE FOR PEACE AND SECURITY PROJECT TO AID DISASTER RELIEF

Dr. Bryan L. Mesmer, an associate professor and researcher at UAH's College of Engineering, will team up with academics, other researchers and postgraduate science and technology students from four countries on a \$1.26 million project supported by the North Atlantic Treaty Organization (NATO) Science for Peace and Security (SPS) Programme to develop pioneering solutions for disaster relief using multi-agent drone systems.

The NATO program involves a competition where student teams tackle technical challenges, such as mitigating the disruption of GPS signals, successfully navigating hazardous environments, improving real-time decision making and fault tolerance for the vehicles, and ensuring effective communication and coordination between UAVs. The project seeks to increase the level of autonomy of single and cooperative drone platforms by adopting and developing the most advanced AI-based algorithms and technologies.

The universities collaborating with UAH include City University of London (NATO Partner Director for this program), the University of Klagenfurt in Austria and Delft University of Technology in the Netherlands.

"Drone technology has the potential to play a significant role in the management of crises and civil emergencies," Mesmer says. "In recent years, drone technology has advanced significantly and has been adopted by various organizations and governments for various purposes, including disaster response."

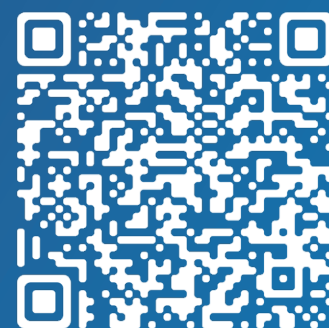
Drones can provide real-time images and data of disaster-stricken areas, allowing first responders to quickly and

effectively assess the situation and prioritize activities in civil emergencies, typically involving searching for survivors, assessing damage and delivering assistance to the affected areas.

"For example, drones equipped with thermal imaging cameras can quickly scan large areas for signs of life, even in areas where visibility is limited, such as during a hurricane or after an earthquake," Mesmer says. "This information can be invaluable for first responders who need to quickly identify the areas that need urgent assistance. The adoption of multiple UAVs in disaster response has the potential to greatly improve the effectiveness and efficiency of crisis management efforts."

A fleet of drones can be deployed in a coordinated manner to gather information, survey damaged areas, deliver assistance and perform other essential tasks with improved coverage and speed, especially valuable in disaster scenarios where quick action is required. One drone might be equipped with a thermal imaging camera to search for survivors while another could provide a high-resolution camera to survey the damage. A multi-UAV system also reduces the risk to human life in unstable or hazardous conditions.

"A multi-UAV system can improve coordination and communication among teams of first responders," Mesmer says. "With multiple drones gathering information and transmitting real-time data, response teams can quickly and effectively coordinate their efforts and make informed decisions. This can greatly improve the speed and efficiency of disaster response efforts." ■



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The University of Alabama in Huntsville (UAH)'s President's Corporate and Foundation Partners (PCFP) recognizes our most generous corporate supporters who believe in UAH's mission and have chosen to invest in their current and future workforce. PCFP is our corporate and foundation equivalent to the university's President's Council (PC), which recognizes the giving of individuals, including alumni and longtime Huntsvillians who want to see their community thrive. By making an annual gift of \$5,000 or more, PCFP members support the university as an institution of innovation and excellence. UAH has made globally significant contributions to research and technology and has generated a talented local workforce that brings international visibility to our community.



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Beginning January 2024, the qualifying amount for PCFP membership increased from \$2,500 to \$5,000. This motion follows last year's decision to increase the qualifying amount for PC membership, an endeavor taken to help better meet the needs of our students. If you are an alumnus, a community supporter, an involved citizen, and/or an educational advocate, we encourage you to reach out to your employer and other companies in the community to ensure they make plans in their budget to be a part of PCFP next year. Gifts can be designated to one or more areas of interest, including your company's preferred college, the Last-Mile Fund, an existing scholarship, or any other fund of their choice.

Whether your company wishes to invest in training cyber security professionals, educating healthcare workers, or shaping tomorrow's business leaders, a gift of \$5,000 or more will help ensure UAH remains a productive resource for local companies who are making global contributions. **Together we can empower students, generate tomorrow's workforce, and cultivate a legacy of success that reaches far beyond North Alabama.**



We would love to meet with you in the coming weeks to discuss how we can work together. Please reply to our contact form by scanning the QR code below to let us know of your interest in partnering with us, and we will gladly reach out to set up a meeting.

Mallie Hale, Vice President for University Advancement, Executive Director of UAH Foundation
Shelbie King Hall, Third Floor // 301 Sparkman Drive, Huntsville, AL 35899
t 205.454.6224 // mallie.hale@uah.edu // uah.edu/giving

UAH RESEARCHER'S DIGITAL RECREATION OF SEQUOIA WILDFIRE **WINS GRAND PRIZE** IN AMERICAN GEOPHYSICAL UNION COMPETITION

Connor Bleisch, a graduate research assistant in the College of Science at The University of Alabama in Huntsville (UAH), has won the 2023 American Geophysical Union (AGU) Michael H. Freilich Data Visualization Competition grand prize. The honoree is being recognized for a data visualization project that places the user in the middle of a first-hand recreation of a raging wildfire in the Sequoia National Park in 2021.

"This award will serve as a significant recognition of the visualization research conducted by our graduate students here at UAH," says Dr. Haeyong Chung, an associate professor at UAH, who mentors Bleisch, along with Dr. Manil Maskey at NASA's Marshall Space Flight Center.

"The project is a narrative data visualization that recreates the events of a major wildfire called the KNP Complex Fire, which occurred from September to December in 2021," Bleisch explains. "NASA Earthdata is materialized as objects and effects in a 3D virtual world that the user can explore. Every element is based on real-world datasets collected from satellites and sensors at the time of the wildfire. The fire starts, spreads and dies according to the actual recorded locations and intensities of the fire."

NASA Earthdata is a site that enables the user to search through more than 90 petabytes of Earth-observation data in NASA's archive. The application is designed to ease the technical burden on users by making it simple to discover and

interact with Earth-observation data created or distributed by NASA.

Through Bleisch's project, users are able to control a camera and move around in this digital world as if they were in the middle of the Sequoia wildfire as it happened. Particles float in the air according to recorded concentrations of byproducts, gasses and particulate matter created by the fire throughout its lifetime.

"The wind blows the trees and smoke plumes individually based on time and space," Bleisch says. "The main focus of the project is to provide a new avenue for average people to experience NASA Earthdata in a less daunting way compared to a typical graph, chart or other 2D visualization that might require more scientific experience to fully understand."

Bleisch has been working on the project for the NASA Interagency Implementation and Advanced Concepts Team as part of his position as a graduate research assistant. "To develop this data visualization, I used a program called Unity which is typically an engine for creating video games," the researcher says. "This project combines my desire to create video games with my love of math and science. I think there has been a need for novel ways to present data, especially in ways that the average person would understand and enjoy."

AGU is the world's largest organization for Earth, atmospheric, ocean, hydrologic, space and planetary scientists. The prize funds professional development activities like conference travel or travel to a NASA facility. Bleisch will also have the opportunity to present his data visualization with NASA and AGU this month at the 2023 AGU Annual Meeting in San Francisco for 25,000 attendees from over 100 different countries. ■



REVOLUTIONARY LOW-COST WEARABLE BIOSENSOR AIMS TO ENHANCE ATHLETIC PERFORMANCE AND PHYSICAL HEALTH

UAH researchers have designed a wearable biosensor that offers a new way to measure human muscle activation to potentially prevent injuries and enhance athletic performance. The breakthrough design is built around a new type of triboelectric nanogenerator (TENG), a device that converts mechanical or thermal energy into electricity for use in wearable electronics. It will cost less to manufacture than traditional nanotechnology.

The new sensor uses adhesive materials to harvest power by transferring an electric charge between two objects when they contact or slide against one another. The breakthrough is detailed in a paper published in the *Journal of the Royal Society of Chemistry* co-authored by Dr. Gang Wang, an associate professor in the College of Engineering; Dr. Yu Lei, chair and an associate professor of chemical and materials engineering; Dr. Ryan Conners, an associate professor of kinesiology, and Dr. Moonhyung Jang, a postdoctoral research assistant.

"Our novel design consists of Scotch tape and a metalized polyester sheet," Wang explains. "When it is pressed and released, we are able to detect human motions involving the elbow, knee, finger, eye and jaw. The design is an advance because it is self-powering, light-weight, low-cost and disposable."

Current wearable TENG devices for the human body monitor and prevent severe body injuries for medical patients and athletes, but they require nanotechnology expertise and expensive manufacturing methods to produce.

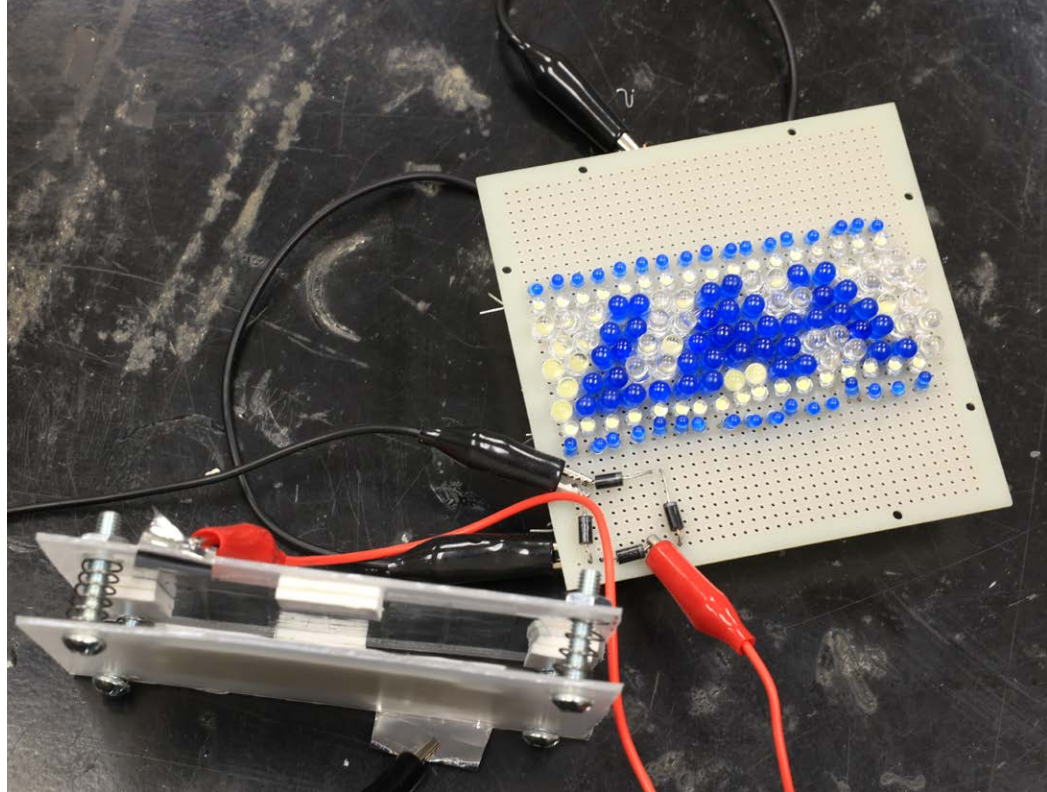
"Our biosensor involves only commercial off the-shelf materials and a simple fabrication scheme compared to those used in TENG-based sensors," Wang notes. "In addition, it does not need an external power source to function."

Conventional devices also tend to be relatively large when compared to the UAH device, and human skin must serve as another triboelectric layer, meaning the sensing performance could degrade with perspiration or other changes in skin condition. UAH's device uses tacky materials in a simpler design that provides a more comfortable user experience and can detect motion involving both gross and fine motor movements.

"For example, different knee motions can be characterized by analyzing the collected voltage signals," Wang says. "We also compared our sensor performance to an electromyography sensor in an isokinetic leg extension test. We are working with Dr. Conners' group to involve more human subjects this spring semester." ■

POWER WALKING:

UAH researchers design limestone putty nanogenerator to harvest energy from everyday motion to power small devices



UAH researchers have created a new kind of triboelectric nanogenerator (TENG) that produces electricity using limestone putty, promising a considerable cost savings over conventional manufacturing methods.

“Traditional TENGs require nanotechnology-based fabrication and other special equipment,” says Dr. Gang Wang, an associate professor of mechanical and aerospace engineering at UAH. “Only craft-level skill is needed to build our triboelectric energy harvester.”

Invented in 2012, TENGs are small devices that convert mechanical or thermal energy into electricity for use in small, wireless autonomous devices like those in wearable electronics, condition monitoring and wireless sensor networks. Examples include heart monitor implants, biochip transponders for farm animals and sensors that alert a driver when tire pressure is low.

TENGs harvest power for these devices by transferring an electric charge between two objects when they contact or slide against one another through motions such as walking, vibration, rotating tires, moving wind or flowing water, all with very little impact to the environment.

The UAH breakthrough is detailed in a paper published in ACS Omega, the journal of the American Chemical Society. Wang’s co-authors at UAH include Dr. Moonhyung Jang, a postdoctoral research assistant; Sean P. Rabbitte, an undergraduate research assistant, and Dr. Yu Lei, chair and an associate professor of chemical and materials engineering.

The research is part of the Department of Defense Small Business Innovation Research program, which supports government-funded contracts or grants that encourage domestic small businesses to engage in federal research and development projects with the potential for commercialization. UAH’s industrial partner is Materials Sciences, LLC, and Dr. Simon Chung is the project lead.

“We have already filed a patent for the triboelectric energy-harvesting design using adhesive layers,” Wang says.

UAH’s novel application of a limestone-based mounting putty, along with a metallized polyester sheet, also extends the operational frequency bandwidth compared to existing TENGs. This is significant because some small energy-harvesting applications, such as health monitoring and wearable exoskeleton systems, require a wider frequency bandwidth to collect the energy from human motion.

“Typical contact-separation TENGs operate at a frequency below 10 Hz,” Wang says. “We are able to extend the bandwidth up to 80Hz by introducing these triboelectric layers in a vibration-based energy-harvester design. After the successful demonstration of the TENG design using double-sided tape, we started to explore less tacky materials for easier separation of the materials. This is how we came up with the idea of using limestone-based putty.”

The researchers plan to explore the effectiveness of different minerals such as marble, sandstone and lunar soil in future putty-based generators. ■



DEFINING DEDICATION: Employee, alumna Reva Johnson Bailey left lasting legacy at UAH

As employee, student and alumna, Reva Johnson Bailey played a major role in the 55-year history of The University of Alabama in Huntsville (UAH), just as UAH played a continuing role in her life.

Her work with students, especially international students, helped build UAH into an institution recognized around the world. The Harvest Dinner, which she first organized in November 1985 as a way to make students feel more at home, became one of the school's signature traditions.

Bailey, who passed away on Jan. 12, 2023, was the university's longest serving employee when she retired in 2000. Her association with the university began a decade before UAH officially became UAH in 1969.

She started working as a part-time assistant in the admissions and records office at the University of Alabama Extension Center in Huntsville on Sept. 17, 1959, when she was still Reva Johnson, a senior at S.R. Butler High School. After graduating high school in 1960, she became a full-time employee on June 1. Then she married Ed Bailey on June 22. They had one daughter, DeLinda, and were married 55 years until his death.

Bailey worked only with graduate students during her first few years at the center. Later her job broadened to include undergraduates and international students. Eventually, she also taught part-time, Management 301.

While helping other students, Bailey pursued her own degrees at UAH. She received a bachelor's in English with a

minor in history at the university's first commencement ceremonies in 1968. She went on to earn her master's degree in administrative science in 1974.

About midway through her UAH career, when she was associate registrar and international student advisor, her co-workers celebrated her quarter century of dedication. In an article about the reception in the June 21, 1985, issue of *Postscripts*, a newsletter for UAH faculty and staff, she talked about her job and why she had remained at UAH:

"I like the academic atmosphere, the learning," she was quoted as saying. "Having been a student for so many years, I feel I can relate to students and enjoy working with them."

She went on to note the variety and excitement of the UAH environment:

"I have seen it go from 1,000 to 6,000 students and from hand-doing every process to the status on the computer we are now. Because the university is ever changing, it doesn't even seem like the same job."

Bailey held the position of registrar and international advisor when she retired, but retirement did not end her involvement with UAH. The Harvest Dinner Fund was established to continue that tradition, and she volunteered with the organizing committee for many years. She also worked with the International Student Office for several years and served as special assistant to the provost until 2014.

When the UAH Alumni Association began the Alumni of Achievement Awards in 2002, Bailey was a natural selection for the inaugural class. ■



Showcasing African Americans and the Arts:

UAH CELEBRATES BLACK HISTORY MONTH WITH LUNCHEON, MUSICAL EVENTS, BLOCK PARTY

The UAH Office of Diversity, Equity and Inclusion (ODEI) organized its 2024 celebration of Black History Month around three public events reflecting African Americans and the Arts, the 2024 Black History Month theme chosen by the Association for the Study of African American Life and History. ODEI also held a block party just for UAH students.

"Black History Month provides all Americans an opportunity to celebrate the accomplishments of African Americans and pay homage to their contributions to the fabric of American society," says Dr. Bryan D. Samuel, UAH vice president for diversity, equity and inclusion. "Essentially, there are no fields of endeavor that these accomplishments do not touch."

Ashley M. Jones, the poet laureate of Alabama, was the keynote speaker for the annual Black History Month luncheon, presented by ODEI with sponsorship from the City of Huntsville DEI and Avadian Credit Union. The

event was held on Feb. 15 at the UAH Student Services Building.

Jones is the first person of color and the youngest person to be chosen as Alabama poet laureate in its 93-year history. She holds an MFA in poetry from Florida International University, and she is the author of "Magic City Gospel" and other collections. Her many awards include the Rona Jaffe Foundation Writers Award, the Lena-Miles Wever Todd Prize for Poetry and the Lucille Clifton Poetry Prize. She is founding director of the Magic City Poetry Festival and is the associate director of the University Honors Program at The University of Alabama at Birmingham.

ODEI collaborated with the UAH Constellation Concert Series to bring soprano Dr. Phyllis Lewis-Hale to campus for two programs on Feb. 15. She began the day by coaching singers from UAH and Alabama A&M University during a performance master class in Roberts Recital Hall.

That evening, Lewis-Hale and pianist Karen Laubengayer performed "Songs of Love, Sorrow, Hope and Healing" in Roberts Recital Hall. This presentation of Afro-Creole folk songs and Negro spirituals explored the historical and cultural differences between these two uniquely American musical genres.

Lewis-Hale is an instructor of music and the director of the Opera/Musical Theatre Workshop at Jackson State University in Jackson, Miss. Her programs at UAH were made possible in part by a grant from the Alabama State Council on the Arts.

ODEI hosted the annual Black History Month Block Party for UAH students on Feb. 21 on the Conference Training Center slab and lawn. This culmination of fun and educational activities celebrated throughout the day was presented in partnership with a variety of campus affiliates, community organizations and Black-owned student and alumni businesses to celebrate Black history. ■



Huntsville Mayor Tommy Battle and Erin Koshut, executive director of Cummings Research Park, showed their UAH spirit during a visit with students at the College of Business last semester. Battle and Koshut talked about the ways that collaborative leadership and strategic long-term planning have transformed the greater Huntsville community into a wonderful place to live, work and play.

Huntsville officially became the largest city in Alabama with the release of the latest Census numbers in 2021. Cummings Research Park, the second largest research park in the U.S. and the fourth largest in the world, has long played a vital role in Huntsville's growth. UAH and its students benefit from the university's location in one of the world's leading science and technology business parks with its mix of Fortune 500 companies, local and international high-tech enterprises, U.S. space and defense agencies and thriving business incubators. ■

UAH Theatre plunges a stake into the heart of Bram Stoker's classic vampire tale with "Dracula: A Feminist Revenge Fantasy." Playwright Kate Hamill weaves humor and social commentary with gothic suspense.

The show runs April 10-14: Wednesday, Thursday and Saturday at 7:30 p.m.; Friday at 7:30 p.m. and midnight; Sunday at 2:30 p.m. For ticket information, visit uah.edu/theatre. ■

DRACULA:

A Feminist Revenge Fantasy
by playwright
KATE HAMILL



Image courtesy of
Amy and Matthew Willson

COUPLE WHO FOUND LOVE AT UAH GIVE BACK TO SCHOOL WITH **\$30K DONATION TO COLLEGE OF BUSINESS**

Amy and Matthew Willson's \$30,000 scholarship gift to the College of Business at The University of Alabama in Huntsville (UAH) began with a love story.

The couple met at UAH as two students from Tennessee: Amy from Kingsport, Matt from Chattanooga. Amy and Matt's mutual passion for video games sparked a friendship which grew into love and then marriage after graduation. Now they're helping other out-of-state students find a good education at UAH, a part of The University of Alabama System.

The Willsons' endowed scholarship, created in 2023, will support out-of-state College of Business students from the U.S. with a preference given to applicants from Tennessee.

"Both of us were in the privileged position where we had family support to go to school," Amy says. "I also had athletic and academic scholarships, and Matt had academic. Education is the key to prosperity in the future, to doing what you want to be doing and accessing what you need to take care of yourself and your family. Being able to help folks coming from Tennessee go to UAH and go to the business

school like we did was something that we both thought was a worthwhile use of our philanthropic dollars."

Amy, who played soccer at UAH, graduated in 2009 with a B.S.B.A. degree in accounting. Matt, who worked in UAH's IT department for about half of his degree, graduated in 2011 with a B.S.B.A. degree in management information systems. He missed walking at commencement because the spring 2011 ceremony was delayed following the tornadoes of April 27. UAH rescheduled commencement for Aug. 6, but Matt could not attend since that was the couple's wedding day.

The Willsons moved to Texas in 2014. They now live with their son in Austin, where Amy is an associate director of development operations at the University of Texas School of Law and Matt is a staff site reliability engineer at Indeed.com.

Along with finding each other at UAH, the Willsons say they gained academic and social experiences at the university that broadened their outlooks and continue to benefit them professionally and personally.

"The degree I got from UAH is a combination of learning about business but also learning about how the world works and how you need to interact with people," says Amy, who also holds a law degree from the University of Tennessee. "I think some people don't realize that a business degree is a broad degree that is applicable just about anywhere. Our business degrees give us insights that other people who do the same work as we do don't have."

Matt adds that his friendships with international students and faculty at UAH continue to be invaluable in his current role which focuses mostly on distributed computing problems.

"I work with people all over the world across many different cultures and languages," he says. "One of the things I remember most about being at UAH was that cross-section of the world that I never would have interacted with in any other aspect of my life. I've worked with people across many cultures, frequently with interpreters, and the experience I gained at UAH helped prepare me to be respectful and professional. Without that experience at UAH, I don't know how well I would have done." ■



FAMILY TRADITION:

PATTERSON SIBLINGS, SPOUSES HOLD 10 UAH BACHELOR'S AND MASTER'S DEGREES

Earning a degree from UAH has become a Patterson family tradition. Among the nine brothers and sisters and three spouses, five of the siblings and two of the in-laws hold a total of 10 UAH degrees: seven bachelor's degrees and three master's degrees from the College of Business and the College of Engineering.

Eldest sibling Albert Patterson started it all with two degrees: a B.S. in mechanical engineering in 2013 and an M.S. in industrial and systems engineering in 2014. Since leaving UAH, he earned a doctorate from the University of Illinois Urbana-Champaign and is now an assistant professor and director of the Manufacturability-Driven Design Lab at Texas A&M University. He received the 2023 UAH Alumni Association's Outstanding Young Alumnus of Achievement Award.

Albert calls his UAH education "key" to his success: "Not only did the rigorous and comprehensive engineering education prepare me well for an industry career and to succeed in a top-10 Ph.D. program, but it helped to form me as a person. I consider my engineering career to be a vocation more than a job, and the excellent professors and mentors I had at UAH did a lot to instill that in me."

In 2014, Albert's sister Virginia Patterson Sutton earned her first UAH degree, a B.S. in business administration.

She graduated with her MBA in 2015. She's now a mother and homemaker.

Sister Elizabeth Patterson, a lead systems engineer for the U.S. Department of Defense (DOD), earned her B.S. in industrial and systems engineering from UAH in 2016 and her M.S. in industrial and systems engineering in 2017.


Sister Marie Patterson works for the DOD, too, but she is an accountant supporting contracts and projects. She graduated from UAH in 2017 with a B.S.B.A. in accounting with a federal account contracting concentration.

Brother Joseph Patterson also went the engineering route, earning a B.S. in industrial and systems engineering from UAH in 2019. He is an engineer for the DOD.

Maria Brown Patterson, Joseph's wife, is an engineer with the DOD, too, but her B.S. degree is in aerospace engineering. She graduated from UAH in 2016.

Sister Theresa Patterson Foy married Matthew Foy, who received his B.S.B.A. in management from UAH in 2021. Matthew shares his in-laws' family feeling about UAH:

"UAH felt like an extension of home. My time at UAH helped me to earn my current position as procurement analyst at LG Electronics. It's a wonderful university to represent Huntsville." ■



UAH ATHLETICS' NEW NUTRITION, WELLNESS PROGRAM AIMS TO STRENGTHEN STUDENT-ATHLETES IN ALL AREAS

To help the student-athletes at The University of Alabama in Huntsville (UAH) perform at their mental, emotional and physical best, the UAH Department of Athletics is launching a nutrition and mental health wellness program.

The new effort is a component of UAH's holistic approach for student-athletes, says Dr. Cade Smith, director of athletics. Part of the funding comes from a gift from Bryant Bank.

"How do we help our student-athletes have the best experience possible? The daily grind of trying to be a student, trying to be an athlete is not easy. Sometimes they're going straight from the weight room to the classroom. No time to go to the cafeteria."

UAH will provide a fueling station where student-athletes can grab a healthy snack and drink to tide them over until they can get a good meal. Snacks include healthy fats like nuts as well as protein bars and fruits, but this is not meant to be a meal replacement.

"It keeps them from getting a doughnut on the way to class," Smith says.

Nutrition education, including experts meeting with athletes and coaches, is also part of the program.

The mental health side of the effort is just as important.

"For young people and everyone else, I think we're more aware of mental health concerns than we've ever been," Smith says.

The department is looking at an app-based daily assistant that provides student-athletes with effective tools to cope with stress. It also enables administrators to track various patterns in mental health that are represented among the student-athletes.

Smith cites statistics highlighted by the app that reveal the extent of the problem: 27% of student-athletes report experiencing anxiety, but only 10% seek professional help.

"We want to integrate this with campus resources," he says. "This is about providing resources for student-athletes to be able to take care of themselves."

UAH's goal is to help student-athletes be their best selves.

"And the byproduct is we have better teams." ■



MASTER'S DEGREE IN KINESIOLOGY

Take your health and human performance bachelor's degree to the next level with UAH's new Master of Science in kinesiology (MSK).

UAH MSK is the only degree program in Alabama that offers these two concentrations:

- ▶ **CLINICAL EXERCISE PHYSIOLOGY** – Ideal for students interested in such fields as advanced human performance and testing, cardiopulmonary exercise physiology, and lifespan physical activity and health.
- ▶ **SPORTS SCIENCE** – Advanced classroom content and an immersive practical experience to prepare for a career in the next evolution of player performance assessment and enhancement.

Hands-on experiences figure into both concentrations:

- ▶ **CLINICAL EXERCISE PHYSIOLOGY** students go through a one-semester practicum in a local health care setting to begin accumulating hours for certification in their field.
- ▶ **SPORTS SCIENCE** majors have a two-semester practicum working with one of the UAH athletic teams.

THE PROGRAM STARTS IN THE
FALL 2024 SEMESTER.

Applications to be part of UAH's inaugural MSK class must be received by **June 15**.



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SUMMER CAMPS

at UAH

Elementary, middle and high school students can boost their academic and athletic skills during summer camps at UAH. Information about the different camps and how to sign up is available on the UAH website.

uah.edu/outreach/summer-camps

