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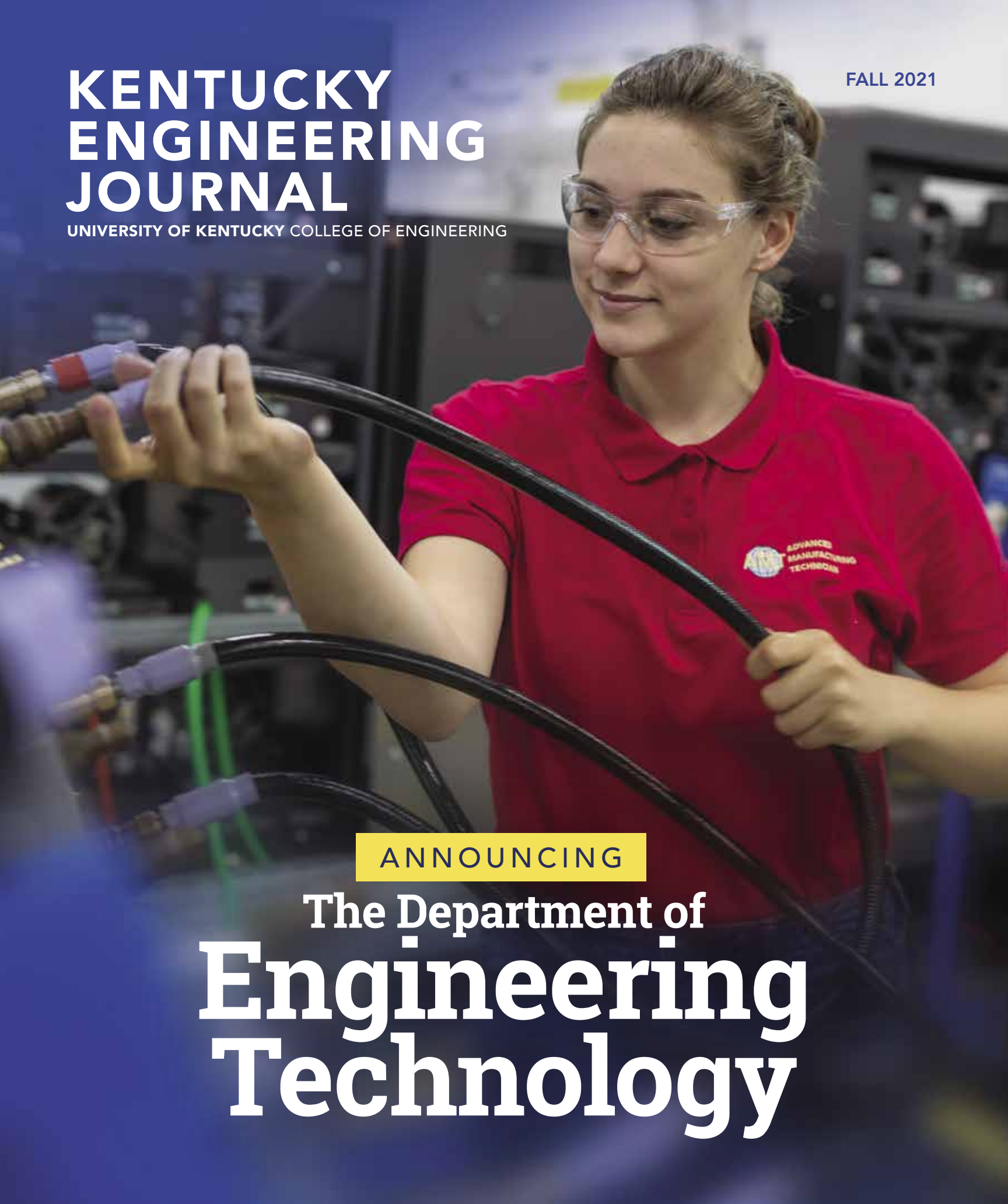

ANNOUNCING

The Department of Engineering Technology

PIGMAN SCHOLARS CAMP PUTS UK, LEXINGTON ON DISPLAY FOR EASTERN KENTUCKY HIGH SCHOOL STUDENTS

Fifty-one rising high school sophomores, juniors and seniors from Eastern Kentucky made the University of Kentucky their home from July 27-30, 2021 for the Pigman Scholars Camp. Over their four-day stay, campers received a good look at UK's campus, the College of Engineering and the city of Lexington. For many, the trip was their first opportunity to visit UK.

"The Pigman Scholars Camp was an incredible experience for our students," said Katie Bailey, a teacher at Floyd County School of Innovation who accompanied the campers during the week. "I loved seeing the students' excitement and hearing them discuss becoming future Engineering Wildcats."

Students came from Belfry High School, Floyd County School of Innovation, Harlan County High School, Johnson Central High School and Pikeville High School.

Alumnus L. Stanley Pigman (BSMNG 1981) and his wife, Karen, funded the camp. Both were on hand for various events and activities during the week.

"Many of these kids love learning and possess the determination to succeed, but they need to be able to see new environments that open up possibilities for them," said Stanley Pigman. "That's why it's so important to get them onto UK's campus, let them see the labs, let them sleep in the incredible new dorms and let them begin to imagine what it would be like to take that journey."

MESSAGE FROM THE DEAN

Our students want to change the world and make it a better place. We encourage those ambitions, and so we teach them the engineering attributes that will make them change agents: the ability to identify and ask the key question when circumstances are chaotic and confusing; the knowledge, skill and insight to answer that question confidently and correctly; and the ability to see the whole picture and think about the endgame ahead of time.

Our goal is to flood the field with UK engineering talent. We want to put as many ambitious and capable individuals into the profession as possible, which is why we have worked relentlessly over the past two years to expand our degree offerings.

In 2020, we launched our undergraduate program in biomedical engineering — inspired by the example and enabled by the generosity of Dr. Joe Halcomb. In 2015, Dr. Halcomb donated $6 million to transform biomedical engineering at UK and set it on a new and ambitious course. Today — not even two years since the program launched — we have 178 biomedical engineering majors and pre-majors. That is outstanding.

> “Our goal is to flood the field with UK engineering talent. We want to put as many ambitious and capable individuals into the profession as possible.”

This fall, thanks to a $2.25 million gift from Toyota, we launched a brand-new department within the college — the Department of Engineering Technology. Students can major in Lean Systems Engineering Technology and Computer Engineering Technology through an innovative 2+2 degree program with our partners at Bluegrass Community Technical College. These programs will produce graduates with an applied skill set and knowledge base tuned for 21st-century digital, networked and automated workplaces. Additionally these programs will appeal to students with the strongest “hands-on” attitude, and produce graduates prepared for a portion of the technical workforce spectrum that is currently underserved. This is a win for the students, a win for the college and a win for Kentucky.

This is an exciting time for the College of Engineering. Four new undergraduate majors in the past year. Partnerships in high-impact industries. And a growing reputation for producing graduates of the highest integrity, skill and grit. I am proud to be associated with the faculty, staff, students and alumni who have all contributed to making these great things happen — and I hope you are proud of your college as well.

Sincerely,

Rudy

Rudy Buchheit
Dr. Rebecca Burchett Liebert Dean

College of Engineering

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Our spring graduates were inducted into the profession on May 13, 2021. During the Induction into the Profession ceremony, graduates take an oath similar to the Hippocratic Oath taken by medical doctors.

UK LAUNCHES DEPARTMENT OF ENGINEERING TECHNOLOGY IN PARTNERSHIP WITH BCTC, TOYOTA

The new department offers two four-year undergraduate degrees in lean systems engineering technology and computer engineering technology.

Lindsey Piercy

Given advancements in technology, society is calling upon engineers to solve the world's most complex problems.

That call is being answered thanks to a unique partnership between the College of Engineering at the University of Kentucky (UK) and the Bluegrass Community and Technical College (BCTC). Students can now earn an Associate of Applied Science (AAS) and a Bachelor of Science (BS) in Engineering Technology.

The new Department of Engineering Technology — made possible in large part by a $2.25 million gift from Toyota — offers two four-year undergraduate degrees in lean systems engineering technology and computer engineering technology.

Additionally, the innovative collaboration involves BCTC's Integrated Engineering Technology and Computer Engineering Technology programs.

Graduates of the new programs will be trained in the latest technologies and equipped with the practical skills necessary for thriving in advanced technology industries.

"The College of Engineering Department of Technology will be an integral part of our university's efforts to advance the commonwealth through ingenuity and collaboration," UK President Eli Capilouto said. "Because of Toyota's generosity and commitment to the state we serve, we can forge new paths toward discovery and empower our community to achieve more in partnership with BCTC."

"We're excited to partner with Toyota and UK to provide this opportunity to our students," Bluegrass Community and Technical College Provost Greg Feeney said. "Recruiting students of all backgrounds will enrich our programs and the industry and empower students to establish careers that will better their lives and communities."

BACHELOR OF SCIENCE IN LEAN SYSTEMS ENGINEERING TECHNOLOGY (LST)

The LST program will prepare students to thrive in a highly competitive global marketplace and provide the skills necessary to improve quality output, streamline processes and reduce waste.

"The demand for increasingly advanced skills in manufacturing requires expanding the engineering pipeline," Nelson Akafuah, inaugural chair of the Department of Engineering Technology, said. "In the ever-evolving world of manufacturing — where manufacturers must connect, predict and adapt to the transition from developing products to engineering experiences — a unique skill set in continuous improvement and creative problem-solving is needed. This new degree path will equip students with those necessary skills."

The curriculum will include classroom instruction and lab experiences, building upon the college's more than 25-year partnership with Toyota. LST students will also benefit from professional instructors, some of whom are former Toyota executives.

"This exciting educational partnership will go a long way to ensuring more Kentucky students are prepared to take on the challenges of an advanced global marketplace," Tom Buffetta, vice president of production engineering at Toyota, said. "We are thrilled to continue our long-term partnerships with both UK College of Engineering and Bluegrass Community and Technical College in this way and look forward to helping equip more students with the skills and knowledge necessary to have a positive impact on society."

LST students spend their first years earning their AAS degree in integrated engineering technology at BCTC's Georgetown campus, before working toward their bachelor's degree at UK's main campus.

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING TECHNOLOGY (CPT)

The CPT program will provide in-depth knowledge of hardware and software design, development and maintenance. Students will learn industry-standard approaches to application software development and state-of-the-art problem-solving techniques for developing application code and firmware, including networking and web operations.

The curriculum will include classroom instruction and lab experiences where students will gain a strong background in cutting-edge development with programming languages currently used in industry.

Additionally, those in the program will gain an architectural understanding of computer systems from low-level gate design to high-end microprocessors.

"Complementary technologies in data analytics, machine learning, human-machine interaction, intelligent robots, interconnected supply chain and the ability to transmit digital instructions to the physical world — that can run smart, cost-efficient and automated plants — require a new set of computing skills," Akafuah explained. "This degree path will uniquely prepare students to become leaders in this advancing industry."

CPT students spend their first years earning their AAS degree in computer engineering technology at BCTC's Newtown campus or online, before working toward their bachelor's degree at UK's main campus.

TOYOTA'S INVESTMENT TO DIVERSIFY THE ENGINEERING WORKFORCE

The department is made possible, in large part, by a $2.25 million gift from one of the world's largest automakers.

The funds will be used toward laboratory enhancement and the establishment of a Toyota Engineering Technology Distinguished Professorship.

In April, Toyota announced a $1.7 million investment to increase opportunities for underrepresented students and assist them in earning engineering degrees. The gift will establish and support the Toyota Engineering Technology Diversity Scholarship Fund, which will provide annual scholarships for undergraduate students.

"Building a stronger Kentucky will require deliberate and sustainable efforts to provide equal access to quality education. This program will give more people a chance to build great careers in fields like engineering," Susan Elkington, president of Toyota Motor Manufacturing Kentucky (TMMK), said. "Toyota is committed to providing resources, time and knowledge to help build stronger communities in which we operate. We're thankful for great education partners that have the same mission."

Preference will be given to students whose ethnic, racial, gender or background would enhance the diversity of their institution, as long as these preferences align with to the university's achievement of its interest in obtaining the educational benefits of a diverse student body. However, every student who is enrolled in the program, who is a Kentucky resident and who has unmet financial need will have an opportunity to compete for the scholarship.

For additional information about Toyota, visit www.toyotanewsroom.com. To learn more about the Department of Engineering Technology, you can visit the UK Engineering website. ■

(From left) Daniel Benitez, Marcus Rodriguez, Leah Blair, Bruno Athie Teruel and Hugo Reyes-Centeno, assistant professor of anthropology, examine artifacts from his human fossil record research. Photo Courtesy: UK Research.

INTRODUCING EDUCELAB, UK'S NEXT-GENERATION HERITAGE SCIENCE LAB

A $14 million NSF grant is enabling the college to construct a world-class cultural heritage lab.

Lindsey Piercy

It's the signature on a bourbon barrel — it's the ancient footprints in Mammoth Cave.

Heritage science is all around us and has deep roots in the commonwealth.

Kentucky's story begins in prehistoric times when mammoths roamed the Ohio River Valley at Big Bone Lick.

Now, thanks to a $14 million infrastructure grant from the National Science Foundation, the University of Kentucky is poised to tell that story in new, groundbreaking ways through the lens of heritage science.

"We are at a turning point," Brent Seales, UK Alumni Professor in the Department of Computer Science, said. "Science and technology present a host of exciting opportunities to the heritage sector. "

For more than 20 years, Seales has been working to create and use high-tech, non-invasive tools to rescue hidden texts and restore them to humanity.

Using the NSF infrastructure funding, he has gathered a team of experts from the College of Engineering and the College of Arts and Sciences to build EduceLab — UK's vision for next-generation heritage science. The collaborative facility will

develop innovative artificial intelligence (AI) solutions for the unique challenges presented by cultural heritage objects.

Heritage science draws on engineering, the humanities and the sciences to enhance the understanding of our past, inform the present and guide our future. Ultimately, the goal is to enrich people's lives and celebrate the commonality and diversity of the human experience.

"The word Educe means 'to bring out from data' or 'to develop something latent.' That's what we've been doing with our virtual unwrapping work. And that context has created an opportunity to expand the very focused question of, 'Can we read what's inside a scroll?' to a broader question of, 'What heritage science questions can we answer right here in Kentucky?" Seales explained. "My goal is to rally some of the best researchers around that theme and build a world-class laboratory that allows us to pose and then answer some of those questions."

And the quest for answers has already begun.

"Here at UK, collaboration is dynamic because we have all of our major colleges on one contiguous campus," Hugo Reyes-Centeno, an assistant professor in the Department of Anthropology, added. "I see tremendous potential to integrate quantitative analysis and new methodologies that will inform the theoretical perspectives that are the hallmark of the social sciences."

MULTIMILLION-DOLLAR RENOVATION TO ENHANCE WILLIAM S. WEBB MUSEUM

EduceLab will function as a user facility for the heritage community and have its home base in UK's William S. Webb Museum of Anthropology, located on Export Street in Lexington, next to the main campus.

Founded in 1931, the museum remains dedicated to enhancing knowledge about and preservation of the nation's cultural heritage.

The Webb Museum houses a world-renowned archaeological collection from more than 250 properties listed on the National Register of Historic Places — including Native American, Revolutionary War- and Civil War-era sites.

The collections provide a link to the roots of the commonwealth and its people. Additionally, the immense research archives offer educational services, practical training and research opportunities for the campus community and beyond — making it the ideal location for EduceLab.

"Within Kentucky, it's probably a well-kept secret that we have some of the best collections that relate to the first agricultural populations in eastern North America," Crothers said. "EduceLab is going to impact what we do in the museum, and in archaeology in general, because it's providing us access to the most sophisticated and high-level equipment, which we didn't have before."

EDUCELAB HAS FOUR PARTS: BENCH, FLEX, MOBILE AND CYBER

BENCH
Modern technology is key to understanding how relics of our past were made.

BENCH will acquire the instruments needed to conduct leading-edge materials science, which will help establish a comprehensive workflow.

"My role is to bring the perspective of materials characterization," John Balk, William T. Bryan Professor of Materials Engineering and associate dean for research and graduate studies said. "As a materials engineer, I look at what materials are made of. That helps us understand how an artifact was made in the first place and the technology that was used to create it."

FLEX
In 2016, Seales' team developed the Volume Cartographer, a revolutionary computer program for locating and mapping 2D surfaces within a 3D object. The software pipeline is used with micro-CT to generate extremely high-resolution images — enabling the ability to read a document without ever needing to physically open it. A charred scroll from En Gedi was the first complete text to be revealed using the software.

While the first-of-its-kind software has profoundly impacted history and literature, not all damaged artifacts are created equal.

Seales and his team had often found it difficult to use equipment that is poorly suited for odd shapes and sizes — so

John Balk (left) is the William T. Bryan Professor of Materials Engineering and director of the Electron Microscopy Center (EMC). Pictured here with EMC staff member Nico Briot, Balk is a co-investigator on the NSF grant.
Photo Courtesy: UK Research.

they decided to build their own.

"With the FLEX, we will have a prototype environment where we can envision, build and test custom instrument configurations built around the heritage object," Seales said. "That is truly a novel approach not seen anywhere else at the mid-scale level."

MOBILE

It's one thing to bring an object into the lab. It's another to go to the object in the field.

By setting up in a museum's parking lot or collecting data at an archeological site, the MOBILE team will take EduceLab on the road.

Suzanne Smith, along with faculty members Sean Bailey and Mike Sama, will deploy unmanned aerial systems for field campaigns. "In a field campaign, we do all kinds of measurements from the air over a large area," Smith, director of UK Unmanned Systems Research Consortium, explained. "It's using different kinds of sensors that can give different perspectives on the shapes being measured, and we can even see through some of the materials — giving us the historical context of that whole area. It's such a bigger scale of where that history has happened."

Additionally, the MOBILE team will use external displays for community involvement. "They can actively see this information coming in," Smith said. "There are going to be exciting discoveries that happen in the moment, and the public will be able to be right there."

CYBER

While MOBILE oversees collecting data, CYBER will be tasked with generating and sharing the data.

Linking MOBILE and CYBER is where Corey Baker's expertise in wireless communications comes in. CYBER will be critical when helping to drive further advancements in drone fleets.

"There are a lot of devices in use when it comes to the unmanned vehicles component. They will pick up data and transfer data. But many times, they may not have internet connectivity," Baker, an assistant professor in computer science, said. "My research focuses on when internet access is limited or nonexistent, how do you build applications and systems to disseminate information?"

Additionally, Baker believes technology should be an enabler not just for researchers but also for the entire community. "These types of projects are not just designed to produce something that looks fancy. They're designed to make a difference."

> "Focusing on heritage science is key to unlocking, in a positive way, how that heritage can help us understand each other, collaborate and shape our future. We plan to keep showing the world what can be done, right here at UK."
>
> **– Brent Seales**

THE PROMISE MOVING FORWARD

Seales is considered the foremost expert in the digital restoration of cultural antiquities. To this day, his quest to uncover ancient wisdom is ever-evolving.

Overcoming damage incurred by time is no small challenge. But Seales, and his dedicated team, are committed to conquering the seemingly impossible.

"We're in a time now where our cultural heritage is the key to understanding and embracing our diversity," he said. "Focusing on heritage science is key to unlocking, in a positive way, how that heritage can help us understand each other, collaborate and shape our future. We plan to keep showing the world what can be done, right here at UK." ■

Brent Seales, the UK Alumni Professor in the Department of Computer Science.

UK COLLEGE OF ENGINEERING, TOYOTA COLLABORATE TO 'LIFT UP' KCH PATIENTS

Hilary Brown

Engineers from Toyota and students from the University of Kentucky College of Engineering have created a unique way to transport medically fragile newborns from the neonatal intensive care unit (NICU) to their car.

When Jeremy Sharp and his wife, Katie, left the NICU at Kentucky Children's Hospital with their newborn son, Brayden, they realized they weren't going to have the celebratory homecoming they had imagined.

"There are a lot of expectations that just got thrown out the window," said Sharp. "You don't expect your kid to have a feeding pump, have profound hearing loss, or for some families, to leave with other things like an oxygen tank."

Brayden was born with a rare genetic condition that required highly specialized care. Leaving the hospital after 21 days in the NICU became an exercise in logistics and creativity.

Luckily for the Sharps and other NICU families, Toyota Motor Manufacturing of Kentucky (TMMK) and the UK College of Engineering were already working on a solution.

After successfully partnering on creating a unique experience for former KCH patients at UK football games, engineers from Toyota and students from the UK College of Engineering brainstormed on what their next collaboration could be as part of their "Lift Them Up" mobility campaign. They heard stories of other families that, like the Sharps, faced the complicated task of transporting a medically fragile newborn from the NICU to their car.

"We determined that there was a need for a mobility vehicle that could safely carry a patient as well as the parents' belongings and any equipment they needed," said Nick Potocki, engineering manager at Toyota. "So we decided that this was the project we needed to do."

The engineers took their idea to Nelson Akafuah, Ph.D., lecturer and associate director for the Institute of Research for Technology Development in the UK College of Engineering. Akafuah and his students worked with Toyota previously on the Lift Them Up cart, and he was excited for the opportunity to continue to address the challenges faced by KCH patients.

> "These types of projects give engineering students unique opportunities to address societal issues through engineering."
>
> **– Nelson Akafuah**

The challenge was to create a cart that could safely transport a medically fragile newborn and have space for any supporting equipment such as oxygen tanks. In the fall of 2019, Akafuah asked mechanical engineering students Andrew Roach, Brielle Hamilton, William Brennan, Ashley Mattingly, Caralyn Collins and Andrew Schaefer to design the cart for their senior design capstone project.

The initial student team could not complete the construction of the cart due to the impact of the COVID-19 pandemic in the spring of 2020. After the initial team graduated in May 2020, Akafuah asked mechanical engineering senior Binit Singh to work with the NICU and Toyota to complete the project.

"These types of projects give engineering students unique opportunities to address societal issues through engineering," said Akafuah. "Working with experienced engineers from Toyota helped expand their engineering education."

"We worked together to come up with multiple ideas and then narrowed down the concept based on the needs of hospitals and what parents would like to see in the cart," said Singh. "We built a prototype and demonstrated a proof of concept. Then we started making a real fabrication to build the cart. It's teamwork with everyone being involved and coming up with ideas from beginning to end."

The cart's features include a seat belt to secure the car seat and compartments for an oxygen tank and other support equipment. The base of the cart includes storage for the family's belongings and a pull-out drawer big enough to hold a cooler for transporting breast milk. The exterior is decorated with images of the tile mosaics found throughout the NICU and a whiteboard announcing the baby's journey home.

The Sharps brought along baby Brayden to check out the cart when it was delivered to KCH.

"When you put your child in there, and there's a spot for their feeding pump, a spot for a cooler, and for some patients, a spot for other things like an oxygen tank, you're saying, 'Wow, somebody thought of my situation,'" said Sharp. "And that gives you a lot more comfort, going out, knowing that somebody thought of you and your situation, even though it feels so crazy and foreign to you at the time."

Toyota fabricated two identical carts for KCH. Singh and the Toyota engineers gave the NICU staff a tour of the carts' features and provide maintenance and repairs as needed.

While Toyota and the college look ahead to the next collaboration, the staff at KCH are glad to provide families and patients a small comfort during a difficult period.

"To give our NICU staff a tool like this, and to be able to provide further care, we couldn't do this without the College of Engineering and our partners at Toyota," said Dr. Scottie B. Day, physician-in-chief at KCH. "We're very appreciative." ■

INTERVIEW WITH SEBASTIAN BRYSON

On July 1, 2021, L. Sebastian Bryson, Hardin-Drnevich-Huang Professor in the Department of Civil Engineering, was promoted from associate professor with tenure to full professor. A significant achievement in its own right for Bryson, the promotion made him the first Black full professor in the history of the University of Kentucky College of Engineering.

"We in the College of Engineering celebrate Dr. Bryson's promotion to full professor. His accomplishments in the areas of teaching, research and service demonstrate he is a model faculty member who can connect with and inspire students as well as junior faculty," said Rudy Buchheit, Dr. Rebecca Burchett Liebert Dean. "That we are in 2021 and only now welcoming our first Black full professor in the college shows we have a lot of work to do to ensure a diverse, equitable and inclusive environment."

Bryson joined the UK College of Engineering faculty in 2006 after teaching at Ohio University for five years. He worked as a geotechnical engineer for CH2M Hill for six years before earning his Ph.D. from Northwestern University in 2002. Bryson holds a joint appointment in the Department of Earth and Environmental Sciences and just began a term as the Department of Civil Engineering's director of graduate studies.

Earlier this year, Bryson was granted Diplomate, Geotechnical Engineering (D.GE) certification by the Academy of Geo-Professionals, and he was elected to the American Society of Civil Engineers' College of Fellows.

"We in the College of Engineering celebrate Dr. Bryson's promotion to full professor. His accomplishments in the areas of teaching, research and service demonstrate he is a model faculty member who can connect with and inspire students as well as junior faculty."

– Rudy Buchheit

What were your thoughts when you were notified that you were being promoted to full professor?

For me, it felt like a load had been lifted from my shoulders. Being promoted to full professor announces to the world that you have achieved the level of senior faculty. So, I was really happy about that. It was one of the few times when I've pumped my fists and yelled, 'Yes!'

The funny thing is, I was never in doubt. I knew my dossier would stand for itself, and my department chair, Reg Souleyrette, had encouraged me to go up for full professor. I felt very confident in my publications, the amount of grant money I've been awarded, the number of Ph.D. students I've graduated and the quality of my teaching. So, while it was never in doubt, it still felt good.

What are your thoughts on being the College of Engineering's first Black full professor?

I'm a Black civil engineer who grew up in the '70s and '80s. So, I've always been the first, the only, or one of two or three. When I joined the Department of Civil Engineering in 2006, I was the first Black faculty member in the department. But it wasn't until I went up for full professor that I realized that I would be the first Black full professor in the 156-year history of the college. One of my colleagues heard that and said, 'That can't be right. It's 2021!'

> "I'm motivated to build things that will last after I'm gone — to leave a legacy. I'm at the point now where the students I taught in 2006 or 2007 are vice presidents at companies."

What do you say when people express surprise like that?

I say we're engineers, so let the data be the data. How many Black and Latino students are enrolled in engineering at the undergraduate level? Master's level? Ph.D. level? How about at the faculty level? How about within the SEC? There are so few of us and we're not producing enough. When you start looking at it that way, what else do you expect?

But I would be remiss if I did not make clear that I have had an excellent support system around me since coming to UK. When George Blandford — who was department chair at the time — hired me, he was very cognizant of the pitfalls that Black faculty fall into at predominantly white institutions. As soon as you walk through the door, they want you to be the chief diversity on everything. They want you on every diversity committee, task force and panel. But those are tremendous drains on your time and resources, and not only do they not count toward tenure, you're penalized because when you're engaged in those activities, you're not writing proposals, graduating students or writing papers.

George Blandford recognized that, and he told the dean at the time that he didn't want me to get involved in any of that until after I had been awarded tenure. I was very appreciative of that. Later, once I became tenured, I could participate in those kinds of things.

What do you think this means for the college?

When I discovered I'm the first Black full professor, I began to see it as an opportunity to inspire junior faculty and graduate students of color. Many times, you don't have individuals of color in those positions because they don't see others who look like them reaching high levels of success. Consequently, they say that it's unattainable. By having someone like me here, hopefully they will say, 'I can do this.'

What motivates you at this stage in your career? What do you believe you still have to offer as a researcher, teacher and mentor to junior faculty?

I'm motivated to build things that will last after I'm gone — to leave a legacy. I'm at the point now where the students I taught in 2006 or 2007 are vice presidents at companies. That just blows me away. One of my former Ph.D. students recently let me know he's going up for tenure and I thought, 'Man! How long have I been doing this?' So, I'm starting to look over the fence at administrative roles and the possibility of becoming a department chair, dean or provost. Becoming the director of graduate studies for the department is a first step.

What do I still have to offer as a researcher? One of my research thrusts is using satellite data to help assess and predict geohazards like landslides, sinkholes and earthquakes. That's something I'm working with NASA researchers, Kentucky Geological Survey researchers and the U.S. Geological survey. I want to see us get to where we can predict when and where a landslide will occur, or even an earthquake.

As far as teaching, COVID turned out to be a strong motivator for me to innovate and improve my lessons. I had never thought I could put design-level classes online, but I've been upgrading to facilitate online delivery. I've been blessed to have good rapport with my students.

What made you want to be certified as a Diplomate by the Academy of Geo-Professionals? What does this mean for you professionally?

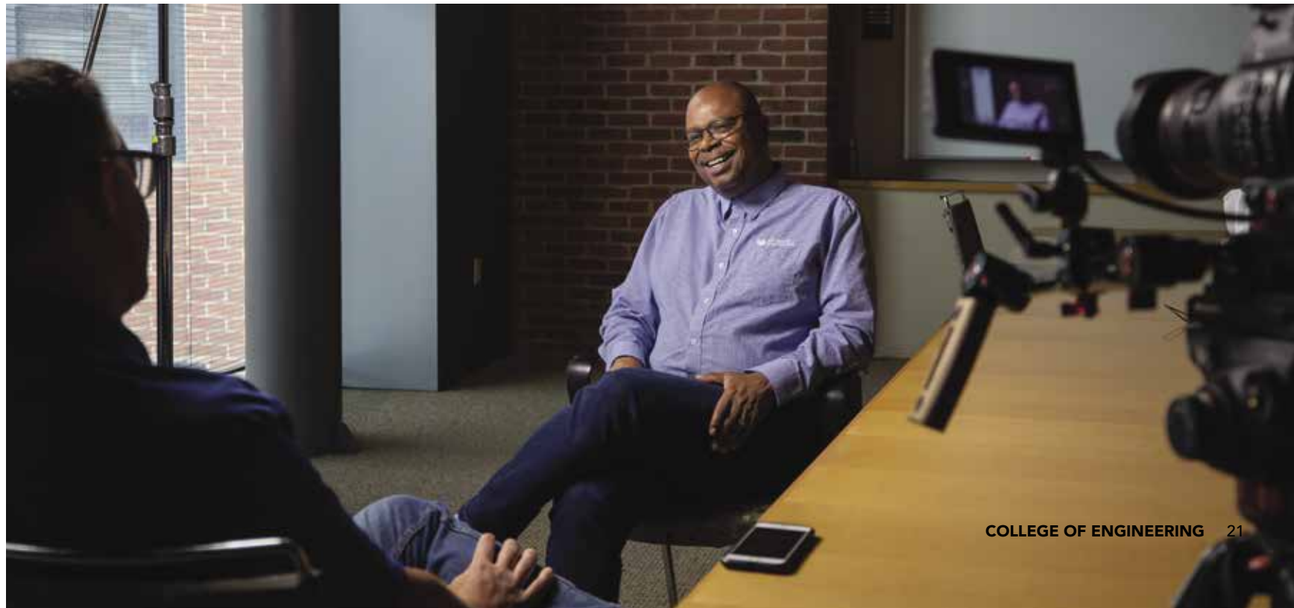
Any profession in science and engineering that deals with soil and rock is a geo-professional. The organization got started because of a recognition that what we do is critical to all aspects of science and engineering. Certification declares that these professionals have reached a certain level of expertise and are recognized worldwide as an expert. It's like taking the Professional Engineers exam, except here the AGP looked at my whole career — as a consultant, as a professor at Ohio University and my 15 years here at UK.

How does it feel to be considered an expert, to have devoted so much time and interest in something over decades?

There are times when you achieve something, and you play it down. You get an award, put it somewhere on your desk and forget about it. When I received certification, I felt it acknowledged that my focus and attention to certain details of my profession had come to fruition. I appreciate it when my colleagues refer to me as an expert in something, but with this certification, it is the peers in my profession who have said I stand out. And, again, graduate students and junior faculty seeing me receive this level of certification provides an example of what is possible.

What do you think it is about you that makes students comfortable connecting with you?

I think it's because I hit a bunch of cross-sections. I'm from the South, but I'm Black; I'm very conservative on some views but liberal with others. I'm an evangelical Christian. I revel in multi-cultural, multi-ethnicity environments. I've got an open-door policy. Come in, and I'll put my feet on the desk, and we can talk about anything you want. ■



RESEARCH IN THEIR OWN WORDS

Jesse Hoagg

What is control theory?

Your car's cruise control is an illustrative example where control theory is used in an engineering application. A cruise control system modulates the engine throttle to maintain a desired speed. Cruise control is a feedback-control system because it relies on continual measurements — feedback — to determine how to modulate the throttle. Specifically, cruise control depends on measurements of the car's speed. A modern adaptive cruise control relies not only on feedback of your car's speed but also on the feedback of the distance from your car to the nearest car in front of it. Designing a cruise control system requires some understanding of the interactions between the car's speed, the engine throttle, the hills and valleys of the road, and the cruise control system itself. Thus, control theory can be broadly thought of as a study of interactions.

Jesse Hoagg, Donald and Gertrude Lester Professor in the Department of Mechanical Engineering, has advanced controls research at UK since arriving in 2010. In this piece, he explains how his research in control systems and control theory can advance a wide array of applications in science, engineering and technology.

Control theory provides mathematically rigorous techniques for designing and analyzing feedback systems. These techniques are critical to various technologies such as aircraft, automobiles, robotics, power plants and chemical processing. New vehicles and devices that are impacted by thermodynamics, fluid dynamics and/or structural dynamics can be greatly enhanced by innovative control methods. Thus, many areas of engineering benefit from advances in control-system theory and technology.

My research focuses on developing and applying control theory to diverse areas in science and engineering — ranging from formation control methods for autonomous vehicles to the study of human learning. For example, my research group develops new cooperative control methods for swarms of autonomous unmanned air vehicles, better known as drones. These methods allow swarms to collaborate autonomously while avoiding collisions. As another example, we use techniques from control theory to study how humans interact with engineered systems such as aircraft, automobiles and robots. This work has potential application in a variety of areas, including robotic-assisted surgery, human-controlled robotic swarms, active prostheses, robotic-therapy devices and autonomous vehicles.

Small-satellite technology is another important application that relies heavily on control theory. Small satellites are less expensive to build and launch than large spacecraft. In addition, multiple small satellites working cooperatively can often exceed the operational capability of a single monolithic satellite. However, the control systems used for large spacecraft are not ideally suited to small satellites. Thus, professor T. M. Seigler in the Department of Mechanical Engineering and I are developing innovative small-satellite control technologies that are efficient, reliable and can be powered by renewable energy sources.

> "My research focuses on the development and application of control theory to diverse areas in science and engineering — ranging from formation control methods for autonomous vehicles to the study of human learning."

One of these new technologies is a system for controlling a small satellite's attitude, that is, rotational orientation. This unconventional attitude control method relies on a system of vibrating masses as opposed to the rotating wheels used for traditional attitude control on large spacecraft. By appropriately vibrating the masses, we can steer the satellite to any desired attitude, for example, pointing toward Earth or another planet. This new approach is energy efficient, lightweight and not subject to significant friction wear. We are currently collaborating with Space Tango, Inc., to fabricate a small-satellite prototype with this new attitude control system. This prototype will be sent to the International Space Station for on-orbit testing in 2022.

We are also developing a new electromagnetic formation flying method, where each small satellite in a swarm is equipped with electromagnetic coils, which can be energized to create forces between satellites. By appropriately energizing the coils, we can generate forces that drive the satellites into desired swarm formations. One key aspect of this work is the use of alternating magnetic field forces to decouple inter-satellite forces and, thus, enable swarms with many satellites.

The work on small satellite swarms is supported in part by the National Aeronautics and Space Administration under 80NSSC17M0040 through NASA Kentucky. Hoagg's other research activities are supported by NSF, NASA, USDA/NIFA, AFOSR and industry partners. ■

Transition to ENGINEERING

In 2016, the UK College of Engineering launched a program that enabled first-year engineering students to take engineering classes from day one. Now, it's implementing that successful model at the high school level.

"I was three years into my engineering program at Georgia Tech before they gave me a task that remotely resembled the engineering activities I performed once I graduated," says Scott Dellinger, an engineering teacher at Elkhorn Crossing School in Georgetown, Kentucky.

These days, Dellinger teaches promising high school seniors engineering content designed by University of Kentucky College of Engineering faculty members as part of its Transition to Engineering (T2E) program. As a result, his students encounter stimulating engineering challenges a full year before stepping foot on a college campus.

"T2E gets students to act and think like engineers while they're still in high school," says Dellinger. "They get to solve open-ended engineering problems that are so much more interesting than completing a series of calculus problems."

Now in its third year, T2E takes the college's wildly successful First-Year Engineering (FYE) program required of all incoming freshman engineering students and applies it at the high school level. Doug Klein, FYE lecturer and well-known educator within the Kentucky public school system, directs the program and trains the teachers who facilitate T2E in their classrooms.

"It is our plan with this program to have students coming to the College of Engineering knowing what to expect from our faculty," says Klein. "Engineering is a rigorous and hands-on major, and allowing students to get started on engaging engineering content and build confidence is a major benefit."

Through the T2E program, high school seniors must pass their engineering course, complete and design a project they present and make themselves, and be calculus-ready at the college level. If they enroll at UK, they will receive credit for the first two required FYE courses and enter a modified version of the third. The program targets students with a strong interest in engineering coupled with high academic achievement.

"Our students learn how to complete college-level work, and they understand how it applies to their futures," states Lynn Shoopman-Campbell, a teacher with the Oldham County school system who has taught T2E both years it has been available. "My most enjoyable moment is pushing them out of their comfort zones and witnessing how they keep pushing until they achieve their goals."

To support the program, Klein provides training for teachers during the summer, develops assignments and videos for high school classrooms, consults with students on project development and visits classrooms in person and virtually.

"Even with the limitations caused by COVID, I was able to get through 95% of the curriculum. Doug provided a Canvas website, a wonderful two-week-long summer training, office hours throughout the year and was always a phone call or email away," says Dellinger.

Madison Gladstone, currently an engineering sophomore at UK, says, "I was very lucky to have been given the chance to experience the T2E program. Not only did the program help me to decide to pursue a degree in mechanical engineering, but I also learned fundamental engineering skills that I was able to take with me into my first year at UK. I learned how to read and wire circuit schematics, program an Arduino using Matlab, further my experience using Autodesk Inventor, put into practice the steps of the engineering design process and even build a professional engineering portfolio." ■

ALUMNI SPOTLIGHT:
ALEXA EGGERT

Kel Hahn

Alexa Eggert (BSCompE 2011) is bringing a passion for serving her country and a problem-solving mindset to the U.S. military's newest frontier.

When Major Alexa Eggert, wears her military uniform around Chantilly, Virginia, just outside Washington D.C., most citizens don't raise an eyebrow. Up close, however, some express surprise over what makes her uniform unique: opposite "EGGERT" is a blue patch that proudly proclaims: SPACE FORCE.

"Is that real?" people sometimes ask.

"Yes, it's real," Eggert might reply, "And it's been needed for some time."

Formally founded in December 2019, the Space Force's mission is to "provide freedom of operation for the United States in, from and to space" and "provide prompt and sustained space operations," as well as "protect the interests of the United States in space; deter aggression in, from and to space; and conduct space operations." For the average citizen, however, the Space Force is shrouded in mystery.

"I imagine this is similar to how a lot of people felt in 1947 when the Air Force was established," surmises Eggert, who joined the Space Force earlier this year after 10 years of active duty in the Air Force. "People were asking, 'Why do we need this?' And now look at how much the Air Force provides not only to our country but to the world. The Space Force is a branch that will touch all the other services and components."

Despite the change in affiliation, Eggert's role in the Space

Force is largely identical to where she was serving in the Air Force. As a program manager supporting the National Reconnaissance Office, she oversees the cost schedule and performance of programs and systems. With her bachelor's degree from UK in computer engineering augmented by a master's degree in human factors engineering from Wright State University, Eggert brings a combination of technical know-how and in-depth understanding of how people interact with technology to her role.

"It's a little odd to have a program manager who is mainly responsible for producing certain outcomes who also understands the technical side. It really helps when I'm reading contracts and working with defense contractors, because I can grasp what they're telling me rather than relying on others to give it to me second-hand," says Eggert.

Born in Germany, Eggert grew up with a first-hand view of military life. Her father was an active-duty serviceman and her family moved often. While at UK, Eggert saw an advertisement for the ROTC that challenged her to do something bigger than herself. She, too, fell in love with the idea of serving her country.

"I love putting on the uniform every day," Eggert says enthusiastically. "Obviously, it's different than going into battle. When I went to Afghanistan, I wasn't holding a weapon, so it's a different aspect, but there's just something about not only serving your country but also striving toward the future. There are more aspects to the military than serving and protecting. We're trying to lean forward into what the future holds for humanity."

It's hard to imagine leaning much more forward than into space. Fortunately for Eggert, her career thus far has sufficiently prepared her for this bold, new adventure. Throughout her posts at Wright-Patterson Air Force Base in Dayton, Ohio; Los Angeles Air Force Base and Afghanistan, Eggert has learned how technology emerges from research laboratories and how war fighters put it to use. Along the way, she would survey her colleagues and realize she was one of a small number of people who didn't have one or two Ph.D.s. However, Eggert says her education at UK gave her a solid footing for her chosen career path.

"Without my classes on algorithms and coding, I wouldn't have made it through my first four years. I would have had to find a different job. That's why I encourage anyone attending UK or any other school to take as many STEM classes as possible. If you can work through engineering problems, you have the capability to work through any problem."

Because Eggert's parents live in Versailles, Kentucky, just a short drive from UK's Lexington campus, Eggert returns to campus on occasion, where she relives treasured memories and visits with the faculty and staff members who made an indelible impression upon her as an undergraduate.

"I have so many amazing memories from UK. Being part of the Air Force ROTC detachment opened opportunities that are not part of the average college student's experience. For instance, I got to present the colors during the national anthem during basketball games and football games. Those are just moments I'll never forget," Eggert recalls. "When I think of faculty and staff members who made an impact, I am so grateful to Aaron Cramer, Ilka Balk, Regina Hannemann, Jeff Ashley and my advisor, Danielle Hinkle-Green, without whom I surely would not have graduated!"

For recreation, Eggert enjoys hiking, reading and playing the flute — an instrument she played while a member of the UK marching band. She also confesses to being a Peloton addict. Eggert has created a #BBN tag that now has 291 members.

"Ending up on rides with Kentucky fans around the country and world is always a joy," she says.

While Eggert has served on active duty for 10 years, she is eager to spread the word that enlisting is not the only way to serve the U.S.

"There are opportunities for you in civil service where you can make a significant impact by bringing new technologies to our war fighters. I don't think many people realize that that's an option, but you can influence the rapidly changing future of our military branches as a civil servant. If that sounds interesting to you, all our service pages have information about starting a career in civil service. ■

STUDENT SPOTLIGHT:

SPARK LAB INSPIRED

Kel Hahn

Recent University of Kentucky graduates Rosemary Alden (BSEE 2021) and Donovin Lewis (BSEE 2021) received prestigious Graduate Research Fellowships from the National Science Foundation this spring. While recipients of such fellowships may pursue Ph.D. studies at other institutions, Alden and Lewis commenced doctoral studies at UK this fall. That says a lot about their experience as undergraduate students participating in research through the SPARK Lab and the welcoming community here at the University of Kentucky College of Engineering.

Rosemary Alden came to UK with an ambition to do something "environmentally driven." While registering for her first semester, she enrolled in the Global Energy Issues class taught by Dan M. Ionel, professor, L. Stanley Pigman Chair in Power and director of the Power and Energy Institute of Kentucky (PEIK). Her penchant for asking questions provided several opportunities for conversation.

"I definitely connected with Dr. Ionel," remembers Alden. "I talked to Dr. Ionel about the Pamplona Renewable Energy program offered in Spain, and once I followed through and made it happen, that's when he invited me to start doing research with his group."

Ionel's group, the SPARK Lab, teaches and researches topics of alternative and renewable energy technologies; electric machines and power electronic drives; electric power systems; energy storage and smart grids and buildings. Its research is sponsored by the National Science Foundation (NSF), Department of Energy, NASA, and numerous external industry, utility and organization collaborators.

> "I've had good success within the lab. I've been able to publish papers and work with Dr. Ionel and with professors from other universities, through joint projects, and with other graduate students."
>
> **– Rosemary Alden**

Donovin Lewis had also taken Global Energy Issues; however, his route to the SPARK Lab came through hearing about their research projects, particularly those in power systems, electric vehicles, smart grid integration with renewables and more. It sounded like the kind of growing field he wanted to join.

"What also led me to the lab was the connections I'd made with other people, whether it was through the UK Solar Car Team, classmates or friends. A lot of my success comes from connecting with people, whether that's in the classroom or through extracurricular activities," he adds.

Working in the SPARK Lab with Ionel and his doctoral students, Alden became interested in distribution systems and how homes fit into the electric grid. Currently, she is researching how machine learning models can predict energy usage.

Lewis' experience designing printed circuit boards and control systems through the Solar Car team sharpened his interest in physical systems and energy storage. Currently, he is investigating how increased numbers of electric vehicle charging — stationary and in-motion — will affect the power grid.

Alden's and Lewis' experiences in the SPARK Lab combined with the opportunity to engage in the kind of research that most interests them led both to conclude UK was the best place to employ the NSF Graduate Research Fellowships awarded to each of them this spring. As part of the five-year fellowship, NSF Fellows receive a three-year annual stipend of $34,000 along with a $12,000 cost of education allowance for tuition and fees for a research-based master's or doctoral degree in a STEM field.

"I've had good success within the lab. I've been able to publish papers and work with Dr. Ionel and with professors from other universities through joint projects, and with other graduate students. This was my motivation to stay and continue working with the group," Alden says.

"For me, it's less logical and more of an emotional decision," states Lewis. "I felt more connected to the people and research being performed at UK than I did to the other schools I considered."

There's also the special relationship with their "Prof," Dr. Ionel.

"Dr. Ionel takes great care to help students learn how to communicate, especially with sending professionally written emails," says Alden. "How you represent yourself and conduct yourself is so important."

Lewis agrees, noting the rarity of one-on-one time with a professor even at the graduate level.

"I don't think that's typical of a lot of research groups," he says. "When I've talked with graduate students at other schools, typically they're mentored by an older student and rarely talk directly to their research mentor. In doing so, Prof nurtures our technical and communication skills while emphasizing the importance of our development and contribution to ongoing research projects."

For more about the NSF Graduate Research Fellowships, see page 34.

UK SOLAR CAR TEAM WINS FORMULA SUN GRAND PRIX, TAKES SECOND AT AMERICAN SOLAR CHALLENGE

Kel Hahn

On August 1, the University of Kentucky Solar Car Team accomplished a feat never achieved in its 22-year history: They won a national solar car competition.

The UK Solar Car Team is an independent, student-led organization formed in 1999 that designs, builds and races solar electric vehicles. Undergraduate and graduate students of all majors and skill levels come together to gain hands-on experience with mechanical, electrical and computer science design; racing strategy and logistics; and business marketing/fundraising.

Every summer, collegiate solar electric vehicle teams across the country gather for a track race, the Formula Sun Grand Prix (FSGP), and every other year for a road race, the American Solar Challenge (ASC).

This year, team members arrived in Topeka, Kansas, on July 27, with Gato del Sol VI, the team's sixth custom-made solar electric vehicle, which has been operational since 2018. The team was the first through the three-day technical scrutineering, a rigorous evaluation to ensure all built aspects of the car satisfy strict regulatory requirements. After finishing scrutineering first, they started first on the track and completed the most laps at Heartland Motorsport Park over three days to win the Formula Sun Grand Prix (FSGP).

"FSGP is as much a test of our driving ability as it is our ability to design and build a reliable car and fix difficult engineering problems on the fly," said Donovin Lewis, a Ph.D. student in electrical engineering. "The technical and hands-on experience gained through engineering education at the University of Kentucky prepared us for quickly and effectively responding to crises and getting us back on the track. Our own grit and dedication alongside years of passed-down knowledge and continual development enabled the success we had out on the track."

The team finished with 250 laps or 625 miles of driving completed and was the only team that did not incur a penalty during the three-day competition, finishing 11 laps ahead of MIT, which took second place.

Mike Johnson, professor and chair in the Department of Electrical and Computer Engineering, said, "The Solar Car Team was absolutely incredible this year, and I am really proud of what they accomplished. This shows what engineers can do when they work together across the boundaries of their individual disciplines to design and carry out solutions to real-world problems. I can't wait to see what will come next."

The closest the UK Solar Car Team had come to winning a competition prior was over 10 years ago in 2009, when it took second in FSGP with Gato del Sol III.

Ecstatic over its accomplishment, the team had little time to celebrate. Two days later, they would begin the American Solar Challenge (ASC), an approximately 970-mile road competition spanning from Independence, Missouri, to Las Vegas, New Mexico. In the past six attempts, the UK Solar Car Team had only finished ASC twice — with a ninth-place finish in 2010 serving as their highest place.

"When it came to the road race, we were entering uncharted waters," said Lewis. "Our most experienced team member, who has been on the team for nine years, had only experienced six hours of an ASC prior before battery issues took us out of that race. Entering ASC, the goal was simply to finish under our car's own power for the first time in our team's history."

Over the five-day event, Gato del Sol VI displayed a strong showing. It spent 33 hours on the road, had no critical issues, and the team never had to load it on the trailer, running on its own power for the entirety of the race. In the end, UK placed second among the seven competing teams in their category with 965.2 miles driven, making a new mark for their best finish at ASC.

UK also picked up the "Most Improved" award for having developed Gato VI — a car that failed to pass scrutineering in 2018 — into a car that was now able to be driven into first place in FSGP.

"We still have so much to look forward to, especially this year," said returning team member Sheldon Salins. "We will have another ASC this summer, with a road distance nearly double what we just completed. So, we are going to perfect Gato del Sol VI into the best vehicle it can be. Even more exciting, this fall marks the beginning of the construction of our next-generation car, Gato del Sol VII, which will be an even stronger competitor on the track and on the road." ■

UK, UT-KNOXVILLE, ARMY COLLABORATING ON $50 MILLION PROJECT TO ADVANCE U.S. MANUFACTURING

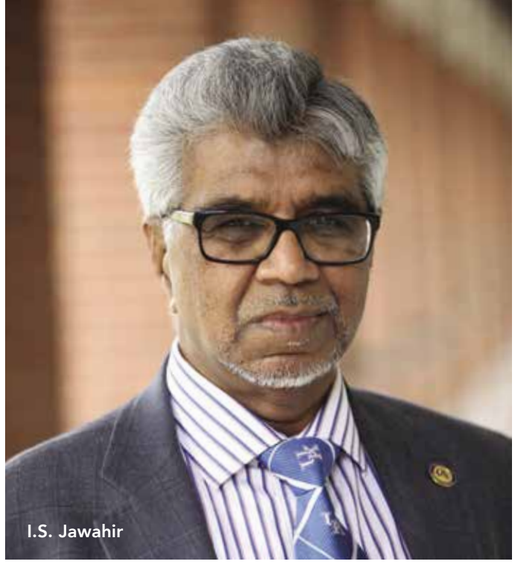
Kel Hahn

The University of Kentucky, the University of Tennessee, Knoxville (UT) and the U.S. Army Combat Capabilities Development Command's Army Research Laboratory (DEVCOM ARL) have announced a five-year, $50 million collaboration directed toward improving manufacturing capabilities in the United States.

Under this three-way partnership, UK's project, "Next Generation Materials and Processing Technologies" (NextGen MatProTech) will receive approximately $23.8 million from the U.S. Department of Defense (DOD).

"We are always more powerful when we come together in uncommon ways to achieve a common good. This partnership will enable us to take our best minds and translate research into practical solutions — accomplishing more and doing more than we would on our own," UK President Eli Capilouto said. "As a university driven by discovery and innovation to serve our community and beyond, that is who we are and what we are called to do. We are deeply grateful to our members of Congress for their continued support in making Kentucky a leader in this space."

The overarching vision is to develop novel materials processing and manufacturing technologies to produce superior products and components for the DOD, as well as civilian use. In addition to increasing intellectual capital, generating new discoveries and identifying high-potential technological innovations, the project will also strive to meet the country's strategic research needs in materials and processes as identified by the National Academy of Sciences, the National Academy of Engineering and the National Academy of Medicine.



I.S. Jawahir

"Kentucky has always played a vital role in our national security, and with this project, the commonwealth's contributions will only grow. I applaud President Capilouto and the University of Kentucky community for leveraging their institution's advanced manufacturing expertise to help the Army fulfill its modernization strategy," U.S. Sen. Mitch McConnell said. "Throughout my time in the Senate, I have been proud to deliver the resources needed to secure Kentucky's prominent place in our nation's defense infrastructure. This new program will not only add to those capabilities but also provide a strong source of regional economic development."

I.S. Jawahir, professor in the Department of Mechanical Engineering, James F. Hardymon Chair in Manufacturing Systems and director of UK's Institute for Sustainable Manufacturing (ISM), will serve as the principal investigator (PI) and project director for UK.

"We intend to meet the challenges of the strategic initiatives within the U.S. Army's modernization priorities. To accomplish these goals, a state-of-the-art additive manufacturing research laboratory will be established within the Institute for Sustainable Manufacturing in the College of Engineering at UK," Jawahir explained. "It will offer several unique and modern additive and hybrid manufacturing machines, material characterization equipment and systems that will facilitate this groundbreaking collaborative research among the three partners: UK, UT and DEVCOM ARL."

Raymond Brennan from DEVCOM ARL, who will serve as the cooperative agreement manager for the UK portion of the program, stated, "This exciting collaboration will pave the way for breakthroughs in discovery and advancement of new materials, as well as groundbreaking advanced manufacturing processes, helping shape future innovations to support Army needs."

Research advances and discoveries hold promise to address the DOD's strategic and growing requirements to maintain global technological superiority by developing higher-performing materials and processes through a combination of additive and subtractive manufacturing.

Working with Army engineers and scientists, UK researchers will pursue new nano-structured metal alloys and advanced composite materials, using novel manufacturing methods such as smart, sustainable and hybrid manufacturing processes. The UK team has identified four primary research areas: engineered high-temperature materials; advanced additive manufacturing; novel manufacturing processes; and predictive modeling and performance assessment.

Thirteen UK researchers — seven PIs and six co-investigators — will participate in initiatives identified as relevant to the four research areas in seven project topics. Jawahir will serve as a topic leader and PI. The other six topic leaders and PIs are

- **Fazleena Badurdeen,** professor in the Department of Mechanical Engineering and ISM faculty;
- **John Balk,** professor in the Department of Chemical and Materials Engineering and associate dean for research and graduate studies;
- **James Caudill,** ISM research scientist;
- **John Craddock,** research program manager at the UK Center for Applied Energy Research (CAER);
- **Haluk Karaca,** associate professor in the Department of Mechanical Engineering; and
- **Julius Schoop,** assistant professor in the Department of Mechanical Engineering and ISM faculty.

"The breadth and depth of research excellence and professional influence in the UK College of Engineering related to advanced manufacturing is truly impressive," Rudy Buchheit, Dr. Rebecca Burchett Liebert Dean of the College of Engineering, said. "Dr. Jawahir and his colleagues have made the college a leader in this vital area."

Jawahir sees UK's project, NextGen MatProTech, as a way to not only make substantial investments in the national economy but also the regional economy. UK will work closely with Flash Steelworks, a new multimillion-dollar plant in Bell County, Kentucky, dedicated to a novel material processing method called flash processing. This plant is funded through a 2021 Congressional appropriation through the Department of Defense Office of Industrial Policy Industrial Base Analysis and Sustainment Program and administered by the Cornerstone Other Transaction Authority with Army Research Laboratory subject matter experts.

"Our new UK project will provide tremendous opportunities for the state of Kentucky and the surrounding region with advanced education and training through new curricula for undergraduate and graduate studies and professional development programs aimed at workforce development for next-generation manufacturing," Jawahir said.

"By building a team that encompasses university experts in the fundamental materials science partnered with cutting-edge industry partners manufacturing the latest advancements in high-strength materials, along with defense-original equipment manufacturers who want to push the new advancements forward is the template to accelerate innovation and rapidly transition technology advancements for the warfighter, and this is what DEVCOM ARL strives to do," Bryan Cheeseman, team leader of the Rapid Technology Transition Team of DEVCOM ARL, said.

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FIVE ENGINEERING STUDENTS AND RECENT GRADUATES AWARDED NSF GRADUATE RESEARCH FELLOWSHIPS

The University of Kentucky Office of Nationally Competitive Awards has announced that 10 students and recent graduates have been selected to receive government-funded National Science Foundation (NSF) Graduate Research Fellowships. Five of the 10 are from the College of Engineering.

As part of the five-year fellowship, NSF Fellows receive a three-year annual stipend of $34,000 along with a $12,000 cost of education allowance for tuition and fees for a research-based master's or doctoral degree in a STEM (science, technology, engineering or mathematics) field.

Below are the five students and recent graduates of the College of Engineering who received the fellowship:

- **Rosemary Alden,** a graduating electrical engineering senior from Nicholasville, Kentucky, who will pursue research in electrical and electronic engineering and her doctorate at UK;
- **Matthew West Coile,** a 2019 chemical engineering and Lewis Honors College graduate from Gaithersburg, Maryland, who will pursue research in chemical engineering at Northwestern University;
- **Donovin Denis Lewis,** a graduating electrical engineering senior from Paducah, Kentucky, who will pursue research in electrical and electronic engineering and his doctorate at UK;
- **Kristen Juranda Price,** a 2019 mechanical engineering graduate from St. Charles, Missouri, who will pursue research in mechanical engineering and her doctorate at UK;
- **Ronald Justin Vogler,** a graduating chemical engineering and Lewis Honors College senior from Mason, Ohio, who will pursue research in chemical engineering at the University of Texas at Austin; and.
- **Mariah Bezold,** a 2020 chemical engineering and Lewis Honors College graduate from California, Kentucky, who is currently working on a doctorate in biomedical engineering at Vanderbilt University and received honorable mention recognition from the NSF Graduate Research Fellowship Program.

The NSF GRFP is the country's oldest graduate fellowship program directly supporting graduate students since 1952. GRFP is a critical program in NSF's overall strategy to develop a globally engaged workforce necessary to ensure the nation's leadership in advancing science and engineering research and innovation. A hallmark of GRFP is its contribution to increasing the diversity of the STEM workforce, including geographic distribution, as well as the participation of women, underrepresented populations, persons with disabilities and veterans.

APPOINTMENTS

ZONGMING FEI ASSUMES ROLE AS COMPUTER SCIENCE DEPARTMENT CHAIR

Zongming Fei, professor of computer science, is the new chair of the University of Kentucky Department of Computer Science. He has taught at UK since 2000.

Fei received a B.S. in computer science from Nanjing University in China in 1986, a master's degree in computer science from the Georgia Institute of Technology in 1999 and a Ph.D. from the same institution in 2000. After arriving at UK in 2000, he was promoted to associate professor with tenure in 2006 and full professor in 2015.

Fei is a member of the FABRIC leadership team. Launched in 2019 with a $20 million grant from the NSF, FABRIC is working to build a platform where computer scientists can test new ways to compute, move and store data. The adaptive programmable research infrastructure for computer science and science applications is a collaborative project with researchers from multiple institutions.

In 2019, Fei helped develop a new undergraduate certificate in cybersecurity and acted as co-director for the certificate program.

Fei succeeds professor Brent Seales, who had served as department chair since 2013.

DOUG KALIKA NAMED NEW DIRECTOR OF FIRST-YEAR ENGINEERING

Doug Kalika, professor of chemical engineering at the University of Kentucky, is the new director of the First-Year Engineering program.

Kalika joined the UK faculty in 1990 after earning degrees in chemical engineering from MIT and the University of California at Berkeley. His research is in the area of polymeric materials and synthetic membranes, and encompasses polymer viscoelasticity, polymer blends and plastics processing. Kalika served as senior associate dean and acting dean of the UK Graduate School (1998-2003), and was chair of the Department of Chemical and Materials Engineering from 2009-2019.

Kalika received the UK College of Engineering Henry Mason Lutes Award for Undergraduate Education in 2007 and has been named the Tau Beta Pi Most Outstanding Professor in the College of Engineering four times (1997, 2007, 2011 and 2020) and Outstanding Chemical Engineering Teacher a total of nine times. This past year, he developed a new elective course, "Automotive Plastics," as part of the Production Engineering Certificate curriculum.

Professor Kalika has served as an ABET program evaluator for chemical engineering since 2012 and is an elected Fellow of the American Institute of Chemical Engineers.

DOUG KREIS NAMED DIRECTOR OF KENTUCKY TRANSPORTATION CENTER

Doug Kreis is the new director of the Kentucky Transportation Center (KTC).

For over 20 years at the center, Doug Kreis (BSMNG 1995; Ph.D. CE 2016) has built an expansive portfolio of interdisciplinary transportation research. He also brings nearly 15 years of experience in the construction industry.

Kreis has been instrumental in helping KTC grow research expertise in several areas, including hazardous materials transportation, freight security, supply chain management, transportation finance, intelligent transportation systems, business management, project development and inland waterways.

Kreis became KTC's associate director in 2014. Soon after, he earned a Ph.D. from UK's Department of Civil Engineering with a focus on construction management. Kreis is also a certified Project Management Professional, has received accreditation from the American Society of Transportation and Logistics, and holds a Master of Arts in Education from UK and a master's in supply chain management from Penn State University.

Kreis succeeded Joseph Crabtree, who retired after serving as the center's director since 2010.

F. JOSEPH HALCOMB III, M.D., RECEIVES HONORARY DOCTOR OF ENGINEERING DEGREE

F. Joseph Halcomb III, M.D., received an Honorary Doctor of Engineering degree at the University of Kentucky May 2021 Commencement Ceremony at Rupp Arena.

As the son of a small-town family physician in southern Kentucky, Halcomb grew up around the practice of medicine. He enrolled at UK in 1969 and began his college career with a visionary concept: He wanted to pursue an academic program that combined medicine and engineering. With the help of two UK professors, Halcomb began a study plan that prepared him for a groundbreaking career in the emerging medical device and biotechnology industries.

He earned a bachelor's degree in mechanical engineering in 1974 and a medical degree in 1978. In his fourth year of medical school, he also enrolled in the graduate mechanical engineering program at MIT. By the time he completed his MIT degree and medical residency at UK, he recognized the need for mechanical engineering in orthopedics and began his career in the orthopedic industry.

In 1980, Dr. Halcomb joined Zimmer, a world leader in orthopedic and surgical products. Five years later he became vice president of product development, leading the development of joint replacement implants that revolutionized the industry. By 1993, he was president of Zimmer's Hall Surgical Division. In 1995, he was recruited by biotechnology company Amgen to apply his medical device expertise in building a venture in cell therapy. Within a decade, Halcomb became Amgen's vice president for drug product and device development and directed a team that launched revolutionary products and expanded the company's reach worldwide.

In 2010, Halcomb established the Halcomb Family Endowed Fellowship in Medicine and Engineering at UK as a special tribute to his father. The Department of Biomedical Engineering became the university's first named department after Halcomb made a larger commitment to the endowment in 2016. His fellowship provides opportunities for graduate students to engage in premier interdisciplinary research in biomedical engineering, and the department now offers a unique undergraduate major in biomedical engineering.

(Rear, from left) L. Stanley Pigman, James C. Duff, Laura M. Schwab, Ashley T. Judd, Valerie Still, Terry Woodward, Steven L. Beshear, Eugene Poole Jr., Davis Marksbury
(Front, from left) John A. Williams, Alan C. Lowe, Jon C. Carloftis, Henry B. "Bub" Asman Jr., F. Joseph Halcomb III M.D., Martha M. McCarthy, Paul R. Wagner

SIX INDUCTED INTO UK HALL OF DISTINGUISHED ALUMNI

On October 1, 2021, the University of Kentucky inducted 27 former students into the 2020 Hall of Distinguished Alumni. The alumni were honored for their meaningful contributions to the commonwealth, nation and the world. Six of the 27 inductees earned degrees from the UK College of Engineering.

The prestigious event, held every five years, was postponed last year due to pandemic restrictions.

THE 2020 INDUCTEES FROM THE COLLEGE OF ENGINEERING INCLUDE THE FOLLOWING ALUMNI:

- **O. GENE GABBARD B.S., '61**
  Electrical Engineering
- **F. JOSEPH HALCOMB III B.S., '74**
  Mechanical Engineering, M.D. '78
- **ELMER T. LEE* B.S., '49**
  Electrical Engineering
- **DAVIS MARKSBURY B.S. '80**
  Civil Engineering
- **L. STANLEY PIGMAN B.S. '81**
  Mining Engineering
- **GREGORY L. SUMME B.S. '78**
  Electrical Engineering

**Posthumously inducted*

UNIVERSITY OF KENTUCKY
COLLEGE OF ENGINEERING

Hall of Distinction

John Wesley Gunn, Class of 1890, earned the first engineering degree awarded by what eventually became the University of Kentucky. Since that modest beginning over 130 years ago, more than 27,500 individuals have followed his example and received degrees in engineering and computer science. Through their extraordinary achievements, our alumni have established a lasting legacy of excellence. Initiated in 1992, the Hall of Distinction recognizes and honors those alumni who have demonstrated distinguished professional accomplishments, outstanding character, and commitment to community service. This recognition serves to encourage exemplary achievements by current students and others. It is a symbol of the respect and admiration held by the University of Kentucky College of Engineering for these esteemed individuals. Below are the 2020 inductees.

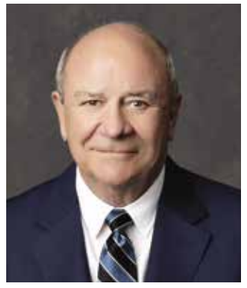
Joan Coleman

B.S. in Electrical Engineering, 1986

After graduating from UK, Joan Coleman joined South Central Bell Telephone Co., which later became BellSouth and then AT&T. In 2003, Coleman became vice president for regulatory and external affairs. Coleman and her team successfully developed and presented the company's policy and supporting data before the Kentucky Public Service commission and the legislature, resulting in the enactment of significant telecommunications deregulation in 2006. When BellSouth and AT&T merged in 2007, Coleman was hired as AT&T Kentucky's state president. As president, Coleman led cross-functional operation and customer service teams in the state, as well as all regulatory, legislative and external affairs initiatives. Coleman retired from AT&T Kentucky in 2009. She currently provides consulting services through her management consulting company, Coleman Consulting, LLC.

Rickey "R.D." James

B.S. in Civil Engineering, 1971



Rickey "R.D." James is the 12th assistant secretary of the Army for Civil Works, a post he has held since his appointment in 2018 by President Donald Trump. James establishes policy direction and provides supervision of the Department of the Army functions relating to all aspects of the U. S. Army Corps of Engineers' Civil Works program. These responsibilities include programs for conservation and development of the nation's water and wetland resources; flood control; and navigation and shore protection. Prior to James' appointment, he served nearly four decades on the Mississippi River Commission, appointed first by President Ronald Reagan in 1981 and then to three more nine-year terms by Presidents George H.W. Bush, George W. Bush and Barack Obama.

Richard Simpson

B.S. in Mechanical Engineering, 1984

Until his retirement earlier this year, Richard Simpson was the vice president, global supply chain for GE Gas Power. He has been a part of the General Electric family of businesses since graduating from UK in 1984. During that time, he served in numerous executive and leadership roles with a focus on global supply chain that accelerated his development as an operations leader. During his career, Simpson traveled to and reviewed operations in more than 40 countries inside and outside of GE. In his last role, he oversaw more than 10,000 team members, 35 factories and an operating budget of more than $6 billion. He retired with 37 years of service. Since retiring, Simpson is actively working with faith-based charities.

Malgorzata "Margaret" Marek Sturgill

B.S. in Computer Science, 1989

Margaret Sturgill is a senior systems architect in HP's Personal Systems division, which produces HP's home computers and workstations. She joined the company as a product engineer after finishing her Ph.D. from the University of Utah in 1998. Sturgill has also served as a visiting scholar and a research engineer, working on several company-wide projects involving software architecture in anti-counterfeiting, machine learning and cloud systems. During her time at HP, Sturgill has received 32 patents for her work and contributed to 25 peer-reviewed papers. She volunteers with a variety of STEM-related programs and has performed volunteer service for Women Investing in Strategies for Health and a charitable prosthesis group for breast cancer survivors and patients.

Harlen Wheatley

B.S. in Chemical Engineering, 1994

Harlen Wheatley was named master distiller of Buffalo Trace Distillery in 2005, becoming Buffalo Trace's sixth master distiller since the Civil War. Since then, he has become synonymous with Buffalo Trace and helped it become one of the most decorated brands in the bourbon industry. Wheatley oversees all distilling operations for Sazerac Company, many of which he has developed for the distillery's family of products. While leading and directing all distilling and barrel aging for the Sazerac Company, he also educates the public on some of the world's finest bourbon whiskeys. Wheatley is a four-time James Beard Award nominee in the Outstanding Wine and Spirits Professional category. In 2015 and 2016, he was named Distillery Manager/Master Distiller of the Year at Whisky Magazine's Icons of Whisky America Awards.

HALL OF DISTINCTION
COLLEGE OF ENGINEERING

NEWS & RECOGNITION

GRANT AWARDS

Ramkumar T. Annamalai, assistant professor in the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering: $809,586 award for National Institutes of Health Centers of Biomedical Research Excellence grant for the project "Immunomodulatory Therapy for Bone Regeneration."

J. Todd Hastings, Reese Terry Professor in the Department of Electrical and Computer Engineering: co-PI for Kentucky node of the National Nanotechnology Coordinated Infrastructure program, which was renewed through 2025 by the National Science Foundation (NSF) with an additional $3.5 million of support.

Alexandre Martin, professor in the Department of Mechanical Engineering: lead UK investigator for $15 million NASA Space Technology Research Institute (STRI) called Advanced Computational Center for Entry System Simulation. The STRI will be led out of the University of Colorado and be implemented in partnership with the University of Illinois at Urbana-Champaign, the University of Minnesota, the University of New Mexico and UK.

Tiffany Messer, assistant professor in the Department of Biosystems and Agricultural Engineering: NSF Faculty Early Career Development award (CAREER) to study whether wetland treatment systems may help filter contaminants, including nitrate, insecticides and antibiotics, from water runoff.

Luis Sanchez Giraldo, assistant professor in the Department of Electrical and Computer Engineering: $598,021 from the Department of Defense for the project "Measures of Information via Representation Learning,"

JiangBiao He, assistant professor and L. Stanley Pigman Faculty Fellow in the Department of Electrical and Computer Engineering: $500,000 over three years from the NSF for "Collaborative Research: Smart Coils for AC Motors."

Ishan Thakkar, assistant professor in the Department of Electrical and Computer Engineering: $300,000 grant from the National Science Foundation for "EAGER: Transforming Optical Neural Network Accelerators with Stochastic Computing."

Josh Werner, assistant professor in the Department of Mining Engineering: $3 million grant from the U.S. Department of Energy to complete a feasibility study in concert with MP Materials on a system to produce rare earth oxides, metals and other critical materials recovered from coal by-products.

John Young, associate professor in the Department of Electrical and Computer Engineering: $751,596 from the Office of Naval Research for the project "Permanent Magnetization and Corrosion-Related Field Prediction of Complex Structures."

PROFESSIONAL RECOGNITION

Akinbode Adedeji, associate professor in the Department of Biosystems and Agricultural Engineering, received the John Clark Award from the Canadian Society of Bioengineering.

Zach Agioutantis, Mining Engineering Foundation Professor and chair of the University of Kentucky Department of Mining Engineering: recipient of the 2020 Stephen McCann Award for Excellence in Education by the Board of Directors of the Pittsburgh Coal Mining Institute of America.

Brad J. Berron, William J. Bryan Associate Professor in the Department of Chemical and Materials Engineering: Recipient of a 2021 College of Engineering Excellence in Service Award.

Dibakar Bhattacharyya, University Alumni Professor in the Department of Chemical and Materials Engineering: named winner of the 2021 SEC Faculty Achievement Award for the University of Kentucky.

Gail Brion, Chellgren Center Professor in the Department of Civil Engineering: named the 2021 Outstanding Senator by the University Senate.

Melissa Brown, student services administrative assistant for the University of Kentucky College of Engineering: recipient of the Outstanding Link Coordinator Award by the Order of the Engineer organization. Also, recipient of the 2021 Staff Excellence Award in the non-exempt category.

Fanny Chapelin, research assistant professor in the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering: named a 2021 Scialog: Advancing Bioimaging Fellow.

Jennifer Doerge, senior director of Advising and Student Success in the College of Engineering: 2021 recipient of the Ken Freedman Outstanding Advisor Award.

Issam Harik, Raymond-Blythe Professor in the Department of Civil Engineering, and **Abheetha Peiris,** adjunct assistant professor and research engineer in the Kentucky Transportation Center: received the 2021 American Concrete Institute Design Award at the ACI Virtual Concrete Convention.

Issam Harik, named University Research Professor for 2021-22.

JiangBao He, assistant professor in the Department of Electrical and Computer Engineering: awarded the Myron Zucker Family Grant by the Institute of Electrical and Electronics Engineers Industry Applications Society.

Hana Khamfroush, assistant professor in the Department of Computer Science: faculty winner of the 2021 Sarah Bennett Holmes Award.

Alexandre Martin, professor in the Department of Mechanical Engineering and director of the Kentucky Space Grant Consortium and NASA EPSCoR Programs: recipient of a 2021 College of Engineering Excellence in Service Award.

Dr. Jennifer McIntosh, director of the Office of Student Services at the Paducah Extended Campus Program: recipient of the 2021 Staff Excellence Award in the exempt category.

Kelly Pennell, Gill Associate Professor in the Department of Civil Engineering and director of the University of Kentucky Superfund Research Center: recipient of a 2021 College of Engineering Excellence in Research Award.

Jonathan Pham, assistant professor in the Department of Chemical and Materials Engineering: recipient of a 2021 College of Engineering Excellence in Research Award.

Brittany E. Givens Rassoolkhani, assistant professor of chemical engineering in the Department of Chemical and Materials Engineering: accepted as a DREAM Scholar.

Wayne Sanderson, professor in the Department of Biosystems and Agricultural Engineering: named a 2021 Great Teacher by the University of Kentucky Alumni Association.

Himanshu Thapliyal, associate professor and Endowed Robley D. Evans Faculty Fellow in the Department of Electrical and Computer Engineering: received Mid-Career Research Achievement Award from the Technical Committee on Very Large Scale Integration of the IEEE Computer Society.

Sarah Wilson, lecturer in the Department of Chemical and Materials Engineering: 2021 winner of the Henry Mason Lutes Award for Excellence in Engineering Education.

Guoqiang Yu, professor in the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering: recipient of a 2021 College of Engineering Excellence in Research Award.

STUDENT AND ALUMNI AWARDS AND RECOGNITION

Rosemary Alden (BSEE 2021), recipient of the Maurice A. Clay Award for the College of Engineering. Alden also received the Undergraduate Student Award — Second Prize at the 2020 Institute of Electrical and Electronics Engineers Power and Energy Society General Meeting.

Stephanie Isaac Blain (BSCE 2007), 2021 recipient of the National Young Engineer of the Year Award from the National Society of Professional Engineers.

Bobby Bose, a senior majoring in computer engineering: winner of the Best Paper Award at the Great Lakes Symposium on Very Large-Scale Integration 2021.

Jacob Concolino, senior chemical engineering major: selected to receive a Research Internship in Science and Engineering from the German Academic Exchange Service.

Danny Francis, graduate student and teaching assistant in the Department of Civil Engineering: 2021 recipient of the Outstanding Teaching Assistant Award.

Carson Joseph Labrado, doctoral student in the Department of Electrical and Computer Engineering: 2021 recipient of the College of Engineering's Outstanding Ph.D. Student Award.

Donovin Lewis (BSEE 2021), awarded the Otis A. Singletary Graduate Fellowship for the 2021-22 academic year.

Xuhui Liu, Ph.D. candidate in the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering: named a Halcomb Fellowship in Medicine and Engineering for the 2021-22 academic year.

Auburn Mattingly (BSCE 2021), winner of an Otis A. Singletary Outstanding Senior Award.

Melissa Moss (BSCHE 1995; Ph.D. CHE 2000), received the 2021 Mungo Undergraduate Teaching Award from the University of South Carolina (USC). Moss joined the USC faculty in 2004.

Esther Max-Onakpoya, Ph.D. candidate in the Department of Computer Science: named a Halcomb Fellowship in Medicine and Engineering for the 2021-22 academic year.

Mehrana Mohtasebi, Ph.D. candidate in the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering: awarded a Predoctoral Fellowship by the American Heart Association.

Jared Payne, graduate student in the Department of Computer Science: 2021 winner of the Outstanding Master's Student Award.

J. Anthony "Tony" Powell (BSEE 1959), inducted into the NASA Glenn Research Center Hall of Fame as part of its 2021 class.

Ngoc Phan (BSCS 2021), winner of an Otis A. Singletary Outstanding Senior Award.

Kristen Price, doctoral student in the Department of Mechanical Engineering: selected for the 2021 NASA Space Technology Graduate Research Opportunities program.

Ronald J. (RJ) Vogler (BSCHE 2021), Recipient of the $10,000 Tau Beta Pi Graduate Fellowship.

Lucas Goss, Cameron Hunt, Tanner Palin and Landon Russell, senior design students in the Department of Electrical and Computer Engineering, took first place in the Manned Competition event at Promoting Electrical Propulsion 2021 held July 21, 2021, in Baltimore.

Materials and Chemical Engineering Graduate Student Association: received the Diversity & Inclusion Award at the hybrid Lead Blue: Student Organizations Celebration and Award Ceremony.

UK chapter of the Society for Mining, Metallurgy, and Exploration: honored with the SME Outstanding Student Chapter Award and the Mineral Education Coalition Outstanding Student chapter awards for the 2020-21 academic year.

TIMOTHY J. BYERS ELECTED TO NATIONAL ACADEMY OF CONSTRUCTION

The National Academy of Construction (NAC) has elected Timothy J. Byers (BSCE 1981), senior vice president and general manager, Federal & Environmental Solutions (F&ES) Business Unit for Jacobs Inc. in Arlington, Virginia, as a member of its class of 2021. He was formally inducted in October during the NAC annual meeting.

Byers had a distinguished 32-year career with the U.S. Air Force, retiring with the rank of major general. He is responsible for the F&ES global business, delivering services and solutions to federal, public sector, private sector and defense contractor clients while leading 3,500 employees. During his military career, he served as the Air Force Civil Engineer, where he led the 60,000-person engineering force at 166 installations worldwide. His previous assignments include major command headquarter tours and base command positions as a squadron and group commander responsible for planning, asset management, program and project management of facility, infrastructure, and major mission and weapon systems. Prior to serving as the Civil Engineer, U.S. Air Force, he was director of installations and mission support, HQ Air Combat Command, Langley AFB and HQ Pacific Air Command, Hickam AFB. Byers earned a bachelor's degree in civil engineering from the University of Kentucky and a master's in engineering management from the Air Force Institute of Technology.

CLASS NOTES

Martha B. Allard (BSEE 1988) has been appointed as an administrative trademark judge at the Trademark Trial and Appeal Board. Judge Allard has practiced in the field of intellectual property law for more than 20 years.

Heather L. Baldwin (BSCE 1998) was named director of enforcement for the Kentucky State Board of Licensure for Professional Engineers and Land Surveyors. Baldwin has been licensed as a professional land surveyor since 2000 and licensed as a professional engineer since 2002. She began her career with the board in November 2018.

Eric Gindlesperger (BSCHE 2014) is the new vice president of engineering and design for Portable Solutions Group. Gindlesperger was previously with a startup company called PureCycle Technologies as a senior process engineer and operations supervisor.

Trevor T. Graves (BSCHE 2001) has joined Stites & Harbison's Intellectual Property & Technology Service Group as counsel from King & Schickli PLLC.

Robert Hans P.E. (BSCE 1990) has joined Michael Baker International as office manager for its newly opened Cincinnati, Ohio, location. Hans will lead the firm's expansion in Southwest Ohio and Northern Kentucky, expand client relationships and drive growth throughout the Great Lakes Region.

Michael S. Hargis (BSEE 1990) has joined Stites & Harbison's Intellectual Property & Technology Service Group as a member.

Rebecca Liebert (BSCHE 1990) was named to the Pittsburgh Business Times' 2021 Women of Influence list. Liebert is executive vice president at PPG.

David Quarles (BSMNG 1984) has published a contemporary novel that revolves around the story of coal miners in an eastern Kentucky town and their survival during the Great Depression years. The novel is titled "Topside."

Mohammad Rezaee (MSMNG 2014; Ph.D. MNG 2016), assistant professor of mining engineering in the John and Willie Leone Family Department of Energy and Mineral Engineering at The Pennsylvania State University, was selected to receive the Centennial Career Development Professorship in Mining Engineering in the College of Earth and Mineral Sciences.

J. William Rivers (BSCE 1997) has been named head of the Federal Bureau of Investigation's (FBI) office in Cincinnati, Ohio. As special agent in charge, Rivers will oversee FBI operations in the southern half of Ohio, including Columbus, Cincinnati and Dayton. The FBI investigates terrorism, cybercrime, organized crime, civil rights cases, violent crime and public corruption.

Matt Snow (BSME 2008) was named system vice president of support services. Snow has worked at Baptist Health Paducah since 2014, most recently as assistant vice president of facility and sign services for the system.

BE *Included*

Please send Class Notes to alumni@engr.uky.edu

LARRY WELLS

July 28, 1947 – March 7, 2021

Dr. Larry Wells, Ph.D., passed away Sunday, March 7, 2021. He served as a professor in the UK Biosystems and Agricultural Engineering Department from 1974-2012. After retiring, he continued active research work as an emeritus professor. Wells was also a member of the Kentucky National Guard and U.S. Army Reserves.

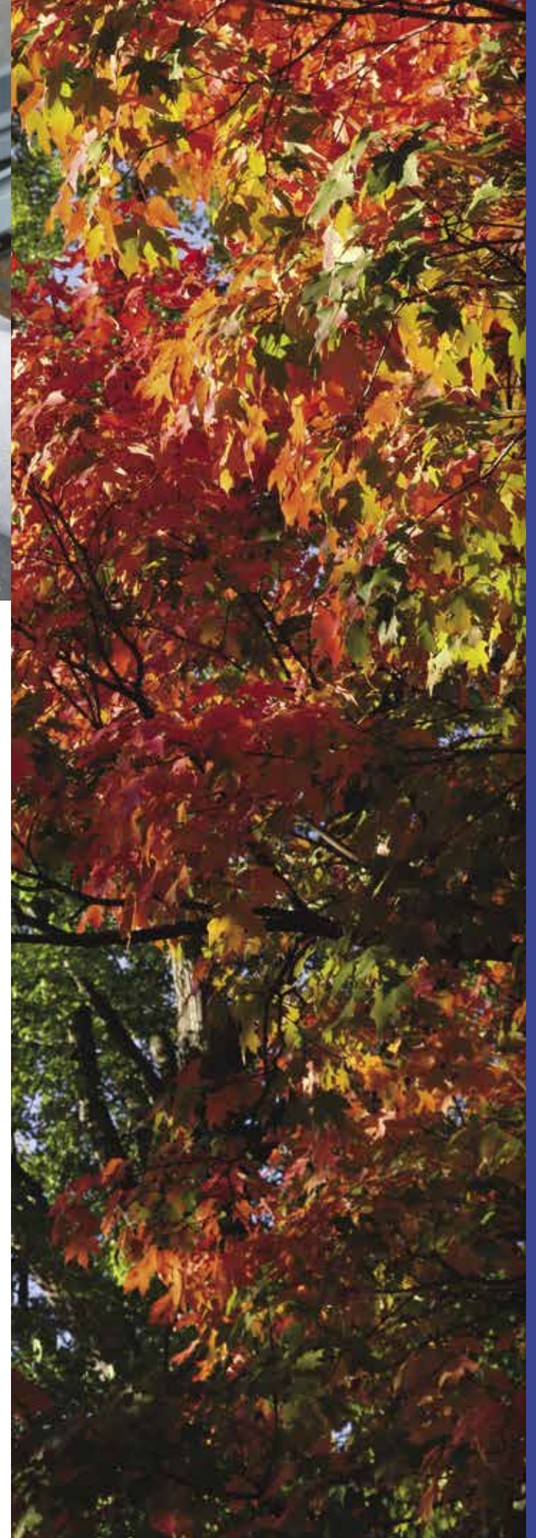
Wells was born July 28, 1947, in Falmouth, Kentucky, and grew up on a farm experiencing both the freedom and confinement of farm life. Long days of sometimes exhausting labor created a desire to develop machines to make things easier. This is where he developed a lifelong interest in agricultural mechanization.

He entered the University of Kentucky in 1965, majoring in agricultural engineering. He was also a member of the 1965-66 University of Kentucky freshman basketball team. Wells graduated with a bachelor's degree (with honors) in 1969 and a master's degree in 1971. He entered a Ph.D. program in biological and agricultural engineering at North Carolina State University. Upon earning his Ph.D. in 1974, Wells returned to UK as a faculty member.

He began his career in teaching and research associated with the design and development of agricultural machinery and made valuable contributions related to tobacco mechanization, mine reclamation, alleviating soil compaction and soil/machine interactions. Wells contributed to many departmental courses (especially in the machinery automation area), served on numerous departmental and college committees, directed the research of graduate students and actively participated in his professional organization the American Society of Agricultural and Biological Engineer (ASABE). In 1987, he was awarded the Sunkist Young Designer of the Year by ASABE. Throughout his career, Wells authored over 50 scholarly articles, was named on three U.S. patents, made numerous presentations of his work in the U.S. and abroad, served on numerous university committees and received over $3 million in research grants.

Wells married his college sweetheart, Estelle (Harper), in May 1971. They would have celebrated their 50th wedding anniversary on May 17. He is survived by his wife, two sons, his mother, a sister and a large extended family. Wells was a devout Christian and was deeply devoted to his family. He was a member of Southland Christian Church in Lexington and served as chairman of Elders and the General Board in 1987.

Wells was a man of strong and unwavering faith, integrity and regard for others. He was held in high esteem by everyone who had the good fortune to know him. A humble leader in both his personal and professional life, Wells tirelessly gave his affection, wisdom and time with no expectation of acknowledgment or reward. He will be deeply missed by his many former students, colleagues and friends. ■



In Memoriam

Owen H. Lewis	Mechanical Engineering	*1949*
Leslie E. Black	Mechanical Engineering	*1950*
Lionel E. Fannin	Mechanical Engineering	*1951*
Roger F. Field	Civil Engineering	*1951*
Ronald P. Walker	Electrical Engineering	*1951*
William H. Alcoke	Civil Engineering	*1952, 1954*
Milton Evans Jr.	Civil Engineering	*1953*
K. Norman Berry	Civil Engineering	*1955*
William L. Chadwell	Electrical Engineering	*1956*
Anthony W. Roberts	Civil Engineering	*1957, 1958*
Robert O. Wilford III	Electrical Engineering	*1957*
Harper D. Lohr	Mechanical Engineering	*1958*
Donald K. Vance	Electrical Engineering	*1958*
James L. Hacker	Civil Engineering	*1959*
John O. Hibbs	Civil Engineering	*1959, 1960*
John L. Loving	Mechanical Engineering	*1960*
John C. Bailey	Electrical Engineering	*1961*
Danny Jasper	Civil Engineering	*1961, 1973*
Charles M. Milward	Civil Engineering	*1961*
Edwin C. Thomas	Electrical Engineering	*1961*
Melvin C. Bunch	Mechanical Engineering	*1962*
Charles D. Powers	Civil Engineering	*1963*
Joseph B. Thompson	Electrical Engineering	*1963*
Gary A. Koch	Civil Engineering	*1964*
Robert O. Barnett Jr.	Civil Engineering	*1965*
Rodney T. Gross	Metallurgical Engineering	*1965*
William L. Crutcher	Chemical Engineering	*1965*
William W. Damron Jr.	Civil Engineering	*1966*
James E. Trotter	Electrical Engineering	*1966*
John J. Liebermann	Mechanical Engineering	*1969*
Larry G. Wells	Agricultural Engineering	*1969, 1971*
R. Vince Sayre	Civil Engineering	*1972, 1974*
Daniel L. Lutz	Electrical Engineering	*1976*
Wayne Cox	Mechanical Engineering	*1977*
Mike Kirkland	Civil Engineering	*1978*
David R. Drury	Mechanical Engineering	*1979*
William Earl Fork Jr.	Mechanical Engineering	*1979*
Michael A. Freeman	Mechanical Engineering	*1982*
Ronald L. Timmons	Electrical Engineering	*1982*
Steve Slade	Civil Engineering	*1983*
Sivaraman H. Subramanian	Computer Science	*1983*
Sandra E. Russell	Chemical Engineering	*1985*
Bret A. Blair	Civil Engineering	*1991*
Christine R. Leverenz	Computer Science	*1998*
Jeffrey R. Fawkes	Mechanical Engineering	*2006*
Chad Alan Manley	Mechanical Engineering	*2007*
Steven James Yaste	Biosystems Engineering	*2008*

UK COMPLETES EIGHT-WEEK GOOGLE APPLIED MACHINE LEARNING INTENSIVE

This summer, undergraduate students representing 11 universities and colleges participated in a Google Applied Machine Learning Intensive (AMLI) at the University of Kentucky.

Sponsored by the National Action Council for Minorities in Engineering (NACME) and Google Education, the eight-week program exposed under-represented minority (URM) undergraduate students to advanced concepts in artificial intelligence and machine learning (ML) using Google Education's open-sourced curriculum.

Corey Baker, assistant professor in the Department of Computer Science at UK, led the summer bootcamp in conjunction with faculty members from partner institutions, including the University of Arkansas and Morgan State University.

"It was a joy having the best and brightest students from around the country experience UK's campus for eight weeks. Our amazing group included 41% women, 52% Black or African American, and 41% Hispanic/Latino students," says Baker.

As ML becomes a powerful tool across industries from health care and retail to investment banking and insurance, there is a growing need for a workforce that understands how to apply ML strategically and use its models to collaborate with data scientists and engineers for maximum business impact. The eight-week ML curriculum gave students the strong computer science foundation they need to work with large datasets and solve real-world problems. Instructors dedicated classroom time to hands-on learning featuring faculty-supported, collaborative project work.

"Google AMLI provided me with a comprehensive, inclusive and engaging introduction to machine learning, a term I have often heard mentioned in computer science with a limited explanation of what is really occurring under the hood," said Elizabeth Eyeson, a computer science major at the University of Colorado in Boulder. "Google AMLI provided me with the 'how' behind this field of study and has broadened my interests in computer science."

The AMLI concluded with five final projects guided by UK graduate students.

"By far, this past summer has been one of the most fulfilling chapters of my professional and personal life," said Tony Ramirez, a computer engineering senior at UK. "It was rigorous and I often felt overwhelmed with the workload, but it was so worth it. My coding skills and confidence grew each day. From all this, my favorite part was the friends I made and the support I had with the TAs, online instructors and Dr. Baker."

The UK AMLI has received funding for two years. Participating students receive full room and board for the duration of the program, a travel stipend to cover arrival and departure costs and upper-level computer science elective course credit for completing the bootcamp.

"The students completed daily lab assignments using Google Colab, finished capstone projects and interacted with Google ML research engineers, all while having fun, you can't ask for a better summer experience," says Ramirez.

ONE DAY FOR UK

4·21·22

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The University of Kentucky Solar Car Team right after Gato del Sol VI took second place in the five-day, 970-mile American Solar Car Challenge, just behind MIT.