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UAH Magazine

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CLIMBING TO THE STARS

UAH WOMEN GRADUATES SCALE THE RANKS AT MSFC

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RESEARCH
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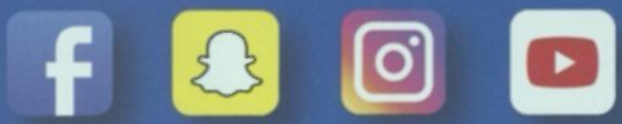

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Climbing to the stars

UAH women graduates scale the ranks at MSFC

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CLIMBING TO THE STARS

UAH WOMEN GRADUATES SCALE THE RANKS AT MSFC

UAH women graduates are proving the ladder to the stars is possible for industrious dreamers as they climb the ranks at NASA's Marshall Space Flight Center (MSFC).

After achieving a BS in Industrial Engineering at The University of Alabama, Dr. Lisa Watson-Morgan earned an MS degree in Systems Engineering and a PhD in Engineering Management at UAH where she became a co-op intern at NASA, "which changed the trajectory of my career," she says. "I had the opportunity to work full time while taking classes towards my advanced degrees."

She has since risen to Program Manager for NASA's Human Landing System (HLS), where she oversees a team of nearly 600 tasked with nothing less than the development of the lander that will carry the first woman and the next man to the Moon's surface in 2024. This voyage will pave the way for a long-term human presence on the Moon by 2028 and supports the next giant leap to sending human explorers to Mars.

"I have an outstanding team supporting this amazing mission," Dr. Watson-Morgan says. "After the astronauts perform extravehicular activities, aka 'Moon walk,' where they will place sensors, obtain science samples, and survey the south pole, they will return to lunar orbit to rendezvous with the Orion capsule that will bring them back to Earth."

Choosing UAH for her educational

▸ Pictured are Dr. Rhega Gordon (left) and Dr. Lisa Watson-Morgan (right).

Images courtesy of NASA

journey to this rarefied aerospace air proved to be a perfect fit. "UAH is well known as a great science and engineering university while maintaining a proximity to NASA. In addition, they offered distance learning for people who couldn't attend in person, which was convenient for students who worked full time as I did."

How does this successful career woman, wife, and mother of three handle the challenges of mixing a NASA career with the stress of day-to-day living?

"I plan extensively!" she says. "I have a monthly calendar posted in the kitchen. I get up really early and work most mornings before physically going into the office: housework, laundry, editing a program document, preparing speeches…enjoying the quiet and solitude prior to a hectic day helps me prepare for the day. I think it's important to keep a positive attitude. We have little control over so many things in this complicated world, but we do control how we react to things."

Her advice to college-bound women thinking about a career in the aerospace field? "Work hard, focus, have some fun, make strong connections, be able to communicate face-to-face with people and have confidence. The nation needs more engineers and scientists. We get to do the amazing things that rewrite the textbooks! We make history. In an era where there is a lot of division and strife, exploring and creating can unify society. You can do it!"

Fellow UAH alumna Rhega Gordon would no doubt agree. Since 2019 she has served NASA as Chief Financial Officer (CFO) at MSFC. Gordon oversees the implementation and administration of all integrated Marshall Center and NASA financial management, including all aspects of planning, programming, budget and execution processes and guidelines for distribution of financial resources.

Gordon achieved a BS in Electrical Engineering from UAH in 1991. She has navigated an impressive spectrum of management positions, including helming the Planning and Control Office in Marshall's Flight Programs and Partnerships Office, the Science and Mission Systems Program Planning and Control Office, the Instrument and Payload Systems Department Resources Group, the Engineering Directorate's Payload and Technology Business Office and Space Systems Payloads and Project Offices.

Rather than worry about challenges she might face as a woman steering her way through the often male-dominated world of STEM careers, Gordon always exhibited an optimism and faith in the unlimited possibilities before her.

"I was kind of surprised when I got to college and people said, oh there are not many women in this field. My parents were very good about exposing me to various options and careers, giving me very broad horizons. I was raised to believe you can be anything!"

Gordon carried this same spirit to UAH, where she never felt surrounded by her male counterparts but focused on the opportunity instead.

"I just wanted to be around people who loved what they do. I wanted to do that too! That had been my norm my whole life. I've been fortunate to have a lot of strong females in my life. I never felt like that was an impairment to success. I'm excited about this millennial generation! They don't seem to have a lot of the gender definitions that us older grownups have. It's more about the content and what you are bringing."

> "I was raised to believe you can be anything!"

Asked what advice she would have for any woman considering a career path once thought strictly the domain of men, Gordon responds with characteristic enthusiasm.

"Expose yourself to all the options! Talk to people, shadow them, ask them what they do and how they do it and how they got there, and everything's on the table for you. It's all a possibility! I had no idea that I couldn't do things." ■

UNIVERSITY **ANNOUNCEMENTS**

Mallie Hale has been named Vice President for University Advancement and Executive Director of the UAH Foundation. She has forged strong connections with past graduates to build on UAH's history of excellence and helped develop the Last Mile Fund.

UAH announced Dr. Robert "Bob" Lindquist has been selected as Vice President for Research and Economic Development. The Principal Investigator on $6.8 million in contracts and awards for 20 separate projects, Dr. Lindquist's research has been supported by the National Science Foundation, NASA, the U.S. Army and associated industry.

Laterrica Shelton has been selected Vice President for Diversity, Equity and Inclusion. She was previously the UAH Director of Compliance and Title IX Coordinator and is the senior executive responsible for providing a campus-wide vision for all major efforts in diversity, equity and inclusion in support of the University's strategic plan.

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EXCELLENCE IN EDUCATOR PREPARATION ACCREDITATION

The Council for the Accreditation of Educator Preparation (CAEP) announced the UAH College of Education received accreditation for its educator preparation programs. The review by the CAEP provides nationally recognized standards to ensure excellence in Educator Preparation Programs. The College offers both undergraduate and graduate programs in educator preparation.

CCNE ACCREDITED

The UAH College of Nursing received the maximum ten years of accreditation from the Commission on Collegiate Nursing Education (CCNE). CCNE notified the College that all accreditation standards for its bachelor's, master's and Doctor of Nursing Practice Programs, as well as its post-graduate Advanced Practice Registered Nurse Certificate Program, were met.

UAH'S MEYER GULLEDGE WINS

GILMAN SCHOLARSHIP GRANT

TO STUDY ABROAD

Sprechen Sie Deutsch? If you need a translation, Meyer Gulledge, a Chemical Engineering senior, would certainly be able to help. Gulledge has been announced as the winner of a Benjamin A. Gilman International Scholarship for 2020, and he has chosen to use this grant to study German abroad through the auspices of the language organization Institut für Internationale Kommunikation (IIK).

The Gilman Scholarship is a grant program administered by the U.S. Department of State and the Bureau of Educational and Cultural Affairs. It is open to U.S. citizen undergraduate students who are receiving Federal Pell Grant funding at a two-year or four-year college or university to participate in study abroad programs worldwide. These grants enable students to sharpen their skills and meet fellow scholars, as well as network overseas in their respective fields.

Gulledge was mentored through the rigorous application process by Dr. David S. Johnson, an associate professor of global studies and German, as well as Dr. Yu Lei, an associate professor in chemical and materials engineering.

"A chemical engineering student came to one of our chapter meetings, and he brought up the Gilman and told us to apply," he says. "Dr. Lei was one of the people who reviews for the Gilman. He did not review for mine, but he was able to help with the process. About this time Dr. Johnson was also saying this was an option, so I did it!"

Gulledge credits his mentors with providing support that was invaluable to obtaining the honor.

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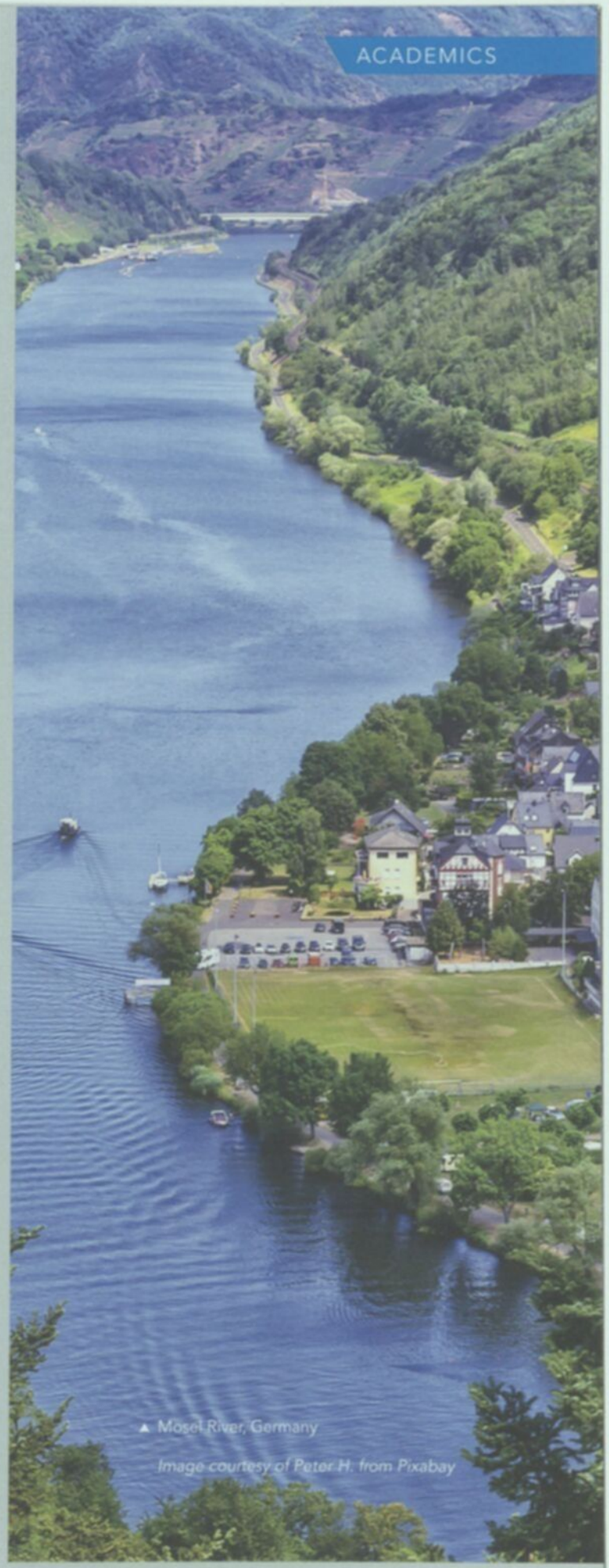

▲ Mosel River, Germany

Image courtesy of Peter H. from Pixabay

"I had Dr. Johnson for German 1 and 2, and I could ask him questions outside of class. He told me how the Gilman could be used to study German abroad. I was worried about the essay part, because I knew people would be writing really good ones, but I guess I did all right. Dr. Johnson and Dr. Lei working in tandem to help me was a godsend. In the future I hope to do the same thing for other students myself."

The Gilman program enables scholars of limited financial means to choose study projects abroad that hone skills critical to national security and economic competitiveness.

"A lot of the major chemical companies in the world are German, like BASF," Gulledge explains. "So I figured Germany was probably the best choice for me."

> "It's an intensive two-month course, something like five hours a day. But after that, I'll be in Berlin. I'll get out of class, and I'll be in Germany!"

Gulledge joins a select group of six Gilman Scholars produced at UAH, dating back to 2013. He was originally slated to begin his internship this summer, but, due to the pandemic, his trip has been rescheduled for summer 2021. He plans to put the extra time in the interim to good use.

"The virus delaying my trip was saddening at first, but I'm happy that I have the chance to improve my German significantly between now and then so that I can get more out of the experience," he says. "I plan to pursue a certificate in Foreign Language and Global Engagement in German. It's possible for me to delay my graduation until the end of next summer and fulfill the requirements for my certificate."

Gulledge expects the experience overseas to be both demanding and rewarding.

"It's an intensive two-month course, something like five hours a day. But after that, I'll be in Berlin. I'll get out of class, and I'll be in Germany!"

Like so many of his fellow students, at UAH he saw the opportunity to readily expand his horizons.

"My interests have always been really broad, and I wanted to do something that I thought would be a good balance. I wanted to learn a language to prove to myself that I could do it. I was tired of being monolingual! I wanted to do something outside my comfort zone."

Gulledge has also spent time working on campus with the Chemistry Department, preparing solutions and as a Teaching Assistant to an intro chemistry class. He is down to earth when asked about future goals once he has completed his studies, but he retains his wistful curiosity and wanderlust.

"Goal number one is to get a job!" he says. "I want a challenge, and I think I want to work for a company that might send me for an MBA. I really want to get into industry, figure out how much I like working in that field—which is where the German could come into use, working for a multinational corporation. I might go on to learn other languages. The ultimate goal is to find a job that lets me travel and see more of the world!" ■

UAH Scientists Brave Curses, Spooky Anomalies to Unravel

SECRETS AT SKINWALKER RANCH

(L to R) Dr. Travis Taylor and Dr. Matt Turner prepare to launch an instrument payload to measure electromagnetic anomalies supported by Skinwalker team members.

Images courtesy of Prometheus Entertainment

Skinwalker Ranch: The name generates serious chills for fans of the paranormal. This 512-acre parcel of picturesque desolation in northeastern Utah is famed for everything from poltergeists and crop circles, to UFO sightings, dangerous electromagnetic forces, dancing fireballs and cattle mutilations. If that's not enough, the ranch is said to be cursed by werewolf-like shapeshifters called 'Skinwalkers' as well.

UAH alums Aerospace Engineer and Astrophysicist Dr. Travis Taylor and Mechanical Engineer Dr. Matt Turner joined Aerospace Engineering graduate Kaitlin Russell on the property to perform experiments for a History Channel docu-series called "The Secret of Skinwalker Ranch."

Dr. Taylor hosts the show and knew his colleagues were in for a truly unique experience with potentially perilous consequences. "I was a bit nervous, as the place can be quite dangerous," he says.

Dr. Turner brought expertise in ballooning, while Russell boasted a wealth of experience in rocketry. The pair performed experiments to measure bizarre electromagnetic anomalies that plague the property and have even sent cast members to the hospital. For the TV novices, filming proved nerve-wracking.

"Having 50 people looking at you with cameras rolling and knowing this is costing money is just asking you to sweat," Dr. Turner says. "It was surreal."

Both investigators had to adapt on the fly. "There were a lot of on-the-field modifications," Russell notes. "I'm still stressed!"

"It's always a crazy ride with Travis," Dr. Turner adds. "We've worked with him at UAH for years. He's data driven, so you've got to be on your toes. I'm sure it's great TV!"

Would they ever do it again?

"It was fun," Dr. Turner says. "I don't know if I could do it as much as Travis. They work insane hours. But I'd love to go back."

Russell agrees. "It would be neat to see more." But when it comes to future TV stardom, she draws the line: "I am no actor!" ■

▸ Makenzie Fogle, DoD SMART Scholar

Makenzie Fogle

named Department of Defense SMART Scholar

UAH electrical engineering student Makenzie Fogle capped a big sophomore year by being named a Science Mathematics and Research for Transformation (SMART) Scholar. The scholarship will pay for her master's degree and provide an additional stipend based on degree level. She is also set to intern with the U.S. Army Space and Missile Defense Command, ensuring a job will be waiting for her once she graduates.

Fogle says this opportunity puts her one step closer to achieving her goals.

"I always wanted to work with the Department of Defense, because I have an interest in radar and communications. Now I will be able to work in the field that has sparked my interest. It will also help me focus on school and not be worried about the financial side of it."

Along with regular classes, Fogle has been working at the UAH Systems Management and Production Center (SMAP Center) focusing on medical projects.

"My main project has been my mom," Fogle says. "She was diagnosed with multiple sclerosis (MS) when I was 12. I was able to get some of her MRIs and 3D model her brain to show lesions and how MS affects the brain."

Only 16% of applicants were named a Smart Scholar in 2019, and only 18% of electrical engineering students. ■

▸ Samantha Johnson, SPIE Scholarship recipient (MS Physics 2020)

Physics doctoral student

Samantha Johnson

receives SPIE scholarship

Samantha Johnson, a doctoral student in physics, has been awarded a $4,000 optics and photonics education scholarship by SPIE, the international society for optics and photonics, for contributions to the fields of optics, photonics or a related field. She is advised by Dr. Don Gregory, a distinguished professor of physics (PhD 1984).

As a graduate research assistant (GRA) at NASA's Marshall Space Flight Center (MSFC) Johnson supports the X-ray Astronomy Group in UAH's National Space Science Technology Center. Her research includes replicated X-ray optics, development of a polarized X-ray source for calibrating the NASA Small Explorers (SMEX) mission, and outreach efforts for the Lynx X-ray Observatory.

Winning the scholarship came as a surprise. "Scholarships at the graduate level are very competitive! I was relieved and grateful, because financially, it really helped me out," Johnson says.

Her interest in instrumentation for X-ray astronomy began with the Active Luminescence For X-ray Emission Detection (ALFRED) system, a UAH Space Hardware Club anti-coincidence shield designed to reduce the background in X-ray detectors.

"Dr. Jessica Gaskin (PhD Physics 2004), one of the mentors for the ALFRED, hired me as an intern for the MSFC X-ray Astronomy Group, and that internship developed into a graduate research position," Fogle says. ■

▲ Dr. Azita Amiri, Bloomberg American Health Initiative Fellow

Bloomberg American Health Initiative selects

DR. AMIRI AS FELLOW

The Bloomberg American Health Initiative has selected Dr. Azita Amiri, PhD, an associate professor of nursing at The University of Alabama in Huntsville (UAH), as a Bloomberg Fellow.

Dr. Amiri's fellowship focuses on environmental challenges in the part-time Masters of Public Health Program that begins in June at the Johns Hopkins Bloomberg School of Public Health in Baltimore.

The Bloomberg American Health Initiative is a new effort that aims to improve health and save lives in the United States. The Bloomberg Fellows Program is an initiative that provides world-class public health training to individuals engaged with organizations tackling critical challenges facing the United States. Fellows receive a full scholarship to earn a master's or doctorate degree in public health, then use their new skills to continue tackling some of the toughest challenges facing U.S. communities.

Dr. Amiri has spent over a decade in environmental health research.

"In 2017, I found the pleasure of working with the environmental justice communities in Alabama," Dr. Amiri says. "This narrowed down my nursing practice, and my research focuses on vulnerable populations and environmental justice communities."

Her fellowship goal is to develop an environmental justice model to mitigate inequalities, injustices and health disparities concerning environmental exposures in Alabama, and possibly expand it to other states.

"Environmental justice is a complex public health challenge and a global problem," Dr. Amiri says. "I am confident that, with what I will learn from this fellowship and UAH's collaboration with the Bloomberg School of Public Health, UAH can lead the environmental justice mitigation plans in the South."

The fellowship provides UAH the opportunity to have Johns Hopkins University as a longtime collaborator, she says.

"UAH does not have a Department of Public Health, and collaboration with the top public health school in the world is exciting."

She expects to finish the program in two years.

"My selection as a Bloomberg Fellow reflects my potential to make a difference in my community and across the nation," Dr. Amiri says.

"I dreamed it and worked hard for it, and most importantly, I never gave up. Now I'm dreaming where I want to go next from here," she says. "I am so delighted to be part of this and looking forward to advancing communities here in Huntsville and Alabama." ■

Nuclear thermal propulsion research wins graduate student

AAS MOLLY K. MACAULEY AWARD

Research on seeded hydrogen in nuclear thermal rocket engines has won a graduate research assistant one of two 2020 American Astronautical Society (AAS) Molly K. Macauley Awards for Science and Engineering and the opportunity to present orally at the AAS John Glenn Memorial Symposium.

Dennis Nikitaev (MS Aerospace Systems Eng. 2019), a doctoral student studying aerospace systems engineering, found out he'd won by email after making a virtual presentation to the AAS selection committee.

"It was an incredible feeling after working so hard and seeing the results of many sleepless nights," Nikitaev says.

The annual student researcher competition seeks to recognize future space industry leaders by awarding and contributing to the professional development of outstanding college and university students. The award has two tracks: Business and Space Policy, and Science and Engineering.

Five finalists from each track are selected to get a $500 travel award with free registration to the Glenn Memorial Symposium and the opportunity to present their research as a poster at the symposium. One winner from each track is selected to receive an additional $2,500 toward attendance of any future conference and also make an oral presentation at the symposium.

Nikitaev's research is directly related to UAH work under a NASA grant to model how a nuclear thermal propulsion (NTP) spacecraft might be engineered to achieve human flight to Mars. That effort is led by Dr. Dale Thomas (PhD Eng./Physics 1988), UAH's eminent scholar in systems engineering and Nikitaev's advisor.

Nikitaev studied the effect that small molar concentrations of argon in hydrogen had on NTP engine and vehicle performance.

"The experiment is needed because the properties of the argon-hydrogen mixture at the temperatures and pressures inside the NTP reactor are unknown and currently can only be estimated," Nikitaev says.

The next big step is to use the NASA Marshall Space Flight Center Nuclear Thermal Reactor Element Environment Simulator (NTREES) laboratory to heat and pressurize this mixture to the NTP conditions and discover the actual properties.

"By doing this, not only will it help the seeded hydrogen research, but it will also increase our understanding of hydrogen-noble gas mixtures at supercritical conditions and the underlying transport properties associated with these mixtures," Nikitaev explains.

NTP may hold promise for long-range missions like a trip to Mars because it can help achieve the goals of low weight, high power and good economy. An NTP engine uses low-enriched uranium to heat a lightweight propellant, such as liquefied hydrogen, to 2,650 degrees Kelvin through channels in its core. The expanding gas exits the nozzle, providing thrust. ■

▲ ABOVE: Dennis Nikitaev, AAS Molly K. Macauley Award winner

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Nuclear thermal propulsion research wins graduate student

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The annual student researcher competit
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▲ ABOVE: Dennis Nikitaev, AAS Molly K. Macaule

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DURING THE COVID-19 CRISIS

At UAH, our students are the reason we get up and work each day. They are our rising stars, and they are the leaders that will bring us into tomorrow. But UAH is more than just students, faculty and staff - **UAH is YOU**.

As a part of the UAH community, I ask you to make our mutual pursuit wider and brighter through a gift at a level meaningful to you and directed at an area that you have come to value even more since the start of the year.

Thank you for being a light to our university!

With Charger Pride,
Mallie S. Hale
Vice President for University Advancement
Executive Director of UAH Foundation

You can be proud to know that your university has responded to these unprecedented circumstances in the true spirit of the UAH slogan, "Charge on!" Whether by quickly transitioning to high-quality online courses as needed or working to ensure the safety and health of the entire Charger community as we return to campus, we have powered through these "interesting times" together with energy and purpose.

Especially vital right now, our UAH Last Mile Fund provides much-needed support to our hardworking scholars at a time when help is most critical – the last year of their degree. Our SSAFE Fund provides aid for personal emergency expenses.

Whatever you choose to support with your gift, know you are making a difference in the lives of our students and in our community.

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"As a future educator, I will always be grateful for your generosity that has helped get me through these final semesters! I want to thank you from the bottom of my heart. Your kindness like this is a rare, selfless thing and I will cherish it!"

Thank you so much,
Elena Bloyer
BS in Elementary Education
Class of 2021

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BRITISH JOURNAL NAMES PHILOSOPHY CHAIR'S PAPER **BEST OF 2019**

▲ Dr. Nicholaos (Nick) Jones

The chair of the Department of Philosophy has won an award for the best paper of 2019 from a British journal. Dr. Nicholaos (Nick) Jones won the Rogers Prize from the British Journal for the History of Philosophy for his paper, "The Architecture of Fazang's Six Characteristics."

"I feel a bit of shock, to be honest," says Dr. Jones, who received notice of the prize in an email from the journal's deputy editor. "I'm trained as a philosopher of science. But I've always had an interest in doing scholarship on the history of Chinese Buddhism, as a sort of secondary research project. I'm very honored for the editors to think so highly of my efforts."

Dr. Jones' paper, which was among only 9 percent accepted by the journal last year, is an effort to explain the ideas of a medieval Chinese Buddhist monk named Fazang.

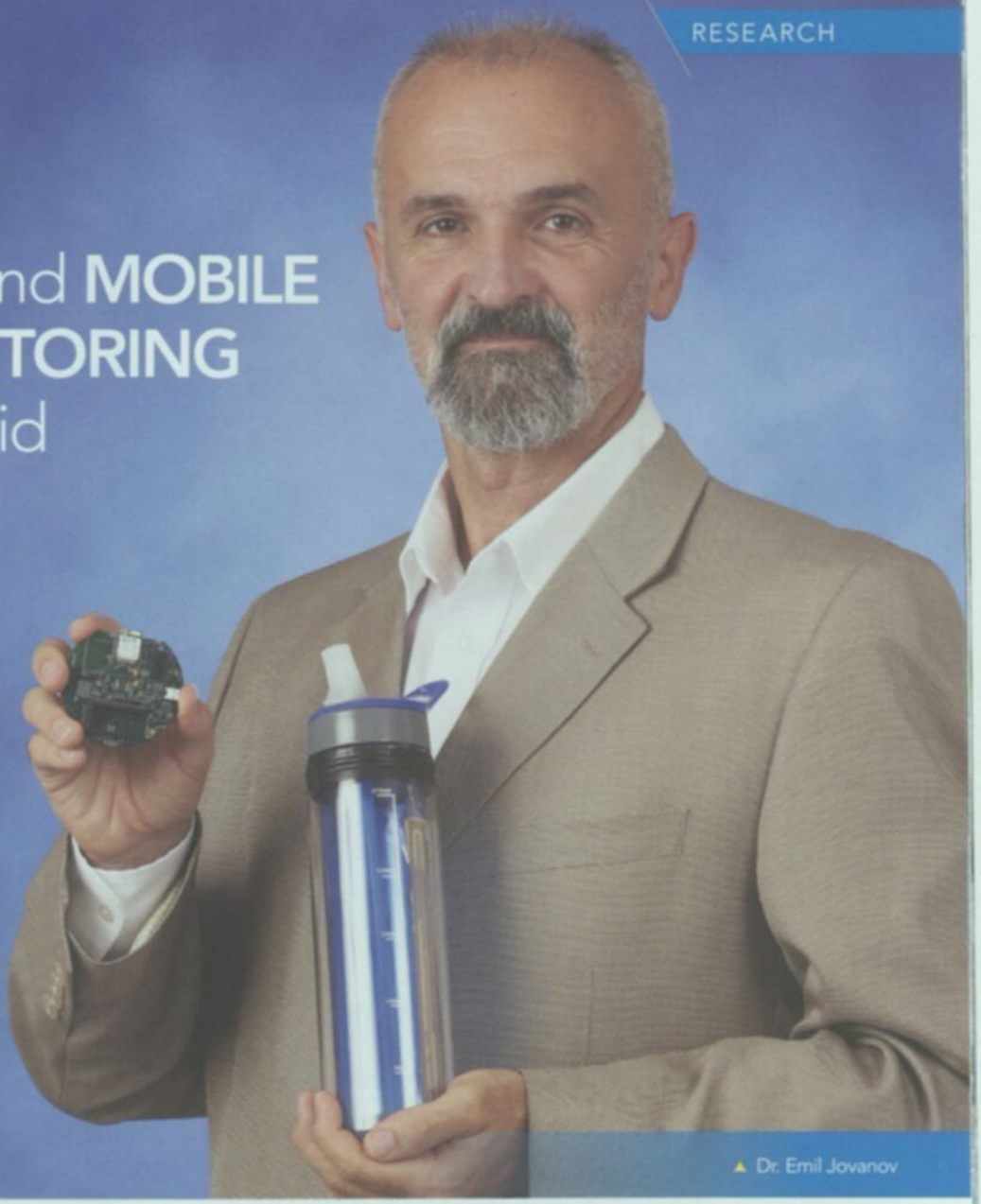
"Fazang had significant influence on subsequent Chinese efforts to make sense of how the things in the world hang together and how we fit in with everything else," Dr. Jones says. "Part of the reason he is so influential is that he has some interesting and provocative views about everything being inescapably interconnected."

Dr. Jones says that when philosophy gets attention in the news, it tends to be for its value in giving people the sort of soft skills that are difficult to acquire in a more profession-oriented education. It confers skills like argument framing and organization, which are relevant to project management and strategic planning, as well as reason-driven persuasion, which is relevant for tactical communication and operational analysis.

"This, I think, is why philosophy majors are so versatile in their careers and why they have the highest mid-career salaries of any humanities degree," he says. "It's also, I think, why everyone can benefit by studying a little philosophy – it teaches you how to bend and flex when life throws itself at you." ■

Support for **TELEHEALTH** and **MOBILE HEALTH MONITORING** Rises Since Covid

Dr. Emil Jovanov, a pioneer in the wearable health monitoring field, co-authored and participated in a study of the use of mobile health technologies (mHealth) to combat health challenges like COVID-19. Conducted by a task force organized by the Mass General Brigham (MGB) Center for COVID Innovation, the study found these technologies offer tremendous opportunities for monitoring, mitigation and testing in future pandemics.



▲ Dr. Emil Jovanov

"We found support for telemedicine and tele-rehabilitation increased from about 10% before the pandemic to almost 60% now," says Dr. Jovanov, an associate professor of electrical and computer engineering selected as an Institute of Electrical and Electronics Engineers (IEEE) Fellow in 2020. "This can create a significant change in digital healthcare that would otherwise take decades."

An integrated mHealth system could help assess who needs to be tested by providing relevant information through contact tracing, tracing of shared space and infrastructure, and monitoring of physiological changes.

"All this information can be used to inform decisions and optimize the use of resources," Dr. Jovanov says. "An integrated system can also characterize disease spread by tracking patterns of new cases."

Dr. Jovanov joined experts from top bioengineering institutions across the globe for the three-month effort.

"We identified technologies that could be deployed in response to the COVID-19 pandemic to predict symptom escalation for earlier intervention, to monitor individuals who are presumed non-infected and to enable prediction of exposure to SARS-CoV-2."

Because these devices are scalable and can be deployed in spaces with no infrastructure in a very short period, wearable health monitoring systems present an opportunity for field hospitals that may become necessary in pandemic outbreaks, Dr. Jovanov says.

"A combination of off-the-shelf technology such as smartphones, smartwatches and wearable sensors, new advanced sensors and the integration of mobile health systems could better prepare us for dealing with the challenges of future surges of COVID-19 cases and to minimize the effects of future pandemics on routine clinical services." ■

Unique Spectrometer Developed at UAH

Finds Ultrafast Aspect of Gallium Arsenide

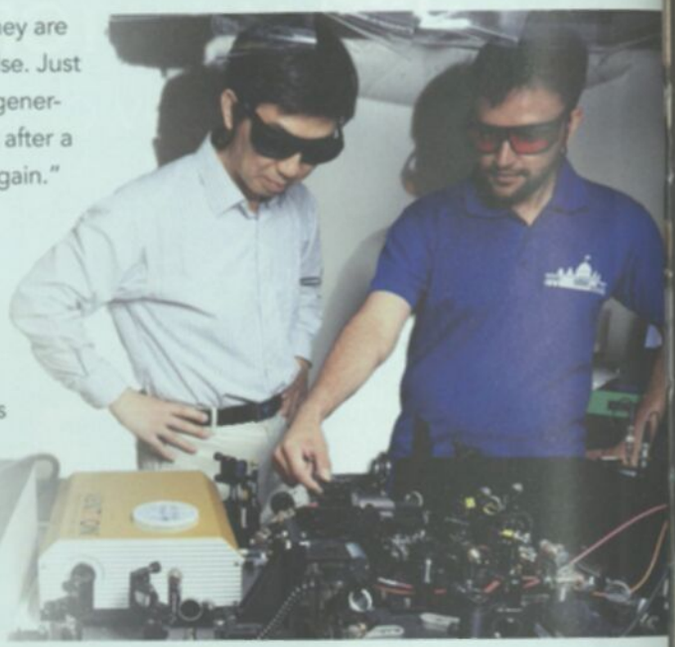
Researchers at UAH have developed a unique spectrometer to study ultrafast properties of photonic materials which led to the discovery of a never-before-observed aspect of gallium arsenide (GaAs), one of the most important photonic materials.

"As far as we know, this is the only such system in the world," says Dr. Lingze Duan, a professor of physics and astronomy, who teamed with Dr. Hemang Jani, a recent doctoral recipient (PhD Optical Science and Eng. 2020), in a five-year effort to develop the spectrometer and conduct the GaAs research.

"Understanding how atoms, molecules and solid-state materials behave in short time scales offers deeper insight into the dynamic processes occurring in them," says Dr. Duan. "We studied how electrons in GaAs behave after they are excited by an ultrafast optical pulse. Just like throwing a rock into a pond generates disturbance and ripples, but after a while the pond will quiet down again."

The quiet-down time in GaAs takes only about 100 picoseconds. One picosecond is 1/1 trillionth of a second.

Understanding these behaviors in photonic materials can help scientists develop ultrafast photonic devices, such as fast photodetectors, photonic switches and semiconductor photocathodes. ■



Standing room only crowd engages in student's **warp drive theory** speech

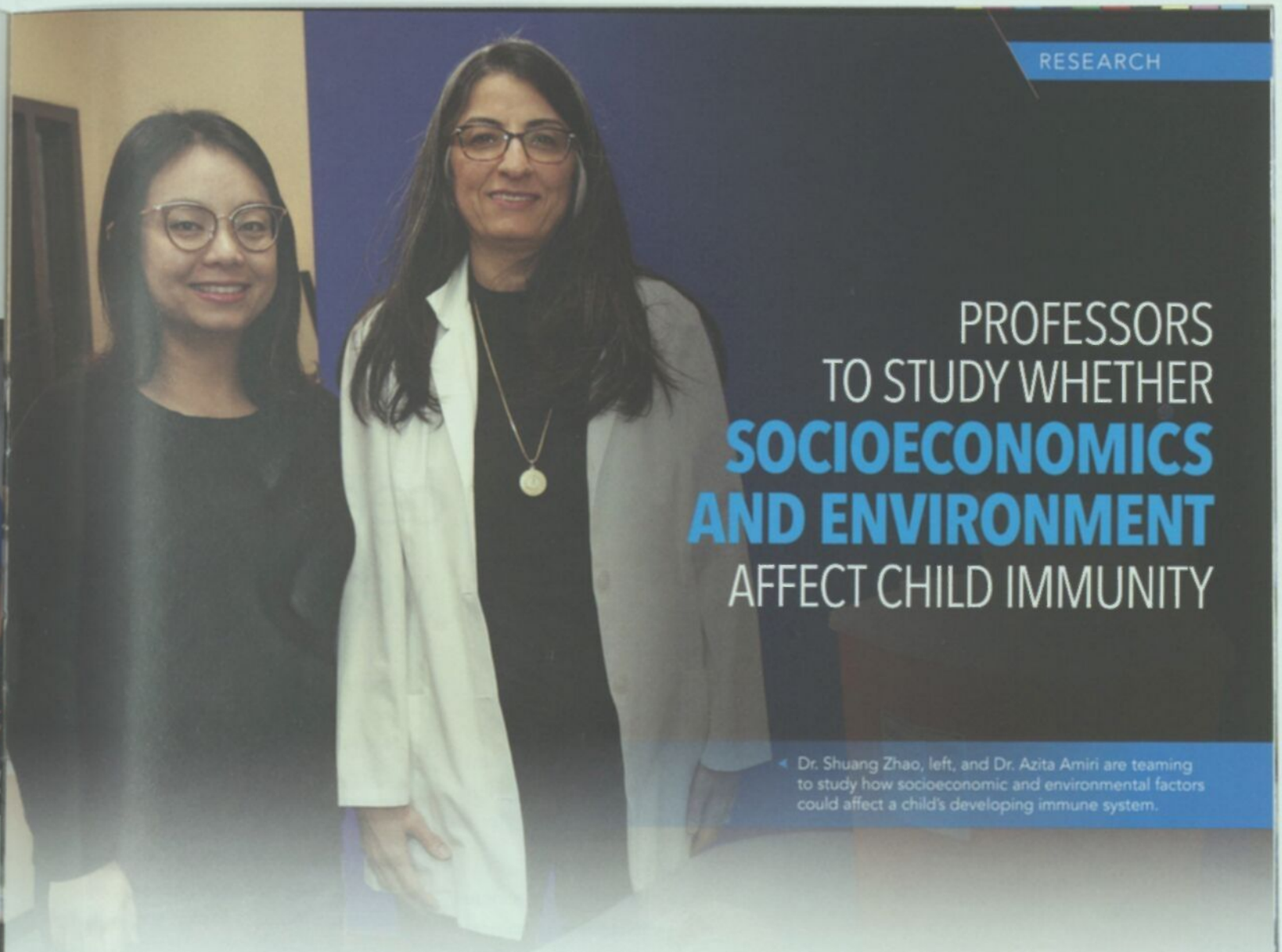
Traveling 186,000 miles a second, light takes 2.573 million years to reach the Andromeda Galaxy. Humans? We're stuck in our own solar system. But a theoretical warp drive offers hope for intergalactic exploration.

"Mathematically, if you fulfill the energy requirements, they can't prove it doesn't work," says Joseph Agnew (BS Mechanical Eng. 2020), a research assistant with UAH's Propulsion Research Center. "What you do is compress space-time ahead of the craft and expand space-time behind it."

Agnew recently wowed the American Institute of Aeronautics and Astronautics Propulsion and Energy Forum in Indianapolis with the feasibility of a working system. "Someone actually came up to me after the presentation and asked, 'Are you funded?'" he says, smiling.

Not yet. But with advances in exotic matter, quantum physics, and metamaterials, who knows? The recent discovery of naturally occurring gravitational waves proves the basis for a working warp drive.

"Warp drive theory is at the point where the mathematics and technologies need more development," Agnew says. "If the opportunity is there to do it, I'll pursue it." ■



PROFESSORS TO STUDY WHETHER SOCIOECONOMICS AND ENVIRONMENT AFFECT CHILD IMMUNITY

Dr. Shuang Zhao, left, and Dr. Azita Amiri are teaming to study how socioeconomic and environmental factors could affect a child's developing immune system.

Two UAH professors have teamed up with a genetic sequencing firm at the HudsonAlpha Institute for Biotechnology to try to understand whether the socioeconomic status of parents and environmental exposures have an impact on the developing immune systems of their children.

Principal investigator Dr. Shuang Zhao, an assistant professor jointly appointed to the Department of Political Science and the Department of Atmospheric Science, is teaming with co-principal investigator Dr. Azita Amiri, an assistant professor in the College of Nursing, for the research, funded by iRepertoire Inc., a genetic sequencing company.

"Children's vulnerability to environmental risks and how the environment impacts them is a top priority for both Dr. Amiri and myself," says Dr. Zhao. "In this study, we aim to identify the body's immunological memory or 'logbook' of all past infection and disease in children from birth to age 18 by using immune repertoire sequencing technology."

From a population of 100 North Alabama parents and their children, the researchers will examine whether parental factors, including income, lifestyle choices and the parents' knowledge about the indoor environment, are associated with the immune system T-cell and B-cell diversity of their children.

Parents will complete questionnaires about their demographic and socioeconomic background, as well as indoor environmental exposures, that later could correlate with their children's immune system.

"As a nurse scientist and a maternal and child health specialist, I want to know what is happening in our immune repertoire in cases of exposure to different environmental hazards, and how we can boost the good part of the immune repertoire and change the bad part," says Dr. Amiri.

Sequencing the immune repertoire will potentially yield insights into the nature of the body's immune response to disease and infection. Data analysis and published results are expected in the year 2021. ■

MORTON HALL REOPENS

with 21st century panache, versatility

▼ The view across the new quad takes in Morton Hall's new footprint, a seamless celebration of past, present and future.

The iconic face of UAH since opening its doors in 1961, Morton Hall has been the first portal to university life for virtually every Charger undergraduate for the last 59 years. The historic structure houses the College of Arts, Humanities and Social Sciences (CAHS) and has witnessed the campus grow from 83 acres to over 500, and a few hundred students to 10,000 today.

Yet the venerated building itself has remained relatively unchanged – until now. The facility was just unveiled as the newest educational building on campus after undergoing a major, multi-year renovation and expansion. The original building was not only completely renovated, but received a two-story expansion as well to increase the total area to 118,000 square feet. The new floorplan features shared common areas and study spaces and supports 32 classrooms of various sizes, seminar rooms, five classrooms with tiered seating, 130 offices and a lecture hall with a capacity for 124 students.

"The expansion runs perpendicular to the original structure and creates an 'L'-shaped building that extends toward Frank Franz Hall," says Greg Smith, Assistant Vice President, Facilities & Operations. "What was once a vehicular drive has been transformed into a large pedestrian quad that will offer a beautiful greenspace, an amphitheatre, shaded sitting areas and sidewalks."

The project brings 21st century flair and functionality to a building originally designed with earlier notions of what a university facility should be.

"Teaching and learning will be facilitated by state-of-the-art classrooms," says Dr. Sean Lane, Dean of the CAHS. "An important feature is flexibility. For many of the classrooms, the tables and chairs can be reconfigured to facilitate techniques like collaborative learning. Others have multiple screens that allow groups of students to work on different projects simultaneously. All classrooms have been updated with the latest audio-visual equipment. We also have a keyboard laboratory for students in Music. Research and creative activity will be enhanced by new laboratories and the Black Box Theatre."

The Black Box Theatre is a performance space that allows for flexible staging and enhanced possibilities for audience interaction.

"The theatre is an exciting new addition to the performing venues on campus and a huge endorsement of the Theatre BA," says David Harwell, the UAH Theatre Program Director. "Future presentations may be in-the-round, arena-or proscenium-style. Its two-story design features a catwalk that surrounds the space to allow for technical enhancement of the sensory experience. The theatre also boasts backstage areas for actors and technicians to seamlessly interact with live events."

Overall, CAHS students, faculty and staff will benefit in myriad ways from the fresh design.

"The new Morton Hall has sparked creativity and provided hope," Dr. Lane says. "Faculty and students have said moving into the new facility has made them excited about the future. I can't wait to see their creativity as they make it their own."

With all these changes, one might wonder about a particularly hallowed UAH tradition: Will incoming students still attend classes in the new Morton Hall as their entre to college life?

"Absolutely!" Dr. Lane says. "A number of general education courses are already being offered by CAHS faculty with students from other colleges. We look forward to having a prominent place in future alumni memories." ■

UAH Seniors **DESIGNING NEW STEM TOOLS** for Economically Challenged **K-12** Students

Two teams of senior students in Mechanical and Aerospace Engineering (MAE) Product Realization are designing Science, Technology, Engineering and Math (STEM) tool products to engage and inspire economically challenged K-12 students to spark interest in STEM careers.

One team is working on a Wind Tunnel for the UAH student section of the American Society of Mechanical Engineers to use for K-12 outreach events, while the other develops a Dash Robots Recharging Station for Madison Cross Roads Elementary School.

The Wind Tunnel team is led by Patrick Rugel and includes Ian Stuart, Nicholas Alawine, Nash Beasley, Levi Cox, Chance Hunt and Jared Sampson.

"As a leader you can't focus on any one specific part of the project," Rugel says. "However, you must look at each part of the project and organize it in such a way that the entire project can be successful."

The Robots team is led by Morgan Jones and includes Andrew Brewster, Nicholas Hall, Cole Miller, Brandon Ploshay and Nick Richardson.

"You must listen to your team's problems and create quick, effective solutions," Jones says. "There are always new tasks to keep up with, for myself and for each of the team members. You have to take baby steps throughout the process and make sure everyone is on the same page."

Part of a STEM outreach effort to primary and secondary education that spans more than a decade, the new tools the teams create enable K-12 students to engage in hands-on learning activities. Research shows that children garner a greater understanding of STEM topics when they are presented in a tactile manner as opposed to a theoretical manner.

"We intentionally target K-12 schools and groups such as Boys and Girls Clubs of America that maintain a high population of minority students or students from economically challenged homes," says Dr. Christina Carmen (PhD Aerospace Eng. 2003), MAE clinical associate professor, who teaches the course. "A child's future shouldn't be dictated before they are even born. As a leading engineering education institution surrounded by hundreds of engineering companies, UAH can help turn the tide."

The UAH students are required to engage the K-12 students in the design process from very early market surveys to final delivery and demonstration of the product.

"These STEM tool efforts can impact young lives and perhaps spark an interest in a field that has a wealth of opportunities provided by NASA, the U.S. Army and too many engineering companies to list," Dr. Carmen says. "These industries are part of these children's communities but for many the chance to work for them is not imaginable."

Dr. Carmen believes the projects also have an impact on UAH engineering students as well.

"So many engineering students have had their eyes opened to the plight of many in society. Hopefully, they will carry these lessons with them throughout their lives." ■

"INTENTIONAL **IMPROV"**

UAH Engineering, Psychology, and Theatre faculty collaborate with NASA for workshops

NASA analysts "live at the Improv"? Well, not quite. But the UAH departments of Industrial & Systems Engineering and Engineering Management, Music, Theatre and Psychology are collaborating with the agency on a project to use improv theater techniques to identify and address common challenges faced by the estimating and analysis community. UAH received $74 thousand in grants to design workshops aimed at helping NASA personnel identify stakeholder issues while maybe enjoying a laugh or two along the way.

> "It's not the laugh we're looking for, but the nugget of information that gets the laugh."

Dr. Bryan Mesmer, an assistant professor of industrial & systems engineering and engineering management, works with Rob Moreland, a NASA management analyst, to address issues with things like budgeting and scheduling that NASA leadership frequently encounters. Dr. Mesmer saw an opportunity.

"There's been a big movement in the systems engineering world recently toward being more transdisciplinary," he says. "It's not just math and physics, it's also social sciences and communication arts."

Dr. Mesmer reached out to Amy Guerin, an assistant professor in the Theatre Program, and Dr. Kristin Weger (MA Psychology 2013), an assistant professor in the Department of Psychology. With the help of Dan Friedrich, a graduate of the Conservatory of The Second City, the improv comedy troupe notable for launching the careers of folks like Bill Murray, Steve Carell, Tina Fey, Amy Poehler and Stephen Colbert, they crafted a workshop titled, "The Truth is Funny: Using Theater and Comedic Tools to Elicit Issues within Project Management and Systems Engineering."

"Any project manager can relate to the issue of going over budget and over schedule," says Dr. Mesmer. "Attendees at the symposium already recognized that a lot of the methods they use are flawed. So we try to tease out these hidden truths through improv."

The collaborators found that people were able to lighten up and better identify problems by making jokes about those problems.

"It's not the laugh we're looking for, but the nugget of information that gets the laugh," Dr. Mesmer explains. ■

Lance West
Named Head Coach of UAH Hockey

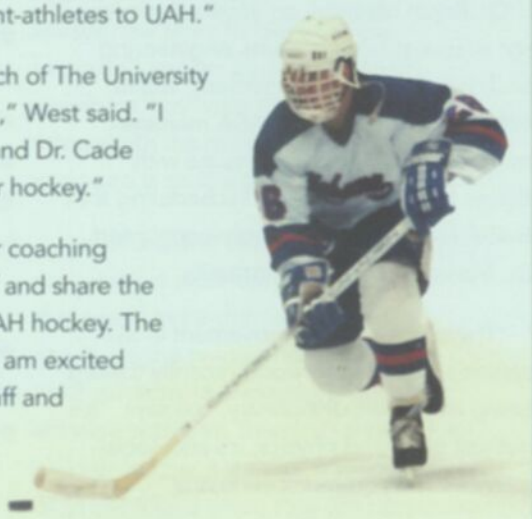
The UAH Department of Athletics has announced the promotion of Lance West (BS Biological Sciences 1997) to head coach of the UAH hockey program after two seasons as an assistant on the Chargers bench.

"We are excited to officially announce Lance as head coach of the UAH hockey program," Director of Athletics Dr. Cade Smith said.

"He has a deep understanding of what UAH hockey means to the community and an incredible pedigree within the college hockey landscape. We believe Lance will be successful in continuing the regrowth of the program and will attract successful student-athletes to UAH."

"I am honored to be named head coach of The University of Alabama in Huntsville hockey program," West said. "I want to thank President Darren Dawson and Dr. Cade Smith for the opportunity to lead Charger hockey."

"I have spent 18 years either playing or coaching with the program, and I am very aware of and share the passion of our alumni and fan base for UAH hockey. The challenges that lie ahead are tough, but I am excited to work together with the young men, staff and the University that have committed to making this a successful program."



West is now the sixth head coach in program history. ■

Cade Smith chosen as UAH athletic director

Dr. Cade Smith (MS Management 2018) has been named Director of Intercollegiate Athletics at UAH.

"Cade's broad experience as an administrator, head coach and interim athletic director, and his educational background made him the best choice to lead UAH into the future," says UAH Associate Provost and NCAA Faculty Athletics Representative Brent Wren.

Dr. Smith has been at UAH since 2013. He was selected chair of the Gulf South Conference (GSC) Volleyball Coaches Committee, an American Volleyball Coaches Association (AVCA) Top 25 Voter, AVCA Mentor, RAC Committee member for South Region Volleyball and AVCA Head Coaches Committee Member.

Before joining the UAH volleyball staff, Smith spent six years coaching at Central Arkansas Christian School in Little Rock, Ark., and, in addition to his coaching duties, he served two years as the school principal following four years in the classroom. ■

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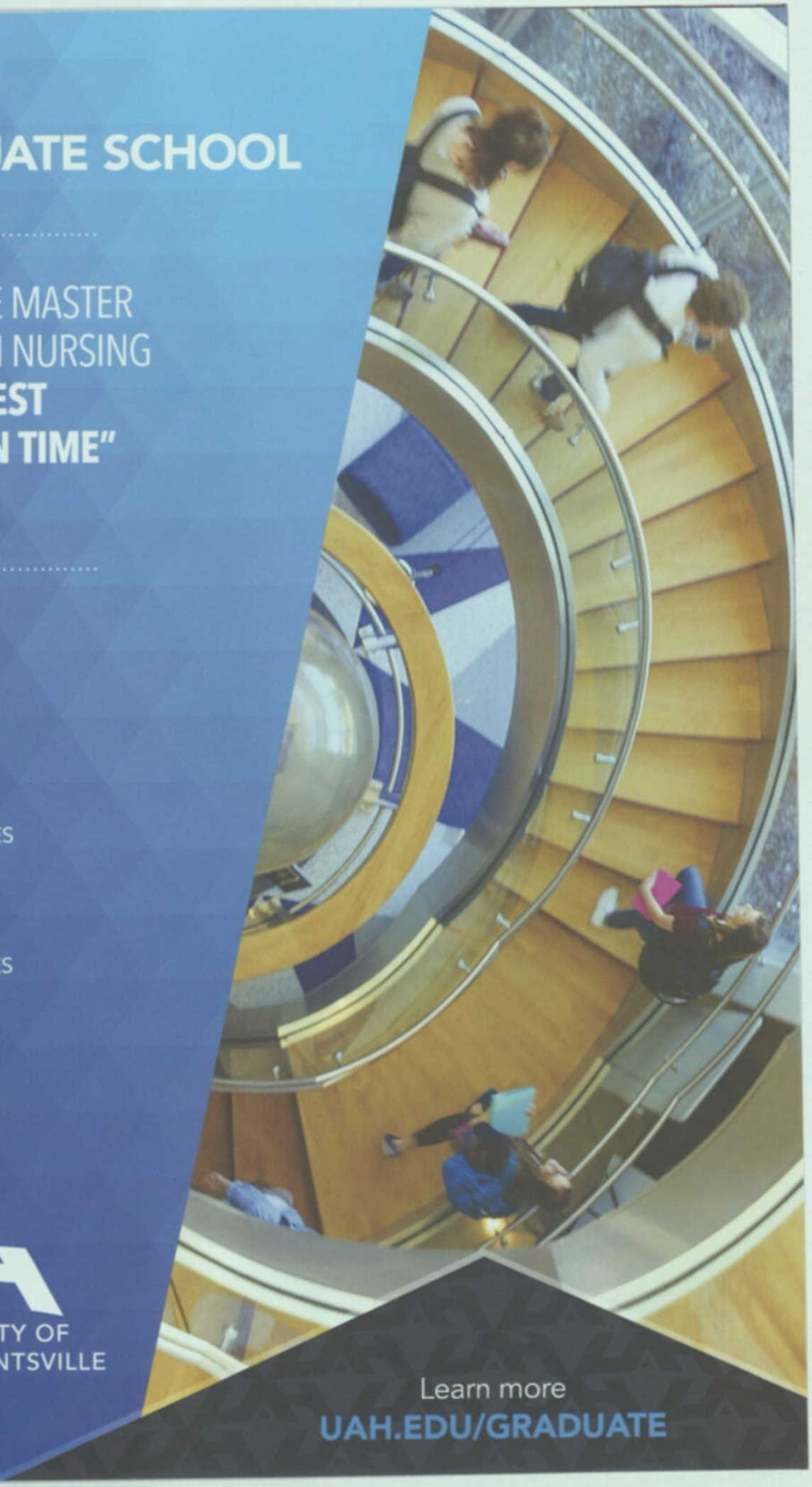

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