

KENTUCKY ENGINEERING JOURNAL

UNIVERSITY OF KENTUCKY COLLEGE OF ENGINEERING

Spring 2019

Modernizing the College

DEAN RUDY BUCHHEIT'S PLANS FOR THE FUTURE



Once again, the Fire Tornado mesmerized engineers of all ages at our E-Day Open House. The highly successful engineering and computer science showcase brought nearly 3,000 visitors, 120 exhibits and contests, and 400 volunteers.



“WE ARE DETERMINED TO REMOVE FINANCIAL OBSTACLES FOR POTENTIAL STUDENTS WHO SIMPLY WANT A CHANCE TO SUCCEED.”

MESSAGE FROM THE DEAN

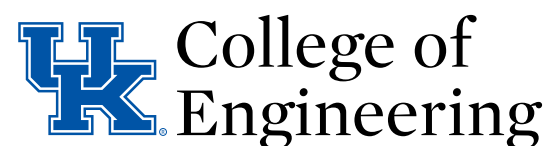
The top 10 college majors with the highest starting annual salary averages were fields either within engineering and computer science or closely related, according to the 2016-17 edition of “Recruiting Trends,” published by Michigan State University’s Collegiate Employment Research Institute (CERI).

In our college, we know that an engineering or computer science degree can positively change a young person’s financial future. Our passion is to do everything we possibly can to make sure our students achieve that milestone and go on to enjoy successful careers. From generous scholarship support to proactive academic advisors to stimulating preparatory experiences like undergraduate research or co-ops and internships, we want every graduating student to feel confident they will succeed wherever their engineering interests take them.

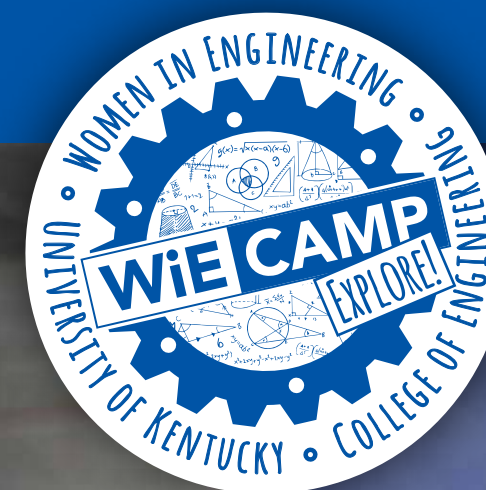
The first-ever One Day for UK, a campus-wide philanthropic event, will take place on April 17. In preparation, we are inviting alumni, industry partners, parents of students, and friends of the college to help us raise over \$100,000 for scholarships. We are determined to remove financial obstacles for potential students who simply want a chance to succeed. Will you join us? You can learn more about One Day for UK by reading about Terry and Sue Strange, passionate engineering alumni who have pledged to match up to \$50,000 for scholarships (pp. 26-29). Terry and Sue are incredible people, and I hope their desire will inspire you to make a difference on April 17.

Sincerely,

Rudy Buchheit
Dean



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June 16-22, 2019
enr.uky.edu/wie

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Modernizing the College

Dean Rudy Buchheit has set a goal to expand the college's overall enrollment to 6,000 students by 2025. How we get there will transform the college in exciting ways.

Editor's note

We don't know the last time you've been to the University of Kentucky campus, so we're not sure whether you remember Enoch Grehan Hall. Does the name ring a bell?

How about, "the building with the silver metal doors and half-spiral staircases"? Ah, there we go!

Erected in 1951, Grehan Hall has long been home for the College of Communications & Information and the Kentucky Kernel student newspaper. Near the heart of the campus, Grehan is less than a five-minute walk to the White Hall Classroom Building, Funkhouser Building, Patterson Office Tower and other nearby facilities.

It's also the next-door neighbor of the Engineering Quadrangle.

Grehan Hall is undergoing a massive \$23 million "modernization." When it reopens in early 2020, it will be the College of Engineering's newest facility, adding 45,000 square feet to the college's current total of 275,000.

In a way, Grehan Hall's modernization provides a useful metaphor for understanding Dean Buchheit's goals for expanding the college's footprint at UK and beyond.

First, Grehan Hall is not new construction, and the college's expansion goals build upon what's already here. Second, as Grehan Hall sorely needed updating for today's engineering education, the college's infrastructure pertaining to faculty, staff and facilities needs a significant upgrade to keep pace with its growth. Finally, as Grehan Hall's new features—allocated space for senior design projects, computational lab space and a retreat for graduate students—will prove attractive to prospective undergraduate and graduate students, enhanced curricular offerings and delivery systems within the college also provide more entry routes for new students.

In short, Grehan Hall's modernization is symbolic of the growth and change already occurring within the college. Dean Buchheit has set a goal to expand the college's overall enrollment to 6,000 students by 2025. To put that in context, enrollment at the beginning of the 2018-19 academic year was approximately 3,900. To meet the challenge, the college will need to add close to 1,600 undergraduate students and 500 graduate students in the next six years.

What renovations will allow this College of Engineering modernization project to succeed? Dean Buchheit presents six upgrades he's passionate about seeing become reality in the college.

Modernizing Academic Offerings

Two fields within engineering currently experiencing significant growth are biomedical engineering (BME) and aerospace engineering. We are poised to make both into formal undergraduate academic offerings in the near future.

While BME has a long history at UK—the first graduate degree based on biomedical engineering research was awarded in 1959—an undergraduate degree in BME has never been available. However, a BME minor introduced in 2015 opened BME classes to undergraduates for the first time.

As engineering’s potential to transform human health and wellness is realized through innovative devices and procedures, more and more high school students look for the option to major in BME.

Like biomedical engineering, aerospace engineering at UK has flourished. Students have ample opportunities for exposure to the field through undergraduate research experiences, student research teams and graduate fellowships; however, undergraduate and graduate degrees specifically in aerospace engineering are not yet available. The aerospace certificate program, which does provide formalized recognition of aerospace engineering studies, puts students in touch with several

mechanical engineering faculty members conducting aerospace research. We already have breadth and depth in this area; offering degrees will better enable us to leverage our expertise.

In addition to BME and aerospace engineering, specialty master’s degree programs in supply chain engineering and data science/data analytics, as well as a suite of new certificates, are in the pipeline. We have the expertise necessary to offer new programs, and we plan to do so as we grow.

Modernizing Teaching and Learning

How much of an engineering curriculum lends itself to online learning? Hitting our target of 6,000 students by 2025 may depend upon how well we answer this question.

The centuries-old model for creating learning communities by aggregating teachers and learners in the same place at the same time is now being extended in our massively connected electronic world. Graduate programs, especially those geared toward working professionals, will best enable us to connect with more online learners. In fact, we already offer a manufacturing systems engineering master’s program that can be completed entirely online.

As the technology for distance learning improves, we will be able to offer more courses at both the graduate and undergraduate levels. High-bandwidth communications, data storage and rendering that span the globe allow us to port the traditional classroom experience across distance and time. This enables us to reach new kinds of students and develop educational programs that go far beyond traditional degree programs. As we become more efficient with online courses, we will also be able to provide an even better on-campus educational experience.

In terms of on-campus education, the First-Year Engineering (FYE) program continues to furnish an excellent bridge between high school and college. In addition to discovering all of the engineering fields taught at UK, FYE students take engineering courses right away and participate in hands-on projects. The result has been more engaged students and improved retention. Plans are underway to strengthen FYE and make it more robust.

Additionally, while education abroad has been around for a long time, we would like to see more students prepare themselves for the globalization of engineering. Engineering is an international endeavor. Our students must be prepared for the international dimension of the profession by training with and among

students from other parts of the world or by learning in venues away from home.

Modernizing Infrastructure: Faculty, Staff and Facilities

If the student body is going to grow, the faculty and staff will also need to grow in order to accommodate it.

In September, I announced an initiative to hire 20 new tenure-track faculty members for the 2019-20 academic year—one of the largest hiring campaigns in our history, if not the largest. All eight departments will have hired at least one new faculty member to start next year.

That’s just the beginning. In all, we plan to hire 70 new faculty members over the next five to six years to match our anticipated enrollment growth. Substantial investments in staff, such as academic advisors, mentors, counselors, philanthropy officers and more, are also essential to supporting our mission.

As a land-grant institution, we are responsible to bring our comprehensive research mission to communities across the state. It’s our obligation to make sure our expertise and facilities are put to good use for the people of the Commonwealth.

While Grehan Hall will expand the college’s capabilities,



“Like all modernization projects, a lot depends on the integrity of the structure. In this regard, our growth plan rests on 'good bones' thanks to passionate alumni, talented faculty and staff, and my predecessors, Larry Holloway, John Walz and Tom Lester.”

and even feature a connector that will make it contiguous with the rest of the Engineering Quadrangle, adding 45,000 square feet of space will not be enough for us to handle our plans for up to 6,000 students.

That's where the proposed Central Engineering Building comes in.

Located between the Robotics & Manufacturing Building and Memorial Hall, the Central Engineering Building will

offer the size and scope needed to educate our rising number of engineering students.

If everything falls into place, our hope is that we will take up residency in the Central Engineering Building in 2025.

Modernizing Areas of Research Strength

As with any renovation project, we are looking to build upon our strengths.

Dedicated faculty members and researchers have enabled us to gain notoriety in areas like energy production and distribution; transportation and logistics; manufacturing and materials; and more. Thanks to those well-established fields, we can make important contributions to research areas naturally emerging from them.

Autonomous systems is one such area. Last summer, 20 faculty members representing five departments, as well as staff from the Kentucky Transportation Center, participated in a research retreat focused on developing, connecting and focusing UK's existing research strengths in the area of autonomous systems across multiple technical areas and domain applications. Of the 20 new faculty members to be hired for the next academic year, up to three will specialize in autonomy and robotics.

Other niches for research breakthroughs include sustainable systems and structures; engineering for human health; computing and information; and cyber-physical systems and security.

Our annual research expenditures currently total approximately \$50 million. Our plan calls for that number to be at \$70 million by 2023.

One strategy for achieving that number is to continue utilizing federal funding sources like the National Science Foundation and the National Institutes of Health and diversify our pool of funding resources. Expanding the number of funding pools will increase the odds of maintaining research productivity during economic downturns. Focusing on emerging areas of research may also enable UK to become the home of a large, externally funded research center.

Modernizing Industry Partnerships

The College of Engineering has enjoyed a fruitful partnership with Toyota Motor Manufacturing in Georgetown, Kentucky, for 25 years. Hundreds of students have completed co-op rotations with engineering companies in Kentucky and across the U.S. The college's 2018 fall career fair featured 142

employers from across the nation, 25 of which had never attended the event.

Opportunities for mutually beneficial partnerships with current and new industry partners are plentiful.

While industry partners have always been able to support senior design projects, participate in "Evening with Industry" events, financially support student organizations like Kentucky Racing, establish scholarships, donate equipment and more, we would like industry partners to take a more active role in faculty recruitment, startup companies, research programs and even join the faculty through a courtesy or part-time faculty appointment.

Modernizing the Student Body

We put diversity and inclusion here, not because it is least important but because it's inherent in all of the other areas.

Broadly, our goal is to enhance diversity and inclusion among our students, faculty and staff, but we want to do more than that. We want to exceed what is expected of us and go on to accomplish something more difficult than surpassing thresholds: create a culture and climate where everyone participates and benefits.

So when you begin to visualize what the college will look like with new programs, new student opportunities, new facilities, new faculty hires and new industry partnerships, know that our commitment to diversity and inclusion is hardwired into each initiative.

Conclusion

Like all modernization projects, a lot depends on the integrity of the structure. In this regard, our growth plan rests on "good bones," thanks to passionate alumni, talented faculty and staff, and my predecessors, Larry Holloway, John Walz and Tom Lester. Our goals would not be possible were it not for their tireless work and love for the college. ■



Dean Rudy Buchheit and wife, Cate, at the Kentucky Castle in Versailles, Kentucky, for the annual State of the College presentation.

Dean Buchheit Establishes Endowed Scholarship Fund

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How much does Dean Rudy Buchheit believe in the UK College of Engineering’s mission and growth plan?

Enough to put his own money behind it.

Last fall, Dean Buchheit pledged \$50,000 over the next five years to create the Buchheit Family Scholarship fund.

“Having scholarship support can change the trajectory of a student's life. This is an investment my family and I are more than happy to make,” said Dean Buchheit.

The fund will provide one or more scholarships for undergraduate students in the College of Engineering. Preference will be given to students majoring in materials engineering.

Endowed scholarships are just one of many ways Kentucky can make a difference. To learn more about how you can contribute, call (859) 257-9395 or visit www.engr.uky.edu/philanthropy.

‘STUCK’ IN THE LAB & LOVING IT

Involvement in undergraduate research is giving Kaitlyn Kearns graduate-level experiences.

Kel Hahn

A junior from Nicholasville, Kentucky, majoring in mechanical engineering, Kaitlyn Kearns didn’t come to the University of Kentucky with a plan to do undergraduate research. As with most good things in life, she discovered it through a friend.

“One of my roommates I’ve known since my freshman year started doing research, and I thought what she was doing sounded really cool. I heard that there was a mechanical engineering department research fair and decided to go. While I was there, I talked with Dr. Grady.”

An assistant professor of mechanical engineering, Martha “Meg” Grady studies thin film adhesion with biofilm-forming bacteria. Adhesion occurs when two things are stuck together, such as when bacteria coalesce into what is called a biofilm on a surface. Because there is currently no widely accepted method to accurately measure biofilm adhesion strength, Grady’s research is aimed at figuring out the strength needed to remove biofilms, measuring those forces required and understanding the factors that influence adhesion strength.

“I’ve always enjoyed biology, and her research combines mechanical engineering and biology,” says Kaitlyn. “I’m learning how to independently culture cells and test the adhesion rate of bacterial biofilms.”

Recently, Kaitlyn received notification she had won an award in

the Oswald Research & Creativity Competition, which promotes creativity in all fields of study. She had submitted an edited version of a report she wrote for the Grady Lab.

“I really like the writing aspect of research. This semester we’re finishing a publication, and because I contributed to data collection and created some of the figures, I will be listed as one of the authors.”

Kaitlyn’s current research project is supported by pilot funding from the College of Dentistry—studying biofilms that cling to dental implants.

“The titanium part that is screwed into the gum can become infected with bacterial biofilms that cause strep, cavities or gum disease. If the biofilms grow underneath the surface, there’s no way to get rid of them except by removing and replacing the implant. That’s not good for the patient, because the bone and gum have already adapted to the implant. Our end goal is to model the mechanical characteristics of bacterial biofilms on titanium, allowing us to improve the implant material so that bacterial adhesion will be prevented while cell integration is still possible.”

Currently in her third semester working in the Grady Lab, Kaitlyn was able to arrange her schedule so she can be immersed in research from 9 a.m. until noon every weekday and attend classes in the afternoons.



"Kaitlyn's skills and work ethic are impressive," says Grady. "After about a year in my lab, she is taking on responsibilities commensurate with first-year graduate students. I am proud to be a part of her story."

However, Kaitlyn's interests extend beyond the lab. Numerous times each fall, she trades her lab coat and equipment for a marching band uniform and a trumpet.

"I actually started playing in my high school's marching band when I was in eighth grade, and I joined UK's marching band as a freshman. I've gotten to go to all three bowl games and especially enjoyed the two played in Florida."

Kaitlyn also served as a peer mentor in the Engineering Living Learning Program last year, something she considers to have been an important part of her engineering experience.

"I feel like the students under my mentorship became one of the more close-knit groups, and I was proud to see that a lot of them went on to be peer mentors themselves."

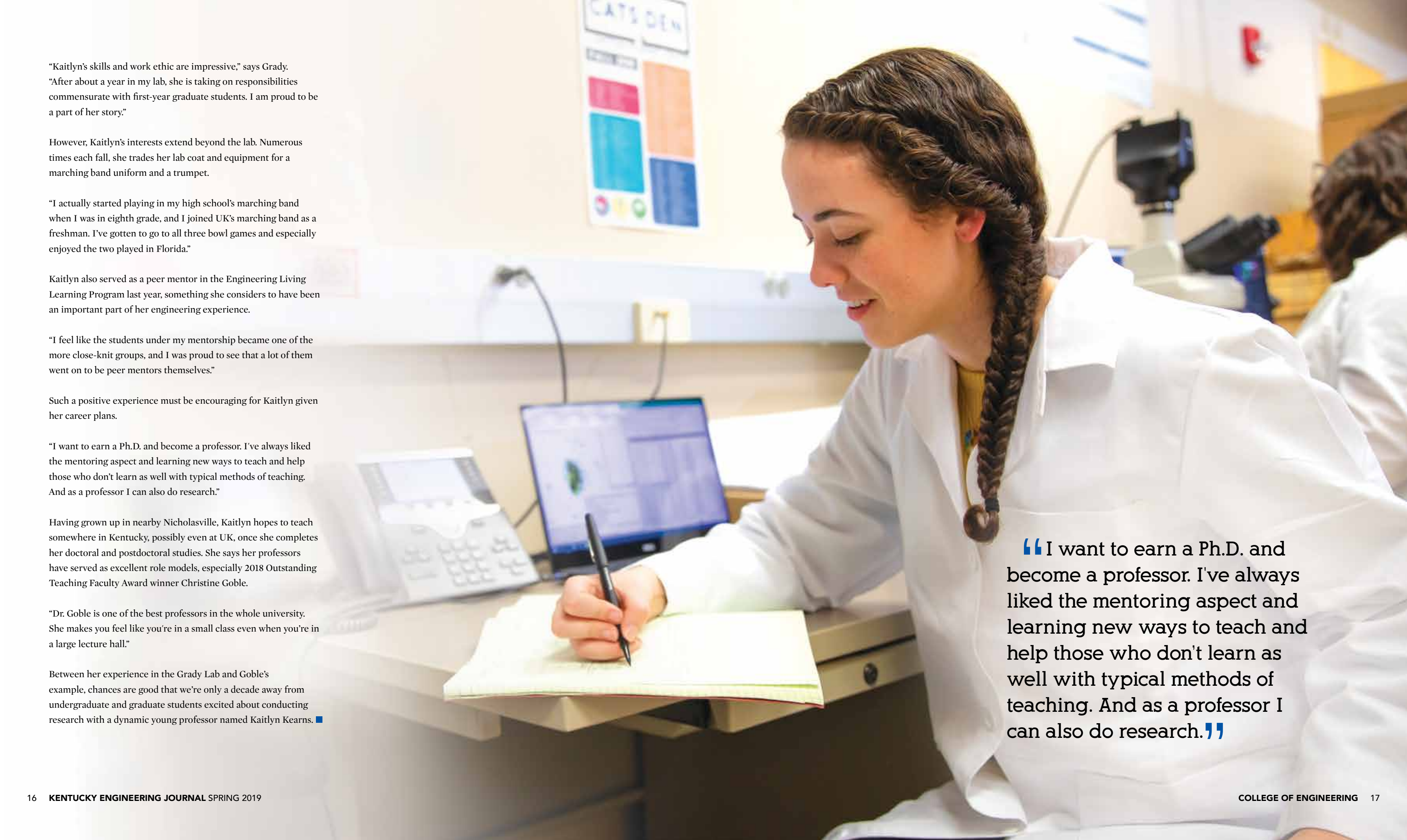
Such a positive experience must be encouraging for Kaitlyn given her career plans.

"I want to earn a Ph.D. and become a professor. I've always liked the mentoring aspect and learning new ways to teach and help those who don't learn as well with typical methods of teaching. And as a professor I can also do research."

Having grown up in nearby Nicholasville, Kaitlyn hopes to teach somewhere in Kentucky, possibly even at UK, once she completes her doctoral and postdoctoral studies. She says her professors have served as excellent role models, especially 2018 Outstanding Teaching Faculty Award winner Christine Goble.

"Dr. Goble is one of the best professors in the whole university. She makes you feel like you're in a small class even when you're in a large lecture hall."

Between her experience in the Grady Lab and Goble's example, chances are good that we're only a decade away from undergraduate and graduate students excited about conducting research with a dynamic young professor named Kaitlyn Kearns. ■



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RESEARCH IN THEIR OWN WORDS: Jonathan Pham

Last summer, materials engineering assistant professor Jonathan Pham received two National Science Foundation grants totaling \$525,000. Pham, who joined the UK College of Engineering faculty in 2017, researches soft materials and interfaces and liquid-surface interactions, among other interests. Basically, he explores how solid materials...well, sometimes liquids...depending on the size, of course...well, probably better if he explains it.

In general, our work focuses on understanding the behavior of soft materials, primarily at or near interfaces. Soft materials are materials that can be deformed easily. When they become very soft, like gels or putty, mechanical behavior and adhesion approaches that of liquids. This effect becomes even more obvious as you decrease the size. I find this interesting because they are actually considered solids. It reminds me of elementary school when the teacher asks: is it a solid or a liquid? The answer in this case is: It depends on how soft it is and how small it is.

Soft materials and their interfaces are essentially everywhere. Using these materials successfully requires understanding how to control their interactions with other surfaces and materials. For example, how does your soft contact lens attach to your eye, but not forever? How does your post-it stick to the table, but still come off with ease? How about duct tape, Scotch tape and command strips? This is also important for cosmetics—how do makeup and creams stick to the skin? These are products you use day in and day out.

Other questions we ask include how can

we use such interfaces for soft robots, or intelligent skins that can be integrated with the human body? Our bodies, and other organisms too, are made up of soft materials—muscles, organs, brains—and we hope to be able to understand the connection between biological functions and the behavior of interfaces. This may lead to new knowledge on why a cell decides to become a cancer cell or how barnacles can so strongly stick to the side of a ship.

Of course, all of that is a ways down the road. Our current focus is on the fundamental connection between the molecular structure and interfacial behavior of synthetic materials. Those are factors we can control in the lab. Then we can start thinking about more complicated biological systems.

One of the grants focuses on friction of soft surfaces. For this we are just trying to understand how something slides across a soft surface when that object is small. It seems like a surprisingly simple question, yet we don't really know. We question whether it slides more like a soft solid, or like a liquid, or some combination of both. With the other, we are developing a collaboration with a colleague at MIT

to better understand how soft, hydrogel interfaces behave when their molecules are dynamic, which, simply put, means that they are continuously linking and unlinking from one another. This should allow for controlling their interfacial properties depending on the timescale. We hope both of these projects will push forward our knowledge of how to control soft interfaces.

How does someone become interested in soft materials and interfaces? Well, as a graduate student I focused mainly on nanoparticle assembly and solid structures. This got me interested in small stuff. I spent a bit more than half a year living in Paris, working on how these small structures interact with liquids. It's another world at small sizes—gravity and inertia are often negligible. You have to think differently. I continued my research at Max Planck Institute for Polymer Research in Mainz, Germany, working on a variety of projects from biological cells interacting with soft interfaces, hydrogels bouncing on hot plates and something as simple as how a small point pokes into a soft surface. The underlying theme in all of these projects is soft interfaces. We use them all the time, but there is still a lot we don't know how to control. ■

MONON^{OF} ALL TRADES

Kel Hahn

Disney Pixar's *Cars* came out in the summer of 2006. You remember: Lightning McQueen. Radiator Springs. The lovable Tow Mater voiced by Larry the Cable Guy. The film instantly became a hit and later spawned two sequels.

It also birthed a love for motorsports in a seven-year old boy living in Frankfort, Kentucky, named Monon Rahman. Today that boy, now a senior majoring in mechanical engineering at the University of Kentucky, wants to be a NASCAR crew chief for a racing team.

"That's my biggest goal. I want to be at track competing every week and overseeing the direct performance of the car. Being a crew chief combines a lot of what I love, not only the technical aspects but also being a team player and a good communicator."

That blend of diverse interests and talents necessary to establish oneself as a successful crew chief fits Monon perfectly. Technical chops? Yes. Leadership ability? Without question. Communication skills and creativity? In spades.





THE TECHNICIAN

The UK College of Engineering offers two racing teams on its Lexington campus: the Solar Car Team and Formula Kentucky. Whereas the former builds and races vehicles powered by solar energy, the latter does the same for formula-style cars. Generally, interested students choose one team over the other.

Not Monon. He's fully immersed in both. In addition to serving as aerodynamics and body work lead for Formula Kentucky, Monon contributed to the composite manufacturing for the Solar Car Team's newest vehicle, Gato Del Sol VI.

"I've been able to get a lot of my technical experience by being the aerodynamics and body work lead. That's what our teams are for—getting that hands-on experience. It's helped me with both teams."

Monon says that several students he's worked with over the years have received job offers specifically due to their experience on one of the teams. He's hoping that trend continues since he spent the past two summers interning with Venturini Motorsports (VMS), a racing team that participates in the ARCA Series.

Using software called DartFish, Monon would record different cars and "ghost" them together so the VMS teams could see where one car is faster than the other.

"This is really helpful in racing because it allows for a direct, real-time comparison of how one car is doing compared to another."

A typical race day for Monon began with recording for DartFish during practice and qualifying. He would help send the

footage to the VMS teams, which enabled the teams to better understand their vehicle's performance. After practice and qualifying, Monon was free to shadow VMS teams and provide general assistance as needed.

"I was given many opportunities to learn and understand the fundamentals, logistics and challenges of stock car racing. Standing alongside the crews at the pit box provided me insight to the technical aspects of their vehicles and the underlying work that occurs during a race weekend."

And if you dream about working in NASCAR, pit box experience and glowing references from team ownership certainly has to help.

THE LEADER

One of Monon's more enriching experiences as a UK engineering student came during his junior year when he participated in the limited enrollment EGR 490: Engineering Leadership class. As he listened to and networked with guest speakers—many of whom were distinguished alumni of the college—Monon gained an expanded view of where his engineering degree could take him.

"I began to see how engineering really opens a door for you. You might not necessarily be doing engineering your whole life, but you still have the creative problem-solving mindset that you get from becoming an engineer."

Stan Pigman, who graduated from UK in 1981 with a degree in mining engineering and earned a place in the college's Hall of Distinction in 2009, has played an integral role in the Dean's Leadership Class since its inception. As an avid supporter of the Solar Car and Formula Kentucky teams, he's also proved to be a mentor and role model for Monon.

"Mr. Pigman has been one of the biggest influences upon me because he's a donor who goes much further than handing you a check. He's always making an effort to interact with us. He'll even come to the races and watch us compete. He genuinely cares—he cares about what we do as students and what we do once we graduate."

Because Monon fills several roles across both teams, he's been given the title "student manager" for Kentucky Racing, the umbrella that encompasses both

teams. But it's as team manager for Solar Car where he's actively preparing to wear a crew chief's headset.

"Being team manager for Solar Car has been important for me probably because it relates to where I want to end up career-wise. As a team manager I'm overseeing the development of a racing team, seeing what steps we can take here and there and watching our actual performance at the races. That's what I really enjoy."

Monon's path to leadership on the Solar Car Team began early. When a team member had to vacate his role as business lead, Monon gladly accepted the responsibilities—even though he had just finished his first semester as a freshman. In addition to managing the budget, Monon frequently works with manufacturers and donors to secure equipment and funding.

"Student organizations don't come fully funded. So we go out and try to get as much money as we can for the team. For me personally, I think it's significantly helped my marketing and communication skills."

As team manager, Monon also ensures the team participates in a wide variety of outreach events. Whether it's a student organization fair, engineering exposure event for kids or even the Versailles Christmas Parade, you can find Gato Del Sol VI and Monon nearby. His favorite event, however, is the college's Engineers Day Open House, also known as E-Day.

"I came to E-Day during my junior year of high school and saw the solar car and

formula car used at the time. I talked to the students and learned a lot about the teams. After that, it was in my mind that if I came to UK, those teams existed and I could join one. As it turned out, I came to UK, and from day one of my freshman year I wanted to get involved. Now when we display the cars at E-Day, I wonder if any of the kids will be future team members. We love doing outreach, because that's how students learn about us."

But the cars are not strictly for show, and at the end of the day, Monon is a competitive guy. He wants to race. After a series of setbacks capped off by a broken left suspension prematurely ended Gato Del Sol VI's debut at the American Solar Challenge last summer in Nebraska, Monon and the team are eyeing this July's Formula Sun Grand Prix (FSGP) as a shot for redemption.

"Last year was hard, but all the issues we faced have made us learn more. Experiencing what we did has really fired us up. We just need things to fall our way a little more."

The race will be Monon's last, and while he hopes to sign with a racing team after graduating in May, he's letting all potential employers know that the race is non-negotiable.

"A lot of us get job offers because of the experience we get on the teams. So employers are typically understanding about waiting until after the race, especially if they're hiring you because of your work there."



THE FILMMAKER

Monon loves to challenge himself. While a full load of mechanical engineering classes would be enough for most students, last fall Monon decided to throw in an elective screenwriting class. Why? Because he felt it would make him a better filmmaker.

Monon says when he was in high school there was a time when few people knew who he was. And then there was a time when a whole lot of people knew who he was. The line of demarcation? A YouTube video Monon posted featuring his version of the “Harlem Shake.”

“It was the first ‘big thing’ I ever made,” he says, supplying the air quotes.

Monon became more serious about filmmaking when he participated in the Governor’s School of the Arts program after his junior year of high school. There, Monon learned about “new media” and specifically worked on photography and videography.

“It was neat to be with other artistic students and see what people in creative fields are doing. I’ve since been able to incorporate that experience into my work with the racing teams.”

During the fall semester, Monon won Best of Show at the UKY Film Festival for *The Void*, an eight-minute film he wrote and directed. The annual event showcases and celebrates the films created by UK students.

“I first came up with *The Void* when I was in the Creative Filming Club two years earlier, but I had to put it on the back burner back then. I was able to write it for my screenwriting class’ midterm and then went to some friends with the idea of getting it done before the film festival. I think we shot it in two days.”

Monon says *The Void* is about a person trying to come to terms with their own shortcomings. He also says it has a

personal connection to how he felt after the letdown in Nebraska.

“The real message I’d like people to take from it is that it’s okay to not be okay all the time. We’re trying to get so much done, and people don’t always give their own mental health as much focus as they really should.”

As is often the case with award-winning ventures, Monon had to overcome adversity. The film’s arguably most impressive shot is that of an iPhone being dropped from the second floor of the William T. Young Library and hurtling toward the camera. One particular practice run didn’t go so well.

“I tried to clap my hands together to catch the phone, and it went right through them. Broke the screen,” Monon says with an embarrassed grin. “My dad was like, ‘What were you thinking?’”

NASCAR HOPEFUL

Monon’s favorite NASCAR crew chief is Alan Gustafson, currently head man for Hendrick Motorsports’ No. 9 car driven by Chase Elliot. Gustafson formerly served as crew chief for racing legend Jeff Gordon and led Mark Martin to five victories during the 2009 season.

“What I really like about him is that he’s either worked with very young drivers or veterans trying to get a resurgence; but whatever the case, he’s been successful. He has a calm demeanor, and he’s done really well helping Chase Elliot.”

Whether Monon will have the opportunity to become the next Alan Gustafson remains to be seen, but his combination of relentless drive and thoughtful self-improvement aim him in the right direction. First up is securing a race engineering position on a team interested in bringing him aboard.

But only after he gets in Gato Del Sol VI for the last time this July. ■





ONE
DAY
FOR
UK

KENTUCKY
CAN. THE 21ST
CENTURY
CAMPAIGN

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Terry and Sue Strange Need Your Help

One College of Engineering alumni couple is passionate about student success, and they're asking you to participate in One Day for UK.

Giving back. Paying it forward. Helping students. Terry and Sue Strange are intimately familiar with all of the above, and they do it without any desire for recognition. Unfortunately for the Stranges, their generosity and dedication are hard to ignore given they are offering \$50,000 in matching funds for UK's first annual giving day: One Day For UK.

"My parents always assumed I would attend college," says Sue. "They worked hard and saved so that they could afford to pay for my undergraduate education. It was one of the greatest gifts they gave me and opened up a world of ideas and opportunities that has enriched my life and made me the person I am today. To be able to extend the opportunity for higher education to today's students is a fitting way to honor my parents' gift to me, and my hope is that the students who receive the help will benefit from their UK education as much as I have and pass on the tradition of valuing education to the next generation."

Both Terry and Sue are accomplished graduates with undergraduate and master's degrees from UK, and they happily share stories of living overseas while working for Dow Corning. Their faces light up when they speak about their children and grandchildren, and the Stranges delight people with tales of their cycling adventures and Terry's woodworking hobby.

What you won't hear them talk about is Terry's induction into the College of Engineering's Hall of Distinction in 2011 or the fact that Sue earned her degree in chemical engineering while raising two children and commuting back and forth to Indiana.

Nor will you hear them boast about all they've done for the College of Engineering since they both retired. Terry and Sue decided they would dedicate their time, talent and treasure to the Department of Chemical and Materials Engineering, to the Engineering Alumni Association and to supporting student success. This has played out by way of teaching a leadership class for CME students, serving as board member and president for the Engineering Alumni Association, serving as a mentor for

engineering students, creating and supporting a scholarship fund for the student AIChE chapter, and now by generously offering a \$50,000 matching gift fund for the Lester Scholarship for the April 17 One Day For UK day of giving.

"The University of Kentucky provided both of us a quality education that helped us to be successful engineers in our jobs around the world," says Terry. "For me, I came from a home where no one went to college. I have two brothers and neither was able to go. My parents didn't even have a high school education. Sue and I have been together since high school and knowing she was going gave me incentive that I should go. There was no money to pay for it, so I worked summers and had work study jobs during

the spring and fall semesters."

Terry and Sue value the opportunities their education has granted them, and they recognize the importance of student success. Scholarships are a part of that success because they open doors and eliminate burdensome debt. Terry and Sue want you to help them open those doors by making a gift to the Lester Scholarship fund on April 17.

"I know there are many young people in Kentucky who are in similar situations to me," Terry states. "My desire is some of the money raised during the One Day for UK will enable some to attend UK who would not have otherwise been able to go."

Scholarship support gives students peace of mind about paying for college. Will you join us on April 17?



#ONEDAYFORUK

UK GIVING DAY

ONE DAY. ONE GIFT. ONE ENORMOUS IMPACT FOR ENGINEERING.

On April 17, the University of Kentucky will rally its alumni, friends and fans to support One Day for UK, a 24-hour day of giving where you can support the college, unit or cause of your choice.

The College of Engineering has set a goal to raise as many gifts as possible for the Thomas Lester Scholars Program, known affectionately as the Lester Scholarship, during the day of giving.

To aid us on the path to success on One Day For UK, Terry and Sue Strange have generously offered to match up to \$50,000 for gifts made to the Lester Scholarship fund on April 17.

With a greater need for Lester Scholarships than ever before, not only can you help us meet the fundraising goal set by the Terry and Sue, you can also help us surpass it! On April 17, 2019, visit onedayforuk.uky.edu early in the day to make your gift to the College of Engineering and take advantage of the match. Then join the conversation and encourage friends to give on social media with the #OneDayForUK hashtag.



AN INTERVIEW WITH THE SIMS™ PRODUCER
JOANNA LIO AMOS

Kel Hahn

A lifelong gamer, JoAnna Lio Amos graduated from the University of Kentucky in 2001 with a bachelor's degree in computer science. While furthering her education through a master's program at Indiana University, JoAnna scored two successive summer internships at Electronic Arts (EA) in San Francisco, where she began working on The Sims franchise. Today, JoAnna is a producer at EA for Maxis, the studio behind The Sims and SimCity™. EA is a global leader in digital interactive entertainment, and The Sims franchise alone has sold more than 175 million units since its launch in 2000.

A member of the UK Department of Computer Science's advisory board, JoAnna visits campus twice a year. During her fall trip to Lexington, JoAnna overcame jetlag and an overnight series of flights to tell us how she became a game producer, what her job entails and whether she plays her own games.

So...what gaming systems do you own?

I own and play on all the mainstream consoles plus PC and mobile. My husband and I both game, so we each have a PS4, Xbox One, and Switch so that we can play together on the same couch.

What led you to choose UK?

I liked that UK is a liberal arts school, so I wasn't siloed into just engineering. I got the full breadth of the humanities. I double majored in English, so I got to take creative writing classes, various literature classes and courses in the Colleges of Communications and Business & Economics. I even took an architecture class where one of our projects was to create art pieces based on architectural concepts.

What was that like?

With programming, you know when you have solved a problem

because what you've made functions, but art is more subjective. 'Is this good enough? Is it maximally illustrating what I want it to say?' There's no defined endpoint.

Is the same true of producing video games? It seems like you could always add more features.

Game production is a similar phenomenon as a mix of art and science. But when it comes to making games, you have the benefit of your timeline; you have finite resources and a hard deadline.

What made you choose computer science for your major?

I always wanted to do something with video games, but I didn't know if that could become a reality. How many people dream about becoming an actor or actress compared to how many actually make it? I knew nothing about game development other than somebody has to make them.



When I was a teenager, there was a magazine I really wanted called Game Developer. It was kind of expensive, so I never got it. The bookstores kept it wrapped in plastic, so I couldn't even flip through it. But I'd look at the cover and think, "I really want to know what's in there!" So when I got to college I figured I would major in computer science, learn programming and that would get me closer to something in game development than nothing.

What does a game producer do?

The definition of the role can differ based on the company and team. For Maxis, at a high level, the game producer represents the player. Where the engineer creates the foundation and tools, the artist crafts the visuals, the designer invents the mechanics of how the game will play and then builds that with the tools provided by the engineer, the producer ensures the game is an amazing experience for players. Producers coordinate all the development disciplines and collaborate with partners such as marketing, publishing and legal. The highest level producer is responsible for the game as a whole.

How do you describe The Sims to people unfamiliar with the franchise?

The Sims is a charming, lighthearted game that simulates life. It's not intended to replicate life by any means—it's more a parody of life. When we all played with dolls or action figures as kids, the story all came out of our head, and the toys just did what we had them do. The Sims is a toy that responds to what we're doing. So the really fun part of playing is poking around and seeing what happens.

Say you want to make a love story. One Sim wants a perfect wedding and the other Sim is a slob. You can create the Sims, build their home with a wedding venue in the backyard, put the two of them together and then experience what happens in the simulation.

It's always a surprise. One of the tricky parts of demoing the game for people is that we don't know what the characters are going to do!

The Sims has had four main incarnations, plus add-ons. What's next for the franchise?

The Sims Mobile launched in March 2018 for most of the world

and then in Japan, South Korea, Taiwan, Hong Kong and Macau in August. We'll continue to add lots of new gameplay and content for years to come!

What has changed for you in moving from PC/console to mobile?

The reach of the mobile platform is enormous, vastly expanding access to games. Compared to PC and console games, play sessions on mobile devices tend to be much shorter and more frequent, so we make an experience that caters to that.

How do you do that?

One of the most exciting elements for me is that we can dynamically respond to how players are playing. On a mobile platform, we get loads more data and can find out what works and doesn't work for each player. That enables us to address problems and make the experience better and better.

In a world where technology is constantly changing, you always have the opportunity to make good use of that technology.

Do you ever play your own game?

Yes! It's in my regular rotation of games. Mobile devices are really nice because my games go with me. I can play on my lunch break or in between meetings. If I need to reference the game in a conversation with a co-worker, all I have to do is pull my phone out of my pocket.

Where do you see yourself going in your career?

I want to keep leading teams in making playful, interactive experiences that touch the lives of millions of people. It has this special mix of elements: I get to work with interdisciplinary teams on projects that are both artistic and technical, and the output is fun. I love bringing entertainment to people that sparks their imagination, enables their creativity and makes them laugh.

The landscape of games is changing constantly as technology develops and new games emerge that raise the bar. There are always fresh challenges and new things to discover. ■

“On a mobile platform, we get loads more data and can find out what works and doesn't work for each player. That enables us to address problems and make the experience better and better.”



In Transit

UK Researchers Discuss Fallout from the Rise of Ride-Hailing Companies.

Kel Hahn

When John Zimmer took a city planning course in college, he had an epiphany: We’ve built our communities entirely around cars. As a result, we have more traffic and pollution and fewer green spaces, sidewalks and parks. Determined to revolutionize public transportation, Zimmer became co-founder and president of Lyft, a popular transportation network company (TNC).

“...I believe we’re on the cusp of nothing short of a transportation revolution—one that will shape the future of our communities,” wrote Zimmer in a 2016 blog post titled “The Third Transportation Revolution.” “And it is within our collective responsibility to ensure this is done in a way that improves quality of life for everyone.”

Uber, a larger ride-hailing service with an estimated 100 million users worldwide and the biggest market share within the United States, has espoused similar hopes. A former mission statement for the company reads: “Uber is evolving the way the world moves.”

“TNCs have pretty strong PR arms,” says UK civil engineering assistant professor Greg Erhardt. “They come along and say, ‘Look, we’re new technology. We’re green. We’re sustainable. You don’t need to regulate us or make us follow the same rules as taxi cabs. We’re going to fix your city’s congestion problems.’ And cities have been happy to get on board.”

Greg Erhardt in conversation with doctoral student Sneha Roy.

Sounds like everyone wins, right? Erhardt says not so fast.

“The question is whether their claims are accurate from a public policy perspective. We want to look at what’s really happening. TNCs got bigger than people expected and in a short amount of time, so we’re trying to understand the impacts of those companies on the transportation systems.”

Erhardt says one challenge inherent to such research is that TMCs operate in major U.S. cities, making it near impossible to set up experiments and change one factor at a time.

“The economy has been strong lately, and these cities are adding jobs. More people are going to work. Their populations are growing as well. You have factors like gentrification, changes to the service, fluctuating gas prices—all of these affect the whole picture in different ways, so it is challenging to parse out one particular area.”

Challenging, but not impossible.

Mei Chen, associate professor of civil engineering at UK, says advances in tracking and big data thanks to GPS-enabled devices like smartphones and in-car navigation systems generate copious amounts of travel-related data available through data vendors.

“The reason why this is so significant for us is that it provides direct measurement of the operating conditions on a given roadway: speed, delay and travel time. Before this technology came in, it had been really expensive to get this data. Now, we can directly measure what’s happening on the road.”

Data of this kind has been available since 2009, so it is possible to see how congestion has changed over time at any given location, as well as network-wide.

“You can see what the rate of speed was for any particular road from 9 to 9:05 a.m. on January 1st, 2019, and then compare it to that same timeframe three, six or even 10 years ago. The continuous data lets us measure the change in congestion over time,” Chen adds.

How does that relate to the TNCs? Chen says researchers from Northeastern University produced their own data set pertaining to Uber and Lyft trips in San Francisco and made it available to the San Francisco County Transportation Authority (SFCTA). That’s where UK comes in.

In October, SFCTA released a report titled TNCs and Congestion, the first comprehensive analysis of how TNCs have contributed to traffic congestion in San Francisco. Erhardt, Chen and doctoral student Sneha Roy conducted the research which found that transportation network companies accounted for approximately 50 percent of the rise in congestion in San Francisco between 2010 and 2016. Forbes, Wired, and numerous local and national news outlets picked up the report.

“When you add a new TNC vehicle to the road, is it taking off vehicles from the road or is it adding vehicles to the road?” asks Roy. “We found that about 67 percent of all TNC vehicles added to the network are new cars and only 33 percent are substitutes, which significantly increases congestion, especially in a city like San Francisco, which is already congested.”

According to Erhardt’s doctoral student, Alex Mucci, increased congestion isn’t the only impact caused by TNCs. Transit ridership, especially on buses, is down.

“There was a study from 2002 to 2015 that looked at the factors affecting transit ridership. But then between 2015 to 2018, we saw that Uber ridership in New York City rose from 60,000 to 600,000. We wanted to extend the earlier study to 2018 to see if TNCs could be a variable.”

Mucci, Erhardt and undergraduate student Michael Graehler presented their findings at January’s 98th Annual Meeting of the Transportation Research Board. The paper, titled “Understanding the Recent Transit Ridership Decline in Major US Cities: Service Cuts or Emerging Modes?” revealed that in 22 major U.S. cities, bus ridership experienced a steep drop. Heavy rail systems, such as subways, also experienced a drop, although not as severe as bus lines.

“You would expect that with the population growing in these cities, transit ridership would be going up, but it’s not,” says Erhardt. “That gap seems to be correlated with the entry of TNCs into the market. TNCs say they’re bringing people to the rail stations, but we can also see that they’re concentrated in the city centers and near tall buildings where it’s hard to park. Those are the exact same places where bus trips are most viable, so you’re taking people off the bus and putting them into a car.”

“We found that about 67 percent of all TNC vehicles added to the network are new cars and only 33 percent are substitutes, which significantly increases congestion, especially in a city like San Francisco, which is already congested.”

– Sneha Roy

Is there a downside to taking people off buses and putting them in Uber or Lyft cars?

“There’s a clear benefit for the person in the car. They’re getting a better experience, or they wouldn’t do it,” Erhardt agrees. “But there is a negative impact on everyone else: on the road system, other drivers and the people on the bus who also have to wait in traffic.”

“What’s best for you is not always best for everybody else or the traveling public as a whole,” Chen adds.

It sounds like instead of Uber and Lyft solving the traffic congestion problem, they’re making it worse.

“So then you’re left with a question,” Erhardt summarizes. “What do we do about this?”

Erhardt insists the answer isn’t beating up or blaming TNCs but, rather, understanding the trade-offs.

“In order to craft effective policy, you start by understanding the problem. Then you have to evaluate the effectiveness of the proposals, and that’s what we’re trying to do as transportation engineers.”

One proposal currently being considered by the city of San Francisco involves congestion pricing. Congestion pricing looks at external costs associated with congestion and charges more for driving during peak periods or in areas more prone to gridlock. Ten years ago, transportation engineers created a congestion pricing proposal for San Francisco, but the recommendations were never implemented. Now, that report is getting a second look. One of the engineers who contributed to that study was Greg Erhardt.

“What’s interesting is that TNCs are actually supportive of congestion pricing,” says Erhardt. “They see that it would affect not only them but also drivers, and if it reduces the number of people in single-occupant vehicles, then it builds their market as well. It actually makes me a little bit hopeful that there’s an opportunity for it to move forward.”

Moving forward. That’s all anyone on the road wants to do. Through the work of Erhardt’s team, maybe it won’t be long before we can all get to our desired destination, in our own desired way, in our own desired time. ■

In the Trenches

To improve student retention, the college has made substantial investments in academic advisors for first-year students. And it's working.

Kel Hahn

Jennifer Doerge, director of advising and engineering student services in the University of Kentucky College of Engineering, has a master's degree in higher education, and she's completed her Ph.D. coursework in the same field. That's a long way from her undergraduate studies in art history.

"For a long time I thought I was going to work in a museum as a curator," she says, recalling her days at Centre College in Danville, Kentucky. "Now, I think I would have been miserable. It would have been too calm and quiet."

Calm and quiet do not describe the James and Gay Hardyman Center for Student Success, where Jennifer and three other first-year student academic advisors, Diane Freeman, Lesley Brenner and Susan Herrick, have their offices. With a ratio of 275-1 first-year students per advisor, their hall sees a lot of traffic.

"We have an open-door policy," explains Lesley, who secured her first academic advising position in 2013 through the Department of Mining Engineering. "We don't have a gatekeeper, nor do we require an appointment. We don't want any barriers between the advisors and the students. We want them in our offices, early and often."

For readers whose previous experience with academic advisors rarely moved beyond picking the next semester's classes, let it be known that the academic advisor has been reinvented. Forget about churning folks through registration; according to Jennifer, advising is now a much more holistic field.

"We want to be students' first point of contact, and that makes us have to wear different hats. We are friends, we are confidants, we're shoulders of support. We make referrals to financial aid and the counseling center. We try to be that one-stop shop for

students. We want to be the ones they feel comfortable with and their go-to person when they need help."

Diane, who has worked at UK since 1986 and advised freshmen engineering students since 2004, says it's personal interaction that makes the student/advisor relationship work.

"The main thing our students need is the knowledge that their advisor cares about them and is partnering with them to help them achieve the academic, personal and professional goals they have set for themselves."

A perennial challenge the advisors face is helping students build resilience in the face of early setbacks. They often talk about the "growth mindset," popularized by psychologist Carol Dweck in her book *Mindset*, that is necessary to succeed in a challenging field like engineering.

"Sometimes if a student gets a C on their first calculus exam, they will assume they can't get it. Instead of seeing a C as a failure, they need to see it as something from which they can grow. But getting that mindset to change is difficult," says Jennifer.

Lesley agrees. "Students need to know that I'm on their side but also that I will challenge their way of thinking."

In addition to the open-door policy, the advisors go above and beyond in other ways to help struggling students. Returning late-night emails enables panicking students to breathe a little easier. Advisors have even been known to intercept students at their classes when messages have gone unreturned. Diane says it all comes down to doing everything possible to help each student make the leap from freshman to sophomore.

“We want to be students' first point of contact, and that makes us have to wear different hats. We are friends, we are confidants, we're shoulders of support.”

-Jennifer Doerge



“Our students’ success is important to us and drives everything we do whether it’s printing out their papers when they run out of ink, giving them a necktie before a career fair or just providing a sympathetic ear when they need to talk.”

Still, 275-1? While the ratio sounds absurdly high, NACADA, the global community for academic advising, mandates that advisors should have a ratio of 280 to 1. Jennifer credits Dean Rudy Buchheit and Associate Dean for Administration and Academic Affairs Kim Anderson for making hires to support that ratio.

“Today, there is a lot more recognition of what academic advisors do. We hold some of the keys to student retention. After all, we’re the ones in the trenches, the ones most personally connected to the students.”

And it’s that personal connection that more often than not, leads to the joy of witnessing transformation.

“We’re there for students in the high and low points of their academic path,” says Diane. “Seeing a student who struggled early, but who is now graduating is incredibly rewarding. That’s why I say if you love working with students and enjoy seeing them achieve their dreams, you don’t want to work anywhere else!” ■

Engineering first-year student advisers (L-R): Lesley Brenner, Jennifer Doerge, Diane Freeman and Susan Herrick

ACCOLADES

Jennifer is right when she says academic advisors are becoming more widely recognized for their work. In 2016, Jennifer received the honor of Institution Faculty/Staff Of the Month from the National Residence Hall Honorary (NRHH) after being nominated by the top 1 percent of student leaders who live on the UK campus. In 2017, she was given one of two Staff Excellence Awards. Diane received the same award in 2015. Below are excerpts from their nomination forms.

OF JENNIFER:

“Jennifer’s rapport with the students is outstanding. She can dispense tough love and hard truth but is also so empathetic and understanding. Jennifer has the uncanny ability to remember students’ names after one interaction with them and details about their life/story. She has a way of greeting people that makes the student feels so special.”

“For the Academic Hallwide program that took place in October, we invited several advisors from the different colleges on campus. Our building is predominately engineering students, and we decided to reach out to freshman engineering advisor Jennifer Doerge. From the beginning she was eager to come to our program. At our program, she was very engaged in advising the residents. But what stood out to me was that not only was she interested in advising them, but she knew them all by name. She also knew other activities they were involved in, tests they had recently taken, etc. You could tell she was passionate about what she does. She was so upbeat and enjoyable to be around, and the residents loved having her there.”

OF DIANE:

“In my 30+ years of being in executive management and a business owner, I have not met anyone such as Diane, who truly goes beyond her job scope to assist others...and is always willing to go the extra mile.”

“I have never experienced a more personable, hardworking individual that helped me more with not only scheduling classes but with my college experience.”

“Positive attitude. Compassionate heart. Joyful spirit. Mutual respect. These are words that come to mind when I think about Diane’s approach to her job, department and the college. Diane has this warmth and authenticity about her that does not waver no matter the circumstances, which is not often found in today’s workplace. Through only a cheerful smile or encouraging wave, Diane has the ability to brighten your day. She is just one of those people who you want to work with.”

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 125 years ago, more than 25,000 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 2018 inductees.



Lonnie E. Bellar

B.S. in Electrical Engineering, 1987

As chief operating officer of LG&E and KU, Lonnie Bellar is responsible for ensuring the company provides safe, affordable and reliable natural gas, electricity and customer service to 1.3 million customers in Kentucky and Virginia. Bellar became COO in March 2018 after climbing through the ranks of the electric and natural gas utility industry for more than 30 years. With 3,000 employees, approximately 400 of whom are engineers, Bellar has led the company to be among the top performers in safety, customer service and reliability; provide competitively priced energy; and become an innovator in service offerings. He also has completed executive education courses at the Harvard Business School and the Tuck School of Business at Dartmouth.

Claude A. 'Skip' Berry

B.S. in Civil Engineering, 1973

For over 50 years, Skip Berry has poured his skill, talent and heart into the mission of Wehr Constructors, Inc., located in Louisville, Kentucky. Wehr Constructors, has been rated the largest Louisville area general contractor for 20 of the past 24 years by Louisville Business First. In his 41 years as Wehr Constructors' executive vice president and then president and chairman of the board, Berry has been responsible for over \$1 billion in construction management projects, leading Wehr Constructors to a place in Engineering News-Record's top 100 construction management firms and top 400 construction firms in the nation. The firm has completed high-profile projects such as the Humana Building in Louisville and the 21c Museum Hotel in Lexington, Kentucky.



David R. Houchin

B.S. in Civil Engineering, 1970

David Houchin is president and CEO of Intech Contracting, LLC, a Kentucky-based contracting company he founded in 1991. Intech specializes in bridge repair and restoration, inspection support and related services. The firm is notable for completing the painting of the John F. Kennedy Memorial Bridge in Louisville, Kentucky. Intech has also repaired or provided inspection services on more than 20 bridges that span the Ohio River, including the John A. Roebling Suspension Bridge in Cincinnati. Houchin's company has also contributed to the restoration efforts of many landmark bridges across the country, including many of the 13 wooden covered bridges in Kentucky. Intech is nationally ranked as a top 600 specialty contractor and a top 20 painting contractor each of the past four years.

Mary Beth Willis Hudson

B.S. in Chemical Engineering, 1989

Mary Beth Hudson is vice president of the Polysilicon Division and site manager for Wacker in Charleston, Tennessee. A proven leader with excellent interpersonal and communication skills, Hudson is responsible for all aspects of manufacturing, supply chain, business operations, sales and profitability of the Polysilicon Division throughout the North American and Central American regions. In 2016, Wacker opened a 550-acre greenfield site in Charleston, Tennessee, and tapped Hudson to lead its Polysilicon Division as vice president, including site manager responsibilities for the new facility. The Charleston facility employs 720 workers and boasts a production capacity of 20,000 metric tons of polycrystalline silicon annually. At \$2.5 billion, Wacker Polysilicon is one of the largest private investments ever made in the state of Tennessee.



Karen Martin Maxwell

B.S. in Computer Science, 1985

Karen Maxwell's love for computing began in the McVey Hall computer center, where she completed her computer science projects using punch cards. Although she never lost her interest in computing, today Maxwell is a business owner and philanthropist. She is co-founder and managing partner of KJMM Capital Partners, a real estate investment company. She was also founder and president of a design and decorating LLC. Her impressive IT career with leading companies in major end markets includes government, retail, banking, manufacturing, telecommunications and education. Maxwell now spends her time in Kansas City, Missouri, and Vail, Colorado, where she is active in both communities with several philanthropic endeavors.

Steve A. Polston

B.S. in Mechanical Engineering, 1970

In his long career, Steve Polston has served as plant manager, senior vice president, chief operating officer, president and CEO for various nuclear energy and engineering companies. For nearly the past decade, however, he has put all of his leadership ability toward battling homelessness. Polston is recognized as a co-founder of the University of Kentucky Extended Campus at Paducah (UK Paducah), which opened its doors in 1998. Nearly 200 mechanical engineering and chemical engineering students are enrolled in the program. In addition to orchestrating corporate turnarounds at energy companies in the U.S. and in France, Polston is the founder and board chair for New Life Day Center, a mission in Lexington, Kentucky, that serves over 150 homeless individuals each day.





ANNOUNCING
CHRISTOPH BREHM
2019 Office of Naval Research Young Investigator Award

Christoph Brehm, assistant professor in the University of Kentucky Department of Mechanical Engineering, has received a 2019 Office of Naval Research (ONR) Young Investigator Award. The honor is given to academic scientists and engineers who have shown exceptional promise for doing creative research early in their career.

Brehm’s project, “Numerical Investigations of Particle Interactions with Navy Relevant High-Speed Flows,” addresses the significant gap in knowledge for particulate-laden, high-speed flows, employing one-of-a-kind numerical investigations to study the interaction of particulates with high-speed flows for geometries and flow conditions relevant to the Navy.

Brehm joined the mechanical engineering faculty in 2016. He received a Ph.D. in aerospace engineering from the University of Arizona in 2011 and worked as a senior research scientist at NASA Ames Research Center from 2012 until 2016.



ANNOUNCING
HIMANSHU THAPLIYAL
NSF CAREER Award

Himanshu Thapliyal, assistant professor in the Department of Electrical and Computer Engineering at the University of Kentucky, has received a National Science Foundation Faculty Early Career Development (CAREER) Award. Thapliyal’s project is titled “CAREER: Utilizing Principles of Energy Recovery Computing for Low-Energy and DPA-Resistant IoT Devices.” The project will award \$568,000 over five years and conclude in 2024. Funding for the project is via NSF’s Secure and Trustworthy Cyberspace (SaTC) program. The goal is to develop circuit design techniques for energy-recovery circuits and a library of such design cells to facilitate low-power implementation of block cipher for mobile Internet-of-Things (IoT) devices, where reducing power consumption is critical. The design challenge is to produce low-energy, lightweight and secure devices that are also resistant to malicious attacks that use power consumption traces to extract private or sensitive information.

Thapliyal is also an Endowed Robley D. Evans Faculty Fellow and co-director of the Cybersecurity Certificate Program at UK. He earned his Ph.D. from the University of South Florida. Thapliyal joined the Department of Electrical and Computer Engineering at UK in 2014.



ANNOUNCING
JANA KENNELLY
Senior Director of Philanthropy

Jana Kennelly, assistant vice president for development at the University of Texas at San Antonio (UTSA), has been named senior director of philanthropy for the University of Kentucky College of Engineering. She began her responsibilities April 1.

An advancement professional with progressive leadership and management experience, Kennelly has consistently demonstrated an ability to drive comprehensive development programs. She worked with several units within UTSA to raise funds for the university's first comprehensive capital campaign, which raised \$202 million. Kennelly served as director of development in UTSA's College of Engineering for three years before promotions led her to become assistant vice president for development for the whole institution.

"Jana brings a broad range of experience and expertise that will blend well with our college philanthropy and alumni team and allow her to be an important contributor in the university office," said UK College of Engineering Dean Rudy Buchheit.

Prior to joining UTSA in 2006, Kennelly spent eight years at the National FFA Foundation in Indianapolis.



ANNOUNCING
THOMAS D. DZIUBLA
Chemical and Materials Engineering Department Chair

Thomas D. Dziubla, professor of chemical engineering at the University of Kentucky, has been named the next chair of the UK Department of Chemical and Materials Engineering. Dziubla has taught at UK since 2006 and served as director of graduate studies for chemical engineering from 2013 to 2018. He will begin his new responsibilities July 1.

Dziubla received a B.S. in chemical engineering from Purdue University in 1998 and a Ph.D. in chemical engineering from Drexel University in 2002. From 2002 to 2004, Dziubla was an NRSA postdoctoral fellow in the Institute for Environmental Medicine at the University of Pennsylvania School of Medicine, where he worked on the design of degradable polymeric nanocarriers for the delivery of antioxidants.

He holds five patents, has authored over 75 peer-reviewed publications, edited a book on oxidative stress and biomaterials, and is an associate editor of the Journal of Biomedical Materials Research Part B: Applied Biomaterials. Along with Gill Eminent Professor of Chemical Engineering Zach Hilt, Dziubla is co-founder of Bluegrass Advanced Materials, LLC, a company that is currently developing and commercializing technologies based upon research from its laboratories.

T. Karen Chandler, BSCE 1993, has been promoted to senior vice president and chief operating officer at Laredo Petroleum. Chandler has been with Laredo since 2012 and since 2016 has served as its vice president of operations.

F. Thomas Creasey, BSCE 1981; MSCE 1984; Ph.D. CE 2010; PE, has joined Caliper Corporation as vice president of transportation engineering. An industry veteran with more than 35 years of experience as a practitioner, researcher and educator at major transportation organizations in the United States, Creasey currently serves as the chairman of the Transportation Research Board’s (TRB) Highway Capacity and Quality of Service Committee.

Brian Howard, BSCE 2003, has been promoted to senior virtual construction manager at the Nashville office of Cincinnati-based Messer Construction Co. Howard joined Messer full time after working as a co-op for three years.

Tom Jones, BSCE 2002, has been promoted to senior virtual construction manager at the Nashville office of Cincinnati-based Messer Construction Co. Jones joined Messer in 2002 and has been based in Nashville since 2009.

Clinton Todd Justice, BSMNG 1995; MSMNG 1998; PE, recently joined GEI Consultants Inc., as a senior project manager/geotechnical engineer. Justice has served as project manager and geotechnical engineer for government clients at various hydroelectric, fossil, nuclear, nuclear handling, natural gas, substation and transmission facilities.

Carrie Kelty, BSME 2007; PE, was named to Engineered Systems Magazine’s list of “20 to Watch.” A mechanical engineer at CMTA, Kelty has engineered systems for education, judicial and health care facilities.

Casey Krawiec, BSME 1986, was named vice president of global sales at StratEdge Corporation, a leader in the design, production and assembly of high-performance semiconductor packages for microwave, millimeter-wave and high-speed digital devices.

Gregory R. Lee, BSME 2011, was named president and chief executive officer for Nolin RECC. Previously Nolin’s vice president for system operations, Lee began his new responsibilities in January.

Taunya Phillips, BSCE 1987, received the Lyman T. Johnson Torch of Excellence Award at the 28th annual Lyman T. Johnson Torch of Excellence Awards Dinner on Friday, Oct. 19, at the Woodford Reserve Club at Kroger Field. The award goes to one African-American alumnus or alumna whose faith, hard work and determination has positively affected the lives of people on the UK campus, the city, state or nation.

Tony Richardson, BSEE 1981, associate professor and director of the electrical engineering program at the University of Evansville, received the university’s Exemplary Teacher Award. The honor is given to an exceptional member of the faculty in acknowledgment of his or her teaching excellence. Richardson became a member of UE’s faculty in 2000.

Mike Schneider, BSCE 2002; MSCE 2003, has been promoted to senior virtual construction manager at the Nashville office of Cincinnati-based Messer Construction Co. Schneider began his career with Messer as a co-op in 2002 and returned to Messer full time after earning his master’s degree.

Brahm P. Verma, MSAE 1965, professor emeritus of engineering at the University of Georgia, was awarded the President’s Medal during Founders Day activities on January 28. The President’s Medal recognizes extraordinary contributions of individuals who are not current employees of UGA and who have supported students and academic programs, advanced research and inspired community leaders to enhance the quality of life of citizens in Georgia.

Richard (Rick) W. Westerdale II, BSCE 1991, became senior vice president of Jiangnan Environmental Protection Group Inc. in the fall of 2018. With over 25 years of experience in the energy arena, Westerdale previously worked as a senior advisor at the Department of State.

Travis Womack, BSCS 1998, was named Ashland Lions Club’s “Lion of the Year” for 2018. A member since 2013, Womack served as club president for the 2017-18 fiscal year.



Distinguished Alumnus Davis Celebrates 100th Patent

Alumnus L. Berkley Davis Jr. (BSME 1966, MSME 1970, Ph.D. 1972), who built an illustrious career at General Electric, recently celebrated a monumental milestone: his 100th patent.

Davis’ patents fall into the following categories: gas turbine combustion system hardware—including Dry Low NOx (DLN) hardware, DLN combustion system control strategies, methods of operating power plants to respond to grid upsets, methods to operate power plants with lower emissions, optical message to view flames for diagnostic and/or control purposes, methods to design gas turbines combustors to allow higher efficiency while keeping emissions low and a new method of controlling a gas turbine called probabilistic control.

Davis, who retired in 2016, currently holds 101 patents. He was elected to the National Academy of Engineering in 2006, the UK College of Engineering’s Hall of Distinction in 2007 and the UK Hall of Distinguished Alumni in 2015.

Davis was named a Fellow of the American Society of Mechanical Engineers in 2000. He also received the General Electric Steinmetz Award in 1991, the General Electric Edison Award in 2011 and several other internal awards from GE, including the Intellectual Property Award for Outstanding Issued Patent in 2005, Outstanding Technical Contribution in 2000, Six Sigma Award in 1999 and the Business Initiatives Award in 1994.

In Memoriam

J.C. Leasure	Metallurgical Engineering	1942
Clyde R. Tipton, Jr.	Metallurgical Engineering	1946, 1947
Thornton L. Johnson, Jr.	Electrical Engineering	1947
Karl D. Kirk, Sr.	Electrical Engineering	1948
J. Frank Baugh	Mechanical Engineering	1949
Charles E. May	Mechanical Engineering	1949
Arnold A. Murphy	Electrical Engineering	1949
William W. Long	Civil Engineering	1950
Raymond C. Thornton	Mechanical Engineering	1950, 1951
Woodford W. Crutchfield	Electrical Engineering	1951
Warner C. Grubb	Civil Engineering	1951
Carl L. Pennington	Civil Engineering	1951
Frank W. Atkinson	Electrical Engineering	1952
Kenneth R. Reynolds	Mechanical Engineering	1953
Thomas F. Arnold	Metallurgical Engineering	1954
Henry Alan Steilberg	Civil Engineering	1955
Charles M. Anderson	Mechanical Engineering	1956
Homer Dale Blythe	Civil Engineering	1956
Howard J. Dohrman	Civil Engineering	1957, 1958
George L. Hannon	Civil Engineering	1957
Otis C. Williams	Civil Engineering	1957, 1958
Albert R. Hall	Mechanical Engineering	1958
Russell K. Watkins	Civil Engineering	1958
Charles T. Price	Civil Engineering	1959
Dewey A. Young	Electrical Engineering	1959
Dr. William C. Setzer	Metallurgical Engineering	1959, 1963, 1970
William E. Johnson	Electrical Engineering	1960
Larry M. Judy	Civil Engineering	1961
William A. Feiler	Chemical Engineering	1962
James P. Hill	Chemical Engineering	1962
Frank L. Rothfuss, Jr.	Civil Engineering	1962, 1963
Robert L. Kaftan	Mechanical Engineering	1963
Tom C. Bridges	Agricultural Engineering	1965, 1974
Harold L. Halfhill	Mechanical Engineering	1965
Thomas W. Webb	Electrical Engineering	1967
Melvin H. Wadlington	Civil Engineering	1972
Donald R. Perry	Civil Engineering	1974
Dr. Carlos V. Santos	Chemical Engineering	1996
Daniel Nikolaus Johannes Dilger	Computer Science	2017

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

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NOTES:

Cover: Dean Rudy Buchheit stands outside the Enoch Grehan Journalism Building with Ben Noble, project manager for Turner Construction Company.

p. 14: By “stuck” in the lab, we, of course, mean Kaitlyn’s work with thin-film adhesion.

pp. 18-19: When Jonathan Pham studied engineering as an undergraduate at The Ohio State University, he took advantage of an opportunity to study corrosion in a faculty member’s research laboratory. That professor was none other than Rudy Buchheit, who is now our dean.

pp. 20-21: This photo was taken inside the Otis A. Singletary Center for the Arts.

p. 21: Believe it or not, Monon will only be 19 years old when he graduates in May. He entered UK at the ripe old age of 16.

p. 24: You can watch “The Void” at ukyfilmfestival.org/fall-2018.

p. 25: Monon was recently selected to be an engineering intern in the NASCAR Diversity Internship Program (NDIP). NDIP annually selects a group of current or recently graduated students from diverse backgrounds in order to provide a unique hands-on experience in the NASCAR industry. After graduation, Monon will head to NASCAR R&D in Concord, North Carolina, where he will work directly with NASCAR by providing engineering support for

its aerodynamic program. “To me, this is an exciting opportunity because aerodynamics is a hot topic in NASCAR right now,” he says.

p. 26: We published a Q&A with Terry Strange in the spring 2017 issue of Kentucky Engineering Journal. You can find the digital version of that interview, as well as all of our back issues, at www.engr.uky.edu/about/publications.

p. 31: Again, many thanks to JoAnna for meeting with us after flying all night from San Francisco to Lexington. She not only faced a full slate of meetings the next day but also the State of the College event that night.

p. 36: In the weeks after Erhardt, Mucci and Graehler presented their paper at the Transportation Research Board’s annual meeting, media outlets latched onto their findings. The paper was covered not only by U.S. media, including The New Yorker, but also Spanish, French and Dutch outlets.

pp. 42-43: The 2019 Hall of Distinction ceremony will be held April 12 at The Apiary in Lexington, Kentucky.

p. 45: The CAREER Award is one of the “most prestigious awards in support of the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization,” according to NSF.

GIVING BACK



Chi Epsilon members facilitating the always popular LEGO Bridge Building Contest at E-Day.

Vincent Drnevich

Vincent Drnevich taught civil engineering at the University of Kentucky for 24 years before spending nine years as Purdue University’s head of the School of Civil Engineering. Known for his research on the engineering properties of soils and concrete, Dr. Drnevich is a Fellow of American Society of Civil Engineers, American Society for Testing and Materials, National Society of Professional Engineers and Indiana Society of Professional Engineers.

To this day, Dr. Drnevich remains a passionate supporter of UK’s chapter of Chi Epsilon, a civil engineering student organization devoted to scholarship, character, practicality and sociability. In the past, Dr. Drnevich has committed to matching donations to Chi Epsilon up to \$20,000, and the organization is included in a planned gift Dr. Drnevich has arranged with the college. His gift will allow Chi Epsilon members to pursue professional development opportunities, engage in community outreach efforts, purchase supplies for its popular LEGO Bridge Building contest at E-Day, tutor more civil engineering students and more.

For more information about supporting engineering education through estate planning, contact Matthew Briggs at (859) 218-3506 or matthew.briggs@uky.edu.



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