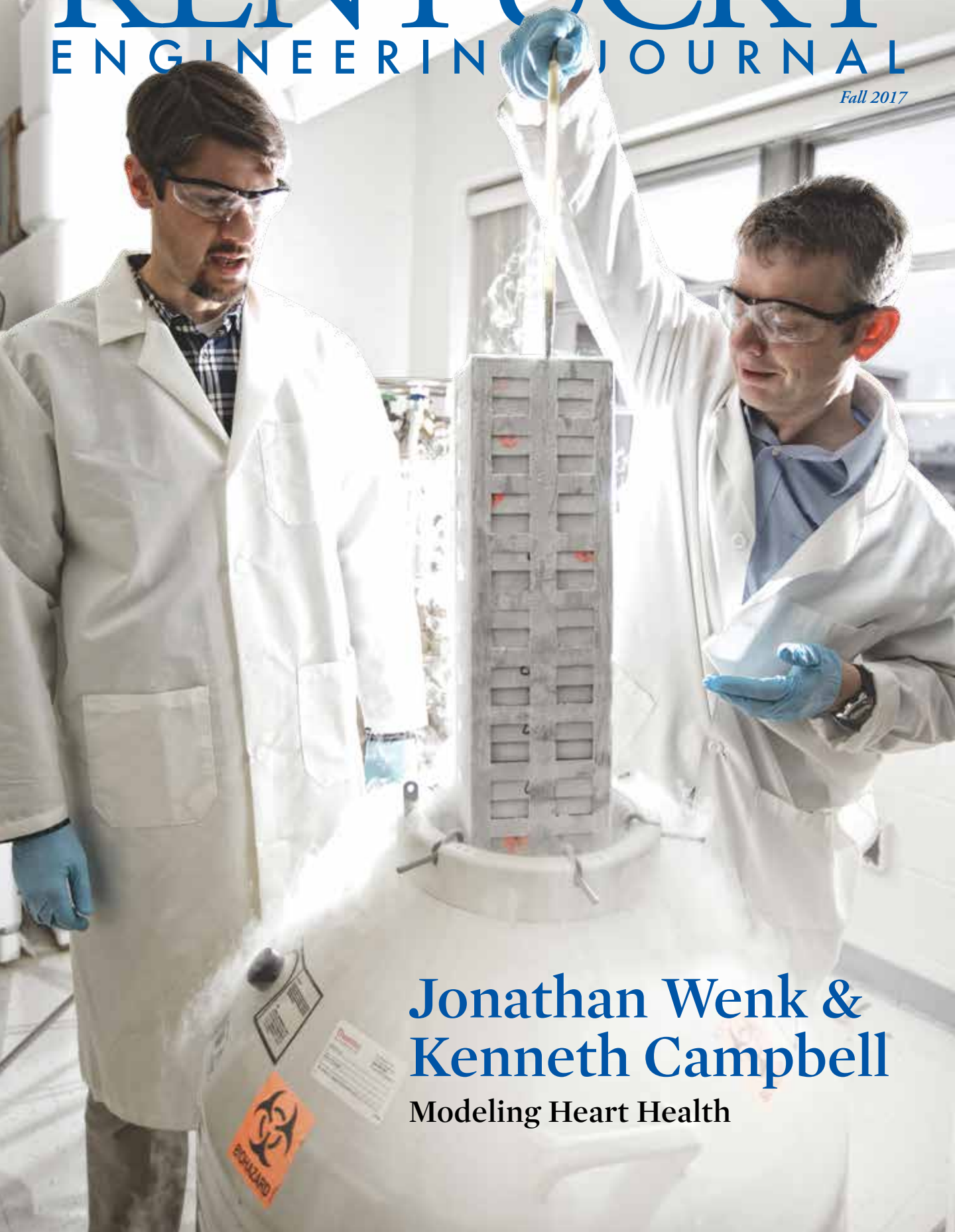


# KENTUCKY

## ENGINEERING JOURNAL

*Fall 2017*



**Jonathan Wenk &  
Kenneth Campbell**  
Modeling Heart Health

**The Great American Eclipse of 2017** is in the books. For the student-led University of Kentucky Solar Eclipse Ballooning Team, August 21 was the culmination of over 18 months of intense preparation for a once-in-a-lifetime experience. Twenty-four students participated on the team, which relied upon eight team leads who handled everything from public relations to search and recovery. Using two high-altitude weather balloons, the team not only captured photography of the eclipse, but also livestreamed it from 60,000 feet.

Mechanical engineering senior Virginia “Ginny” Smith served as mission control leader for the team. The longest tenured member, Ginny attended a ballooning workshop at NASA Marshall Space Flight Center in January 2015. Visit our website to read Ginny’s recap of the events leading up to the eclipse, her team’s challenges and successes, and what turned out to be one unforgettable experience.

(The white dot below is another weather balloon in the distance)



# Message from the Dean

Welcome to the fall issue of *Kentucky Engineering Journal*. Our current semester is drawing to a close. Students are preparing for finals and finishing major projects. Fall is slowly giving way to winter. It is a familiar pattern each year.

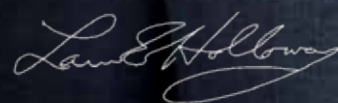
While seasons and students change over time, we in the UK College of Engineering focus on three key areas all year long. First, we place a high emphasis on cultivating a vibrant community in the college. The Engineering Residential College Living Learning Program, our student organizations (now numbering over 40) and the First-Year Engineering program are just a few examples of how we infuse the power of relationships into our brand of engineering education.

Second, not only do we provide the academic rigor that will help students obtain high-paying, deeply rewarding jobs, but we also work extremely hard to help students win those jobs. Our Engineering Career Development Group assists students with resume reviews and mock interviews. Our Cooperative Education Program connects students with employers so they can gain real-world engineering experience while they are still in school. This fall we also launched several new certificate and scholars programs that enable students to specialize in ways that will separate them from other job seekers.

Finally, we remain thoroughly committed to innovative research. Currently, the college has \$48 million in active research awards among its investigators. In the next five years, we intend to raise that number to \$80 million through faculty growth and strategic research clusters that will advance the college, the Commonwealth of Kentucky and society. Our passion for research isn't only at the faculty and graduate student level, either; our robust undergraduate research program involves students in meaningful research early in their academic careers.

Just about every story in this issue touches on one of these three categories. As you read, I hope you get a sense of what drives us and sustains us every day of the year.

Sincerely,



Larry E. Holloway  
Interim Dean

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# LEADERSHIP RENDEZVOUS

By Kelly Hahn

**WHAT:** *Leadership Rendezvous*

**WHEN:** *September 7-10, 2017*

**WHERE:** *Figure Eight Island, Wilmington, North Carolina*

**WHO:** *L. Stanley and Karen Pigman, hosts*

**INVITED GUESTS:**

- *Past participants in the University of Kentucky College of Engineering EGR599 Leadership Class*
- *UK President Eli Capilouto*
- *Former UK President Lee Todd Jr.*
- *Dean Emeritus Thomas Lester*
- *Interim Dean Larry Holloway*
- *Hall of Distinction members Rebecca Cowen-Hirsch, Elaine Duncan, Floyd Henson, Major General Earnest O. Robbins and Beth Weeks*
- *Earl Congdon Jr. and David Congdon, Old Dominion Freight Line*
- *UK Men's Basketball Coach John Calipari*

**WHY:**

*To reconnect with past EGR599 class members, share and receive leadership wisdom and best practices, and enjoy the best Figure Eight Island has to offer!*





UK President Eli Capiluto addresses Leadership Rendezvous attendees on the Friday morning of the reunion.

## The Engineering Leadership Class: A Short History

A little over 10 years ago, Dean Thomas Lester sat down with successful UK alumnus and philanthropist Stan Pigman to discuss a new initiative in need of funding: a leadership class for a select group of engineering students.

“Engineering graduates are often surprised by how quickly they are expected to assume management and leadership responsibilities following their graduation with a bachelor’s degree,” says Lester, who stepped down as dean in 2012 and retired from the university in 2015. “This can happen in small companies as well as in large conglomerates. Once in these positions, graduates can find themselves elevated quickly to more responsible positions up to and including corporate-level leadership—even in Fortune 500 firms.”

Without leadership training, UK’s talented engineering graduates were likely to find themselves in positions for which they were never trained. Stan jumped at the opportunity to fund the program.

Each year, 15 applicants are selected based upon academic performance, student involvement and personal interviews with UK College of Engineering faculty, staff and alumni. As a sign that their investment is more than financial, Stan and Karen have interviewed every student before admitting them to the class. During the leadership class, students engage with leaders in engineering and business, who are often members of the college’s Hall of Distinction. After each class session, a small group of students visits further with the speaker over dinner. During spring break, the class takes an all-expenses-paid trip to Washington, D.C., where it visits members of Kentucky’s congressional delegation and federal agencies focused on major engineering missions.

Lee Todd Jr., UK’s president when the leadership class began, says the experience provides an important step toward rapid leadership development.

“Even ‘born leaders’ must find opportunities to practice

leadership, interact with peers with similar ambitions and learn from those who have had a lifetime of successful leadership experiences. Normally, it would take several years into one’s career to engage in these activities. The leadership class accelerates these essential requirements.”

Graduates of the class have established careers at notable companies and research centers, such as SpaceX, NASA, Boeing, Facebook and General Electric, or are pursuing graduate studies at prestigious institutions like Princeton University, University of Texas-Austin, University of Michigan and Yale University, among others.

Anastasia Hauser, who earned her bachelor’s and doctoral degrees in chemical engineering at UK, attests to the transformative power of the semester-long class.

“Through the class I learned that you can always be an instigator for change, no matter your situation, rank,

title or experience. This has given me the confidence to promote change where I work.”

The 2017 cohort represented the 10th version of the leadership class. Looking long term, the class is being integrated into a Scholars in Engineering Leadership program. Stan would also like to expand the number of students who can participate in the class.

“We don’t have the resources to bring huge improvements to the College of Engineering by ourselves, but we have resources to invest in very promising students taking part in the leadership program. They gain self-confidence from having the opportunity to meet with CEOs, generals and company presidents. When does a 20-year-old get a chance to have dinner with the CEO of a major corporation?”



## Highlights from the Rendezvous



### SURPRISE VISIT FROM COACH CAL

The first indication that this reunion was not going to be like any other reunion came when, following dinner, former UK president Lee Todd introduced a special guest—UK men's basketball coach John Calipari!

Stunned attendees slowly began to applaud. *Coach Cal...here?!*

Coach Calipari, former dean Tom Lester and Stan Pigman participated in a 45-minute dialogue during which the coach discussed helping his players become givers and the power of relationships. Everyone in attendance received a free, autographed copy of Coach Calipari's book "Success Is the Only Option." There couldn't have been a better way to kick off the weekend.



### SANDCASTLE BUILDING CONTEST

Saturday afternoon featured a structural engineering contest like no other. Imagine 11 teams of engineers striving to outdo one another in building the most epic sandcastle! A team representing each engineering leadership class participated, plus a team featuring UK College of Engineering faculty, staff and speakers. Here are the winners from each category:

**Best Castle Structure:** A Kentucky Kingdom – Class of 2017

**Best Sculpture Structure:** A Stan's Home is his Castle – Class of 2016

**Best Showmanship:** Looking for the 9th Leg (UK Title) – Class of 2011





## A Surprise for Stan and Karen

Ever since Stan and Karen Pigman dreamed up the engineering leadership class reunion that came to be called “Leadership Rendezvous,” they were intimately involved in the details of the event. They mulled over what should be included in the swag bags. They carefully selected houses for the retreatants. They envisioned the final meal of the weekend, a formal dinner, as taking place beneath a massive Sperry Sailcloth Tent. As gracious hosts and assiduous planners, the Pigmans knew the ins and outs of every scheduled activity, speaker and logistical detail.

Except one.

It came during the final evening, moments before dinner. Betsy Davies, a development officer in the University of Kentucky College of Engineering’s Office of Alumni & Philanthropy, announced she had a surprise for Stan and Karen. Her statement was accurate—nearly everyone else in the room knew what was about to occur.

She summoned several alumni to join her near the front of the stage. Each one held a card to his or her chest.

Betsy explained that in the months leading up to the rendezvous, she had spoken with alumni from the engineering leadership class about following the Pigmans’ model of philanthropic generosity and making a financial pledge to the college. Hundreds of phone calls went into the initiative. As the alumni flipped their cards, they revealed that the 150-member alumni group spanning 10 years of the engineering leadership class had pledged \$25,000 in future gifts.

Surprised, Stan and Karen stood and applauded. Stan nodded his head in approval.

Abruptly, Betsy halted the celebration with the exclamation, “Wait! Andrew, get over here!” at which point alumnus Andrew Goderwis emerged from the crowd, inserted himself in the line and held a card aloft.

It was a zero. The new configuration read \$250,000.

“I’ll never forget the looks on Stan and Karen’s faces,” says Betsy. “They have truly engendered a philanthropic spirit in the leadership class alumni. These men and women all rallied with a common response when asked to help surprise the Pigmans: ‘Of course I want to be a part of this.’”

Many who pledged are early in their careers, are graduate students or are still working toward their first big break.

“I would have been happy with \$25,000,” Stan later remarked.

But that the pledge amount was 10 times what was expected is exactly the point: If you have been influenced by the Pigmans’ personal involvement in your life, you go beyond what is expected. You keep your appointments and your word. You practice good manners and etiquette. You send personal thank-you notes. You pledge with a view to the future, not the present. It is no surprise that

attending alumni received a book from Stan titled “The Magic of Thinking Big,” with a personal note written on the inside cover.

“I tell the leadership students each year, ‘Look around. Future CEOs, future presidents, entrepreneurs and business owners are all here. You will succeed and will likely make a lot of money. We’d like you to think about giving back if someone gave you an opportunity,’” explained Stan. “I think they’ve gotten the message.”

As the party continued into the night, Stan and Karen continued chatting with alumni, getting updates on their lives, their work and their families. They were buoyed by the perfect late-summer weather, the outstanding R&B cover band and the gift they never saw coming.

Sometimes, it’s nice to not know everything. ■



# PREDICTING HOW HEALTHY YOUR HEART WILL BE YEARS DOWN THE ROAD

*Testing and targeting treatment on a patient's virtual heart could lead to longer and healthier lives.*

By Whitney Harder, UKPR

**P**icture this: You're battling heart failure and meeting with your doctor to discuss treatment. Before prescribing anything, the doctor pulls up a virtual model of your heart on her computer and "treats" it with several drugs. A few moments later, she can see how your heart is doing five years down the road.

Your doctor chooses the treatment with the best long-term outcome, and you live a longer and healthier life.

Two University of Kentucky researchers are working to make this experience a reality for the 5.7 million adults in the U.S. with heart failure.

Combining physiology and engineering, UK's Jonathan Wenk and Kenneth Campbell are developing computer software to deliver better therapies for patients with life-threatening heart failure. The National Institutes of Health recently awarded the team a \$3 million five-year grant to create a computer model of the heart that can be customized to individual patients and predict long-term results.

"This model will have tremendous predictive power, meaning it will change and adapt in response to treatment or disease," says Wenk, an associate professor of mechanical engineering and Gill Professor in Engineering. "For doctors, this is another tool that could guide them in their decision process."

The computer model would take MRI or genetic data of a patient and build a multi-scale simulation of his or her heart, leading to more personalized treatment plans. The model could also serve as a screening tool for scientists and drug companies that are trying to develop new therapies.

"If you gave a patient a drug, how would their heart beat in the next second? Folks are pretty good at predicting that, but we're trying to predict how their heart will grow over months and years after taking a pill or having a genetic mutation," explains Campbell, associate professor of physiology and cardiovascular medicine.

Only a handful of teams in the world are working in this area, and few are as collaborative. With Wenk's





engineering skills and proficiency in organ-level function and Campbell's expertise in medicine and molecular-level function, they are among the first—if not the first—to incorporate the effects of genetic mutations into a model of the heart.

The computer technique is virtually the same used for classic engineering applications, such as simulating a bridge or a car crash.

“Whether it’s a heart or a piece of steel, as long as we understand their governing equations, we can harness them to develop a better design,” Wenk says.

The team, which includes collaborators at Michigan State University and Pennsylvania State University, will specifically aim to better understand familial hypertrophic cardiomyopathy, a genetic mutation and the most frequently inherited heart defect, which affects about 700,000 Americans.

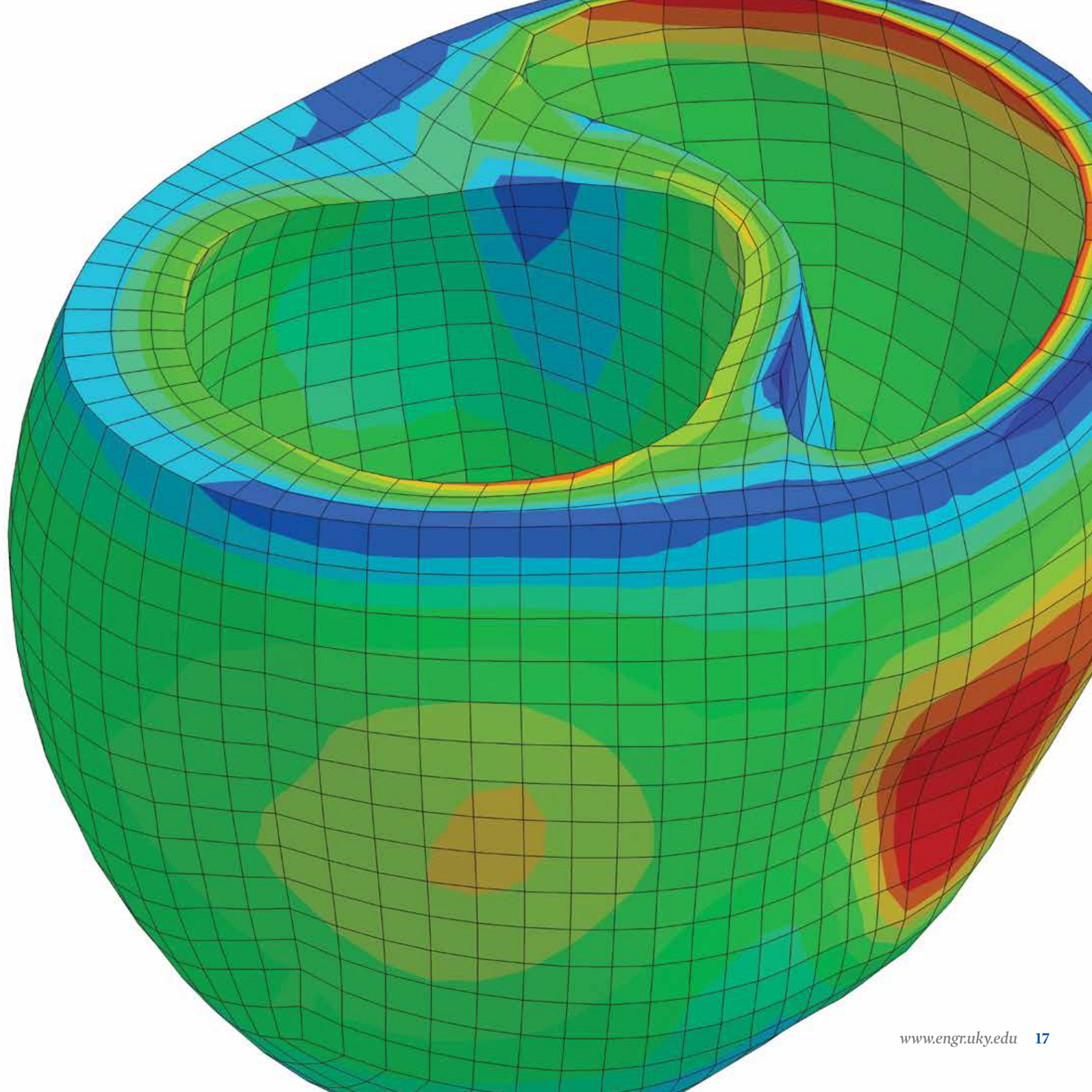
“This is when the college sports athlete suddenly goes into cardiac arrest on the field with no warning,” explains Campbell.

The defect often causes the heart to enlarge over time. The computer model will enable the researchers to test how and why certain genes are causing the heart to grow. And if they understand this, they will be able to intervene in that pathway and potentially reverse the abnormal growth.

Wenk—in addition to working with physiologists and biophysicists—is the only engineering faculty member to hold a joint appointment in UK’s Department of Surgery, where he applies engineering concepts to surgical approaches.

With this project and others, the researchers are aiming to develop a top-tier computational cardiology team at UK. If computers can be used to model better bridges, they can also be used to model healthier hearts.

*This article has been adapted from the full news release issued by UKPR. ■*





# THE BIG PIVOT

*Just three months after graduating, four friends traded in their new jobs and academic plans for a startup adventure in San Diego. Now their company has been included in Southern California's leading startup technology incubator.*

By Kelly Hahn

## COURT VISION

On a balmy summer evening in 2016, recent UK graduates Nick Phillips and Joseph Felix celebrated Joseph's 23rd birthday by watching the NBA Finals. LeBron James and the Cleveland Cavaliers battled Stephen Curry and the defending champion Golden State Warriors in a series that would go seven games.

"It would be really awesome if we could watch this basketball game from LeBron or Steph's point of view," said Joseph. Nick agreed. The game continued.

That might have been the extent of the conversation. After all, most of us occasionally receive surprising flashes of insight that momentarily stir us and then fade into history. Instead, Nick probed further: *How can we make a camera that professional athletes could wear and let us see what they see?* Nick bounced the idea to Joseph and they ran with it. Soon the conversation turned to wearable cameras, an idea with applications beyond watching elite basketball.

Their creative momentum continued well past the end of the game.

At the time of this birthday brainstorm, Nick had just joined Belcan, working on the Lockheed Martin Presidential Helicopter project. It was an impressive first job for any mechanical engineering graduate.

Joseph had just graduated with a B.A. in economics and was on track to become a loan officer. But as they traded epiphanies, their camera idea began to assume a life of its own. By the end of the night they had decided, *Somehow, we're doing this.*

Nick and Joseph knew they would need others to join their nascent venture. Fortunately, two of their close friends were also newly minted mechanical engineering graduates.

## ALL IN

When Nick began thinking of potential recruits to move the camera idea forward, the first to come to mind were his senior year capstone project partners, Sam Howard and Justin Weiss. However, both were already living out their post-graduation goals.

Sam was at Toyota Motor Engineering & Manufacturing North America Inc., when Nick approached him about the camera project.

Justin had been accepted into the one-year MBA program at UK. A few weeks before his program was set to begin, Nick floated an invitation to get involved.

By July, Nick, Sam, Joseph and Justin were spending their evenings and weekends working on the camera and their partnership. They knew that if their idea was going to become a reality, two things had to change. First, each of them would need to make the initiative a full-time occupation.

That would mean three of them quitting jobs and Justin dropping his MBA program.

Second, they would need to move to San Diego, where they would have the best chance to make their startup thrive. A family connection put the four in contact with Darin Anderson, chairman and CEO of a co-working space



Sam Howard, Nick Phillips and Daniel Haders II, Ph.D.



and incubator program, and Mark Pretorius, managing partner of a California-based venture capital firm. Both were interested in helping the four friends take the next step and had the resources and connections they would need. Through Skype calls with Darin and Mark, they came to the conclusion that their vision wouldn't become a reality unless they made the leap.

Both changes would require all-in commitment. Could they really trade security and familiarity for the unknown? Was that smart? Would it work? The questions were unanswerable, but they were committed to their vision.

Nick and Sam resigned the Fortune 500 jobs they had only recently started. Justin spent exactly one day as an MBA student. By September, the four had landed in San Diego. Darin and Mark couldn't promise them a house or money, but they could offer space in the NEST co-working space and a spot in CyberTECH's Entrepreneur in Residence program. For the aspiring entrepreneurs, that was enough to get started.

### CONTACTS, COUCHES AND MIPOV.

Nick, Sam, Joseph and Justin "couch-surfed" San Diego. They slept in offices. They talked to everyone they could about what they were doing. Chaos was the norm, but they took incremental steps forward.

The name for the startup, derived from the concept for the camera, became MiPOV. ("my point of view").

As the four got their bearings, they got to know Daniel Haders, a Kentuckian who is passionate about UK basketball and startups. For over 15 years, Daniel had worked with startups in the area of operations. He began meeting with the MiPOV team twice a week and connected it with his legal, accounting and banking networks. Daniel remembers his first impression of MiPOV.

“WE STAND  
OUT BECAUSE  
WE'RE CRAZY KIDS  
FROM KENTUCKY  
WHO TOOK A RISK  
BY COMING OUT  
HERE.”

"I recognized a group of guys with immense talent and ambition."

He wasn't the only one.

Recently, MiPOV was accepted into EvoNexus' Spring 2017 class. "Evo," as it is known in San Diego, is Southern California's leading startup technology incubator with over 180 companies in its portfolio and \$1.3 billion in funding and outcomes since 2010. Nearly 100 companies applied to the latest class and roughly 10 percent were accepted. Through the program, MiPOV will receive mentorship, access to capital and space in Evo's flagship location in nearby La Jolla at no cost to the company.

Evo's corporate investors include multinational corporations like The Irvine Company, Qualcomm, InterDigital and ViaSat. The three mentors working with MiPOV boast decades of experience at places like Qualcomm, KIO—International and HP, in addition to numerous startups. While working with Evo, MiPOV is raising capital for enhancing product development, adding new team members and scaling the company. Nick says inclusion in the incubator, and the move to La Jolla, is a

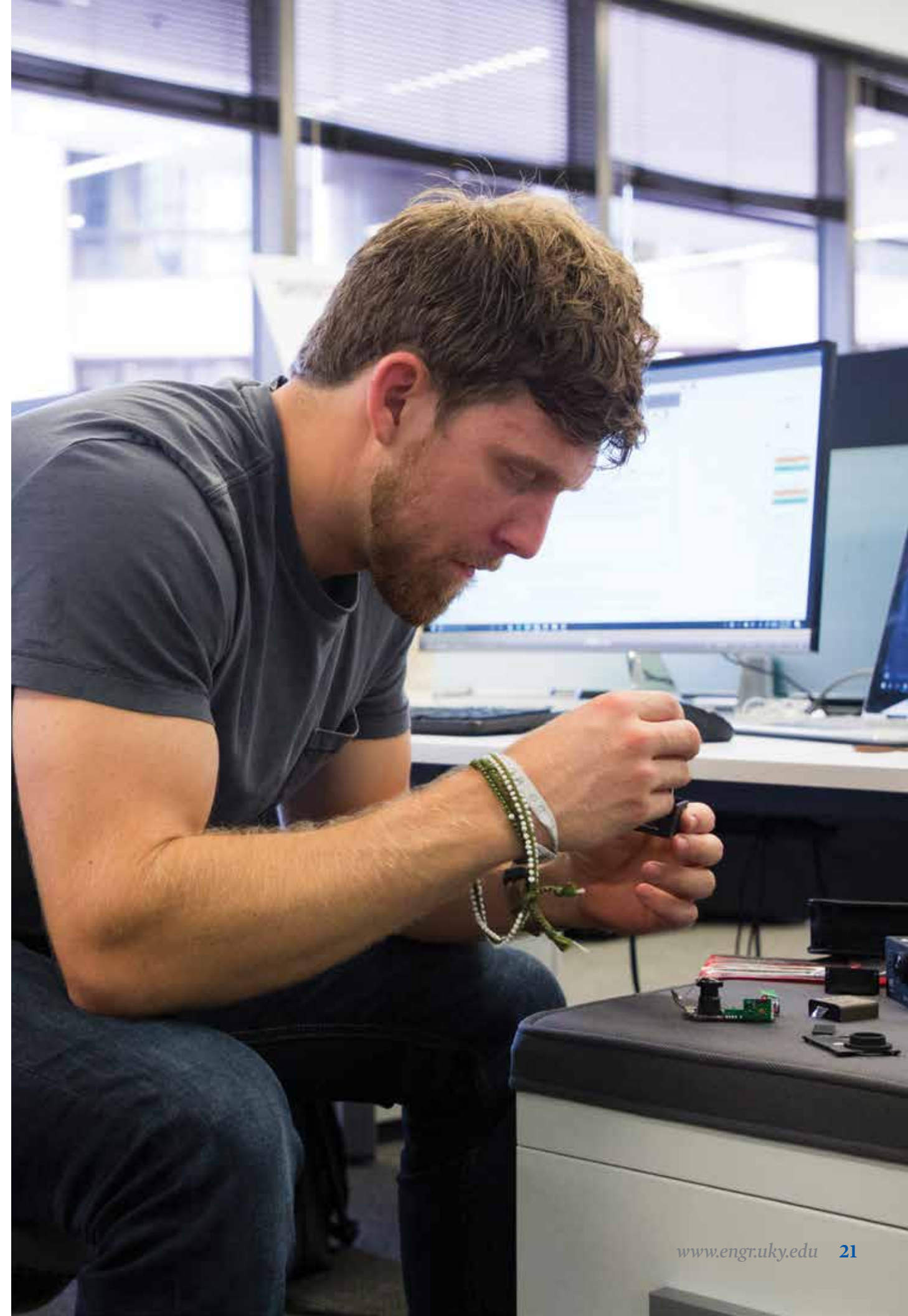
huge step forward for the company.

"This is incredibly exciting for us. Evo is extremely good at fostering innovation and helping companies get funding to see their dreams become reality. Successful Evo graduates of past cohorts have even been acquired for well north of a few hundred million dollars. So, to become part of this family is big news for us."

### CREATING THE PERFECT SOCIAL VIDEO

So what, exactly, is MiPOV's product?

Originally, the guys wanted to create their own camera hardware, software and consumer brand. That proved to be a bit more ambitious than was necessary to get their product to market.







“After listening to investor feedback, we steered away from the hardware aspect and focused on the software,” says Nick. “We’re adding software developers to the company and are initiating partnership deals with companies. We are developing our mobile app and software for connectivity with the top-five action camera manufacturers in the U.S.—SONY, GoPro, TomTom, Yi and Garmin.”

Sam adds that MiPOV’s attention is fully directed toward creating the perfect social video—a market projected to reach \$11 billion in 2021. According to its website, capturing, distributing and tracking a video from an action camera to social media currently requires up to 11 steps and eight apps. MiPOV believes integrating lean manufacturing principles by eliminating the excess and simplifying the process is their biggest competitive edge. The shift in strategy is what the startup world calls a “pivot.”

“Everybody pivots,” Nick says. “It’s all part of the startup experience. You get feedback and change. That has been a huge part of our learning out here.”

“This pivot will enable us to get to market faster,” Sam adds. “When we were going to build a camera and create the software, we were looking at a finished product near the end of 2018. Now, we are in a position to get there faster and for less money.”

Not only do Nick and Sam credit UK with instilling a problem-solving mindset, but they also say they would not have had the courage to move to San Diego without the skill set they developed at UK.

Sam summarizes, “We stand out because we’re crazy kids from Kentucky who took a risk by coming out here. People are willing to help us just based on that.”

Grabbing an idea out of the air, nurturing it with a team, making the big leap, overcoming obstacles and pivoting when necessary—that sounds like success, from any point of view.

*If you’re interested in learning more or getting involved with the team, please email Nick at [info@mipovtechnologies.com](mailto:info@mipovtechnologies.com). ■*



# MUCKING, MENTORING & MUSIC

By Juliana Palomino

At high school commencement ceremonies, new graduates are often charged to “find your passion and chase your dreams.” But as students increasingly face the pressure of securing a well-paying job after graduation, achieving a balance between well-rounded extracurricular fun and studying with an eye to one’s career prospects is a challenge.

Sarah Fay, a junior mining engineering student from Collierville, Tennessee, is determined to have it all.

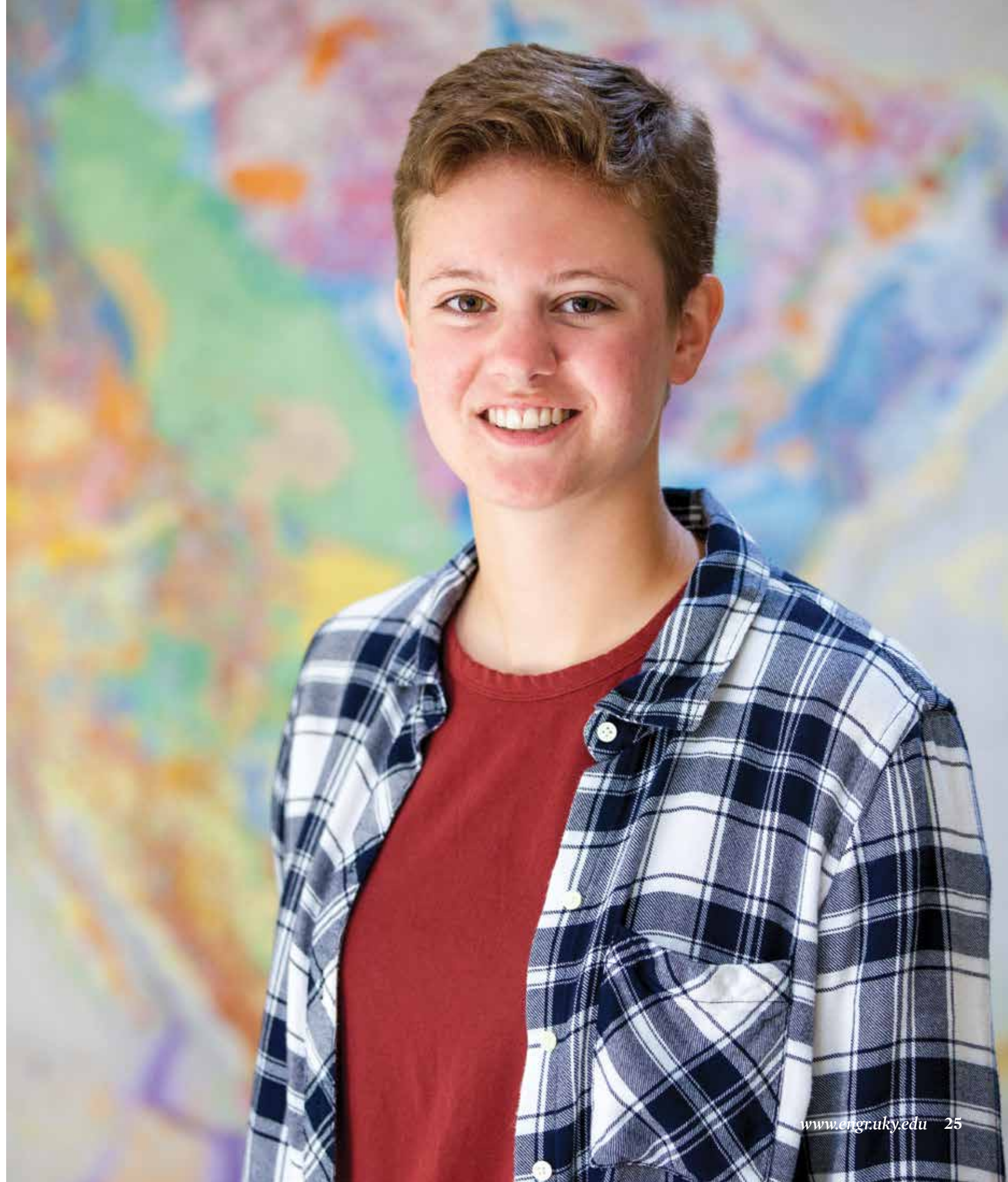
Although thoroughly committed to excelling academically, Sarah possesses a vision for her college experience that expands well beyond the classroom. As a result, Sarah’s life is characterized by involvement in what she enjoys.

## MUCKING TEAM

As a mining engineering student, it was natural that Sarah found her way to the UK Mining Competition Team (also known as the “mucking team”). An intercollegiate exercise that requires teams to master antiquated mining techniques, mucking competitions build community among mining engineering students, involve the mining industry in education and honor fallen miners. Students compete in seven events that incorporate a variety of mining tools, such as jack leg drills, swede saws and gold pans. Sarah cheerfully describes it as “competitive manual labor.”

Among the events, Sarah’s favorites include shoveling coal with teammates into mine carts (mucking), laying railroad tracks (track stand) and finding BB’s submerged in dirt and water (gold pan). Not surprisingly, she often ends those days covered in coal and mud. Though she used to have much longer hair, she recently traded 12 inches of it for a short bob, joking that the new style “is very convenient for hard hats.”

The UK team practices weekly throughout the year at an old mining site in Georgetown in preparation for the annual spring competition, which alternates between national and international locations. Sarah and five of her friends formed UK’s first Women’s Mining Competition Team in 2016 and competed in last year’s events surrounded by their teammates’ boisterous cheers. In 2018, Sarah and her teammates will travel to Camborne, England, to compete against teams from eight countries.







Mucking is exclusively related to mining engineering. What is Sarah doing that interacts with the whole college?

### ENGINEERING RESIDENTIAL COLLEGE LIVING LEARNING PROGRAM

The College of Engineering's Living Learning Program (LLP), called the Engineering Residential College (ERC), is the largest LLP on the UK campus. It houses nearly 600 students from all engineering majors, most of whom are freshmen coming face-to-face with the academic rigor of an engineering education.

Sarah was accepted into the ERC for her freshman year. She says she found the camaraderie and support of peer mentors to be an ideal setting for success.

"It was a really good environment for being successful as an engineering student, and making friends and doing a lot of fun activities."

Sarah enjoyed her freshman experience so much that she is now in her second year as a peer mentor within the ERC. In addition to organizing floor events, she meets one-on-one with students and tutors at study sessions. She loves the emotional investment of staying up late with students, chatting and helping them with projects.

"As a peer mentor, you are building individual relationships, and you see the fruits of your labor. You help them out and see them succeed," she says.

The ERC puts Sarah in touch with a broad section of the UK engineering community, but what about the campus as a whole?

### MARCHING BAND

An enthusiastic band member in high school, Sarah chose UK in part for its excellent marching band, in which she

has now played the tenor saxophone for over two years.

"It's an outlet," she says. "I don't want everything I'm doing to be engineering—or, even school—related. Band is definitely a source of stress relief from the pressures of engineering studies."

Being in the marching band has allowed Sarah to build friendships with students across campus, some of whom are also engineering students. She is part of the growing

GroupMe—a mobile group messaging app—conversation called "The Bandgineers."

In addition to practicing and performing, Sarah serves as vice president of membership for Kappa Kappa Psi, a band service fraternity that promotes music and brotherhood through fundraisers, help with move-in and many other activities. She is just as passionate about being a band member as she is mucking and serving as a peer mentor.

“IF YOU’RE  
ENJOYING YOUR  
TIME, IT’S WORTH IT.  
DO WHAT YOU’RE  
CAPABLE OF, AND BE  
PROUD OF THAT.”

### TRADE-OFFS

Sarah spends each day investing in what she loves. However, she would not impose her approach to college on anyone else. Sarah is up front about the trade-offs.

"Sometimes I stay up until 4 a.m. doing homework. Sometimes I don't spend enough time with people I care about. Sometimes my responsibilities overwhelm me. Sometimes I let people down. Sometimes life is really, really hard."

Sarah says the single factor that keeps her focused is her love for what she is doing. That, she says, is the key to joy amidst the chaos of college.

"If you're enjoying your time, it's worth it. Do what you're capable of, and be proud of that." ■



# FROM PADUCAH TO LEXINGTON

By Kelly Hahn

**D**uring Landon Mott's junior year as a chemical engineering major at the University of Kentucky College of Engineering Extended Campus at Paducah (UK Paducah), a research paper spurred his fascination with the process of producing a drug.

He began looking into other opportunities to apply his chemical engineering studies to drug development, which led him to Ashland Inc. Chair in Chemical Engineering Daniel Pack. Landon decided to apply to graduate school with the hopes of working in Pack's lab, which is on the Lexington campus. He is now working closely with Pack on the development of new drugs for gene therapy.

Landon's story reflects the success of the UK College of Engineering extended campus program in Paducah. Opened in 1998, the program offers bachelor's degrees in mechanical engineering and chemical engineering. By taking all of their non-engineering courses through West Kentucky Community and Technical College—which shares the same grounds as UK Paducah—students in western Kentucky can obtain a four-year engineering degree without taking any classes in Lexington.

Most graduates from the UK Paducah program enter the workforce even when they entertain interest in research or advanced degrees. But a growing number of students, like Landon, are appearing on the Lexington campus to further their mechanical engineering or chemical engineering education.

"The graduates from our chemical engineering program in Paducah receive an outstanding education in the fundamentals and have opportunities for undergraduate research, internships and professional development comparable to our students in Lexington," says Douglass Kalika, chair of the Department of Chemical and Materials Engineering.

"Our departments have always been deliberate about

ensuring that students in Paducah have the ability to interact with Lexington-based faculty and learn about research and graduate study opportunities in Lexington," says David Silverstein, professor of chemical engineering and director of the Paducah program. "Many Lexington mechanical and chemical engineering faculty members have offered at least one research seminar in Paducah, and students have participated in summer research experiences for undergraduates in Lexington going back to the first years of the Paducah program."

Christopher Barrow, who earned his bachelor's degree in mechanical engineering through the UK Paducah campus, is in his first year of a doctoral program on UK's main campus in Lexington. He is working with assistant professor Jack Maddox from the Paducah campus and associate professor Alexandre Martin from the Lexington campus to model radiative heat transfer in fibrous insulation materials used in thermal protection systems such as heat shields and hypersonic vehicles.

"Christopher has been doing excellent work on his research project since starting in September," says Martin.

According to Christopher, the Paducah and Lexington programs are equally strong. "The academic rigor in Paducah is similar to that of main campus and other universities. I feel confident in my abilities to apply the knowledge I learned from my undergraduate courses here."

UK Paducah is a great example of how the college is creating a workforce of highly trained engineers who are critical to Kentucky's future.

"These top-performing students are well-positioned to enter our graduate program in Lexington and are sought after by our faculty for research assistantship appointments," says Kalika. "They come into our Ph.D. program with strong preparation and are a real asset to the department." ■





# \$48M

CURRENT TOTAL OF ACTIVE AWARDS FOR  
COLLEGE OF ENGINEERING INVESTIGATORS



## SPOTLIGHT: AARON COLE



By Juliana Palomino

**R**aymond-Blythe Professor of Civil Engineering Issam Harik has taught hundreds of students over his 35 years in the University of Kentucky College of Engineering. So when he recommended a student from his lab for a possible story, we listened.

“One of the undergraduate students working with me is Mr. Aaron P. Cole,” wrote Harik. “I respect Aaron very much. He is a wonderful young man with great work ethics. He is honorable and trustworthy.”

Who wouldn’t want that said about them?

A senior, Aaron supports himself financially and works hard to do so. He carries a full load of classes and spends his weekends working at Lowe’s in nearby Georgetown, his hometown. He also finds time to work 10 hours a week as an undergraduate research assistant in Harik’s lab.

“He basically has no free time to get into trouble,” says Harik.

Juggling everything has required patience and practice. Aaron says constant homework and four credit-hour all-day classes made his freshman and sophomore years especially hectic. Nonetheless, he doesn’t think the challenges that accompany an engineering education should discourage anyone.

“If you surround yourself with people who are in the same boat—then it becomes much more manageable.”

Aaron originally wanted to become an architect. However, after a high school teacher mentioned that her architect husband had decided to get another job and joked that Kentucky now had one job opening for an architect, Aaron quickly changed lanes.

“I decided to pursue something that I might actually get a job in,” Aaron says with a laugh.

Ultimately, Aaron chose to focus on structures. Not long after that, he began working as an undergraduate research assistant in Harik’s lab making CatStrong—carbon-fiber reinforced polymers for bridge remediation or, as he refers to it, “super duct tape for bridges.” Aaron hopes his education and experience will enable him to design and build bridges after he graduates.

Harik says Aaron’s grit and his determination to elevate his career prospects are a trademark of many successful UK College of Engineering alumni. “Our department and I have been blessed over the past 125-plus years to have worked with many dedicated, hard-working students like Aaron.”

## SPOTLIGHT: SENAIT NUGUSE



By Juliana Palomino

**F**rom the outside, an engineer’s job seems to require heavy-duty math and science skills and a robust work ethic. Yet, according to University of Kentucky student Senait Nuguse, engineers must also know how to be leaders.

A senior electrical engineering major from Louisville, Kentucky, Senait has learned her biggest leadership lessons from involvement with the UK Solar Car Team. As a freshman, she met team members at a student organization fair and attended the first meeting but initially felt overwhelmed. With parents from Ethiopia who encouraged her to pursue a medical career, and with no background in engineering, she felt behind the curve. Yet her curiosity propelled her forward.

“It’s very hands-on,” says Senait. “That’s why I think the UK Solar Car Team is one of the best organizations to be a part of—because you’re actually doing something. I like being part of an organization that has a clear goal.”

As a sophomore, her friends urged her to become the electrical team lead for the Solar Car Team, which entails directing all electrical design on the car. Although she was unsure about the public speaking and conflict resolution, she thrived as electrical team lead and the next year accepted the position of overall team manager.

Her duties now include registering for races, working with university boards and a student business team to handle funding, scheduling meetings and deadlines, maintaining team cohesiveness and occasionally managing conflict.

“There’s always some crisis,” she says.

Respecting people for their engineering abilities and working to complete a group project are essential to functioning successfully as a full-time engineer, and Senait has learned it all.

“If I hadn’t joined the team, I don’t know where I would be at this point. It’s put me on a trajectory that I know I wouldn’t otherwise be on,” she says.

She directly attributes her success not only to the solar car team but also to the Engineering Leadership Course, an application-only 15-student class she took as a junior. Stan Pigman, an enthusiastic donor and supporter of the college, and Interim Dean Larry Holloway led the class, impacting Senait by revealing the numerous doors that are open to an engineer.

During the semester, she connected with alumni, learned about current challenges and innovations in the engineering industry, and visited Washington D.C., to meet with engineers employed there. That trip expanded her horizons into the business world, and she now plans on entering UK’s MBA program after graduation and aspires to be a business executive.

“I’m glad that the College of Engineering had these kinds of projects to help me improve as a student,” says Senait. “I really don’t think I would have grown as much as a person without these things in my life.”





# COLLEGE OF ENGINEERING OPENS JAMES AND GAY HARDYMON CENTER FOR STUDENT SUCCESS

By Kelly Hahn

On Aug. 25, the University of Kentucky College of Engineering changed the way students learn with the opening of a new student resource, the James and Gay Hardymon Center for Student Success.

The 9,600-square-foot renovation occupies the entire third floor of historic F. Paul Anderson Tower and centralizes essential student resources in one convenient location. Alumnus James F. Hardymon, who has given to numerous initiatives within UK and its College of Engineering,

donated the \$3.5 million necessary for the renovations, as well as additional funding toward an endowment for the college's undergraduate research and education abroad programs.

President Eli Capilouto and Provost Tim Tracy spoke at the celebration. President Capilouto remarked that the vision for the new center is in line with UK's larger campus transformation.

"We are changing the way students learn," said President Capilouto. "Together—inside and outside the classroom—that is what is captured in this space. We are not just transforming this place; we're transforming the way we interact with students and the way we are impacting the Commonwealth."

Provost Tracy emphasized the communal benefits of the center.

"In this space students will learn together and support each other as a community. I think this serves as a living room for the College of Engineering," he remarked. "It is a physical embodiment of our commitment to student success."

The center features academic tutoring from the Tau Beta Pi honor society as well as presentation guidance in the Elbert C. Ray eStudio, which had formerly been on the first floor of the Ralph G. Anderson Building. Academic advising, student records and career development services are also located in the center.

Interim Dean Larry Holloway explained that no matter what year a student may be, he or she will have plenty of reasons to utilize the center. Whereas freshmen students will stop by to meet with well-trained, caring academic advisors, students thinking about graduation will make it a point to visit career development specialists.

"In the past, students may not have known where to get certain services; they were scattered throughout the college, but now they will know where to go to get help. They will know to come here to the Hardymon Center."

James Hardymon received his bachelor's (1956) and master's (1958) degrees in civil engineering from UK. He served as chairman and chief executive officer of Textron Inc. from 1993 to 1998 and retired in 1999. Prior to joining Textron, he moved through the ranks at Emerson Electric Company, eventually becoming chief operating officer and president. He was inducted into the College of Engineering Hall of Distinction in 1995 and UK's Hall of Distinguished Alumni in 2000.





# WOMEN IN ENGINEERING SUMMER WORKSHOPS

By Kelly Hahn

When the Department of Mining Engineering's Jhon Silva wanted to demonstrate an aspect of mining engineering for Women in Engineering Summer Workshops participants, he didn't talk about ventilation, mine design or rock mechanics.

Instead, he took them to a mine in Georgetown, Kentucky, and exposed them to explosives engineering in the only proper way: letting them blow things up.

It was a raving success.

This summer marked the third year of the Women in Engineering Summer Workshops. Each of the College of Engineering's eight departments held two workshops during the summer months for females ranging from rising high school sophomores to incoming college freshmen. A record-high 98 participants experienced the workshops, and a few even attended workshops for all eight departments.

The workshops began with an introductory session that explains what a particular discipline actually explores. Following lunch, UK faculty and graduate students took participants through hands-on experiments and demonstrations to further their understanding. Micaha Dean Hughes, a recruiter in the college, says the workshops help young women see possible career paths.

"Data has shown that women, more so than men, need to

connect engineering with giving back. To be able to show how engineering connects to real-world problems is so important, and we have opportunities to do that in the introduction and the lab demonstrations."

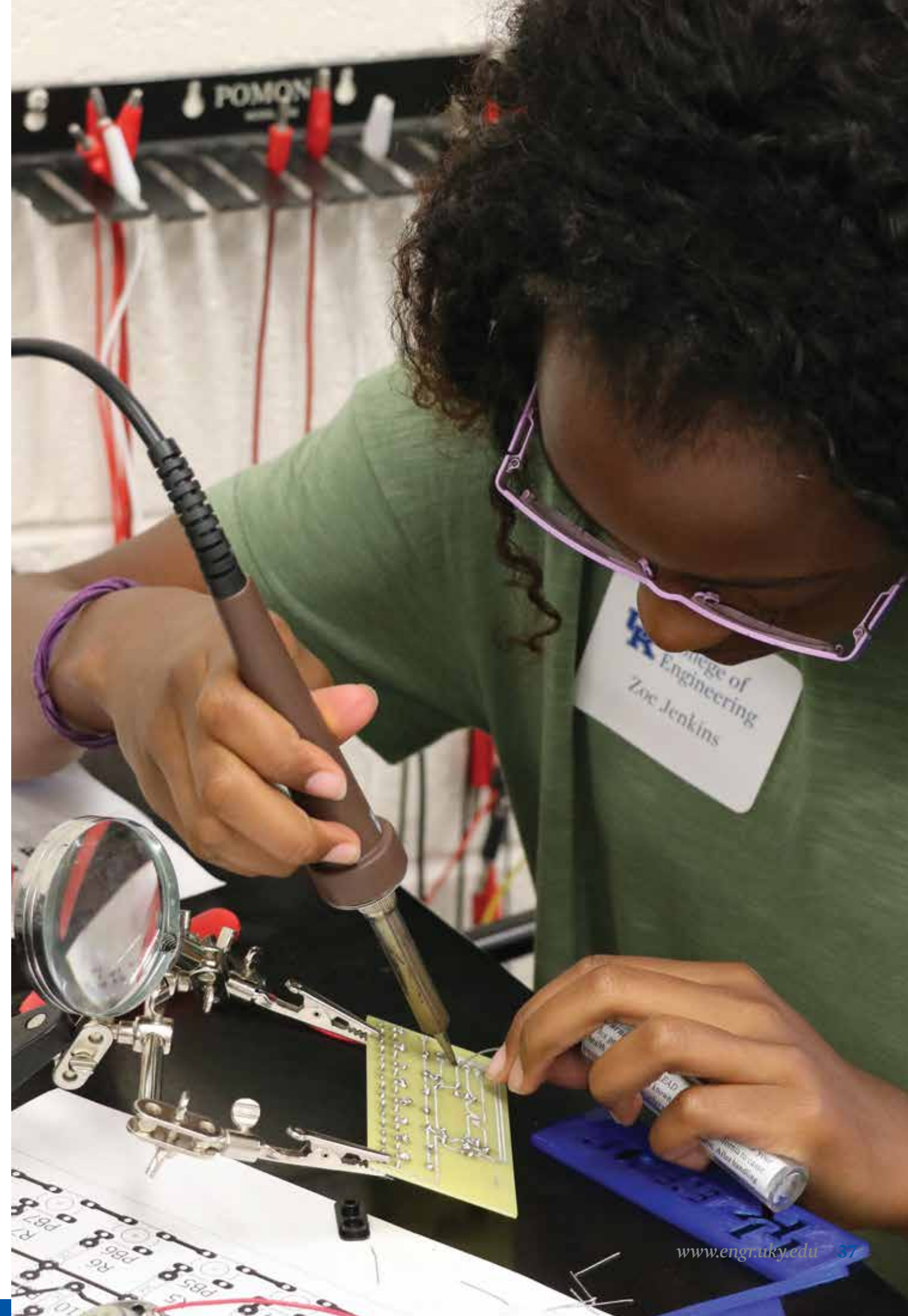
Czarena Crofcheck, professor and director of undergraduate studies in the Department of Biosystems and Agricultural Engineering, says the workshops are a great way to learn about the breadth of engineering disciplines.

"The length of the individual workshops allows for young women to learn about the various engineering disciplines with some depth. For me, it's a really fun day, and I look forward to it each summer."

Hughes says that while the day-long event has been successful, a week-long residential program would allow more participants from outside Kentucky to attend. The program would also potentially be able to offer movie nights, visits to company sites and even stays in the home of the Engineering Residential College Living Learning Program, Woodland Glen III. Such a change is under consideration.

Whether the workshops do change, feedback like this from participants show the program is only gaining steam:

"The workshops have shown me what all of my choices are and what I need to do to go where I want."





# CAN

# DO

## ENGINEERS WITHOUT BORDERS-UKY VISITS MALAWI

By Juliana Palomino

In Malawi, a southeast African nation consistently ranked among the world's 10 poorest countries, 80 percent of children drop out of school after second grade. What can mitigate such attrition? Nutritious meals would be a start. Many children attend school solely to receive free nourishment. Cleaner facilities and structural upgrades would go a long way toward keeping thousands of children in school.

This summer, the Engineers Without Borders student chapter at the University of Kentucky (EWB-UKY) began tackling the challenge.

Launched in 2009, EWB-UKY consists of about 30 members. Past projects conducted by the student organization include roadway construction in Cameroon, latrine improvement in Ecuador and a water distribution network in Honduras. For its most recent initiative, UK students John Pike and Aaron Cambron, along with Raymond-Blythe Professor of Civil Engineering Nikoforos Stamatiadis and his wife, Anne Marie, arrived in Malawi for an 11-day trip to gather research for upcoming work at a local school.

Instead of the sophisticated accommodations of many U.S. schools, picture 2,000 children within a three-mile radius arriving on foot to a single school every day. The structure holds rank, overflowing bathrooms, no kitchen whatsoever and only a dirt floor for sitting beneath the flimsy straw roof. What the EWB-UKY team saw, however, reflects the can-do spirit common to many engineers.

"I didn't think about the lodging or the food and put all my thought toward what we might be able to contribute," Pike says.

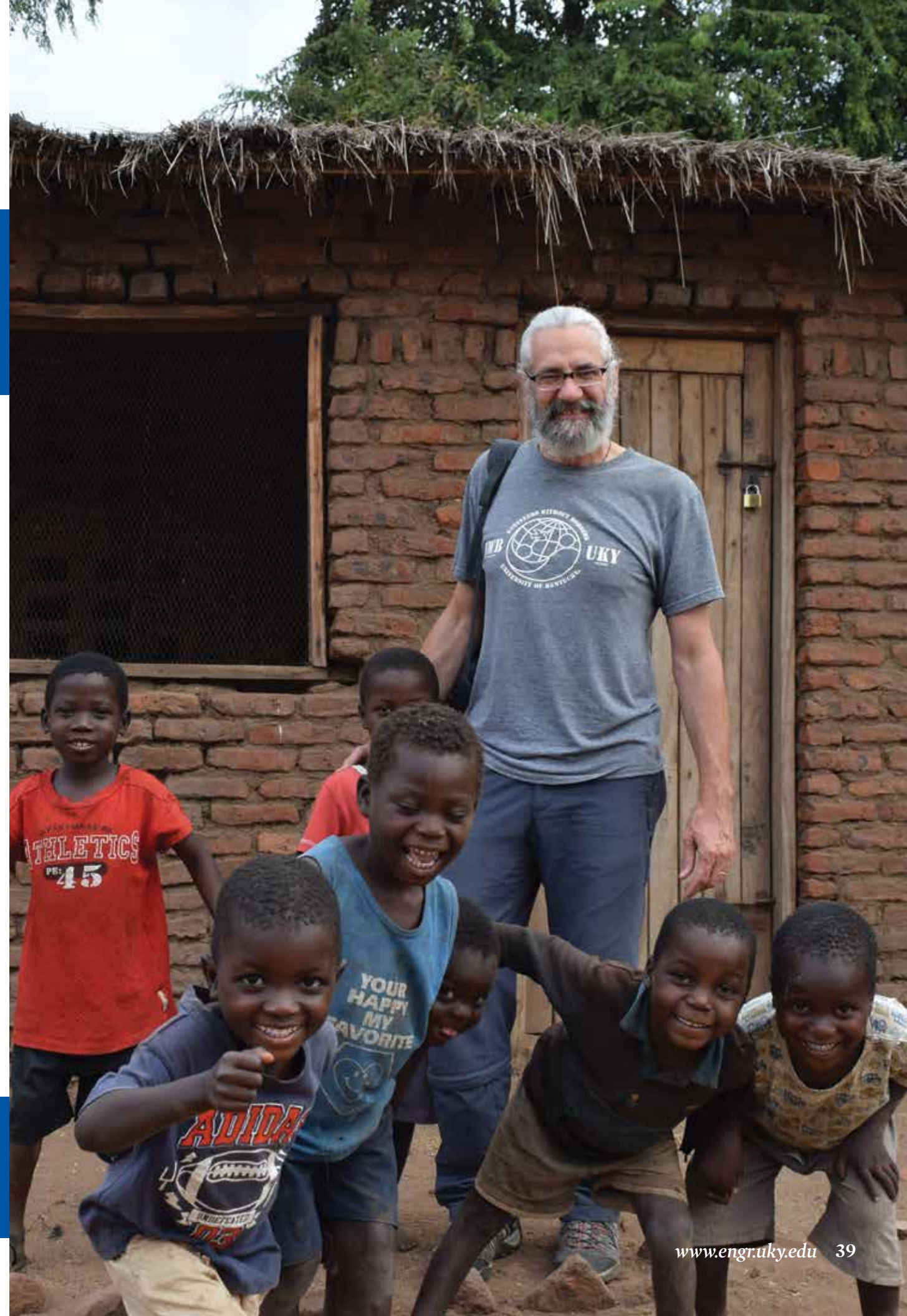
"Challenges abound, but none of them are insurmountable," says Stamatiadis.

Through conversations with community representatives, including teachers and parents, the EWB-UKY team settled upon three key improvements: Clean the septic tanks and establish a regular draining process to combat having to halt their use when they fill; provide better kitchen facilities and a sturdy metal roof; and give students desks so they have a place to sit while they learn. Although only able to select one of six schools in the area, the team will share its findings with other university chapters to lay groundwork for potential projects.

Physical construction will take place on the next trip, currently scheduled for summer 2018. How will the projects be funded? EWB-UKY will rely on donations to make its plan a reality in Malawi.

Stamatiadis emphasizes, "Funding is critical. Whatever people can give us, it goes a long way. For the cost of pennies a day, you can change the lives of a lot of people."

**TO SUPPORT EWB-UKY,  
GO TO THE FOLLOWING LINK:  
[WWW.EWB.ENGINEERING.UKY.EDU](http://WWW.EWB.ENGINEERING.UKY.EDU)**





# CLASS NOTES

**Michael Buschermohle, BSB AE 1981**, has been named University of Tennessee Extension interim assistant dean. He has been a Department of Biosystems Engineering and Soil Science professor for the UT Extension. In his new position, Buschermohle will lead UT Extension’s agricultural, natural resources and community economic development programs.

**Michael Danquah, MSCHE 2007**, has published the book “Pharmaceutical Calculations: 1001 Questions with Answers.” Danquah is an author, drug delivery expert, chemical engineer, assistant professor of pharmaceutical sciences at the Chicago State University College of Pharmacy and the creator of the NAPLEX® calculations prep app.

**Matt Darr, MSBAE 2004**, associate professor in Iowa State University’s agricultural and biosystems engineering department, has received the Kinze Manufacturing Fellowship in Agricultural and Biosystems Engineering. He began his career at Iowa State in 2008.

**J. Steven Gardner, BSB AE 1975, MSMNG 1991**, has been appointed by President Donald Trump to serve as director of the Office of Surface Mining Reclamation and Enforcement. Gardner is president and CEO of ECSI LLC, a consulting firm where he has focused on natural resources, mining, reclamation, energy, environmental, and health and safety issues.

**Thomas Godbey, BSB AE 1967**, received the Robert T. Hughes Memorial Award. Godbey retired from the Donaldson Company Inc., and has authored articles for numerous

professional and trade journals and lectured at many trade events and conferences.

**Shaminda Hubert, BSEE 1998**, took over as president of Biagi, Chance, Cummins, London, Titzer Inc., or BCCLT, in Louisville, Kentucky. The firm provides professional engineering services in 33 states. Hubert joined BCCLT in 1998.

**R.D. James, BSCE 1971**, was nominated by President Donald Trump to serve as assistant secretary of the U.S. Army, Civil Works. James most recently served as a civilian member and engineer on the Mississippi River Commission. He was originally appointed by President Ronald Reagan in 1981.

**Jeremy Kelly, PE, BSME 2002**, was named to the Consulting-Specifying Engineer “40 Under 40” list for 2017. Kelly is principal mechanical engineer at CMTA Inc.

**Aaron Landrum, BSME 1999**, has been hired as president and chief operating officer of Chance Rides Manufacturing Inc. Chance manufactures amusement rides for worldwide distribution from its Wichita, Kansas, headquarters. Landrum comes to Chance Rides after serving as the general manager at PCC Aerostructures-Brittain Machine in Wichita.

**Heath A. Lovell, BSEE 1997**, has been appointed as vice president of public affairs for Alliance Resource Partners. Lovell has been with Alliance since 2006, most recently as vice president of operations in the Illinois Basin.

**Kati Migliaccio, MSBAE 2000**, professor in the Department of Agricultural and Biological Engineering at the University of

Florida, was inducted into the Arkansas Academy of Biological and Agricultural Engineering. Members are eminent graduates of the biological and agricultural engineering program of the University Of Arkansas. This year, she also received the G.B. Gunlogson Countryside Engineering award for superior research and extension programs fostering water conservation by irrigators in the Eastern U.S. Migliaccio is the first woman to receive the award.

**Trey Rawls, BSEE 1992**, has been named commander of the 435th Air Ground Operations Wing at Ramstein Air Base, Germany.

**Toufic Saad, MSCS 1988**, was a recipient of the Great Teacher award at Big Sandy Community and Technical College (BSCTC) and honored at commencement ceremonies on May 5-6 at the Mountain Arts Center. Saad is professor of mathematics at BSCTC.

**Mary Shelman, BSCE 1981**, has been added to the venture partner network of Radicle, an acceleration fund dedicated to growing early stage agricultural and food technology startups into proven industry leaders. Shelman is an internationally recognized food and agribusiness thought leader with an extensive international network built over 30 years of business and academia experience.

**Molly Sherrard, BSCE 1998**, has joined RMC Pharmaceutical Solutions Inc., as a senior consultant. She has built a successful career through positions at Pfizer, Bristol-Myers Squibb and Astra-Zeneca.

**Matt Snow, BSME 2008**, recently received the Regional Leader Award from the

American Society of Healthcare Engineering, a division of the American Hospital Association. The award recognizes leadership and contributions to the field of healthcare facility management. Snow is executive director of facilities at Baptist Health Paducah.

**Johnathan Stewart, BSEE 2009**, electrical engineer in CMTA’s Lexington office, passed the WELL Building Standard™ (WELL) exam. This credential was developed in collaboration with the International WELL Building Institute™ (IWBI) and the U.S. Green Building Council® (USGBC). It signifies advanced knowledge in human health and wellness in the built environment as well as specialization in the WELL Building Standard™. Stewart joined CMTA in 2010.

**Charles A. Stone, Ph.D., PE, BSMNG 1983, MSMNG 1987**, joined HNTB Corporation as principal tunnel engineer in May. At HNTB, Stone’s responsibilities include investigating complex technical problems and serving as a senior technical specialist on major underground projects.

**Mark Washing, BSEE, PE 1992**, has joined the Transportation Business Unit at Barge, Waggoner, Sumner and Cannon Inc., in Nashville. Washing has worked throughout the southeastern U.S., planning, designing and implementing these projects. Washing was previously employed with Volkert Engineering.

BE INCLUDED

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

# IN MEMORIAM

|                             |                           |                  |
|-----------------------------|---------------------------|------------------|
| George A. Rassenfoss        | Civil Engineering         | 1939             |
| Ray E. Hill                 | Electrical Engineering    | 1948             |
| Charles V. Hughes           | Mining Engineering        | 1948             |
| James L. Morrissey          | Mechanical Engineering    | 1948             |
| Hubert L. Ernst             | Electrical Engineering    | 1949             |
| Charles W. Kuhn             | Civil Engineering         | 1949             |
| Carlton E. Steele           | Electrical Engineering    | 1949             |
| Merle Cable                 | Civil Engineering         | 1950             |
| Charles K. Tudor            | Mining Engineering        | 1950             |
| R. Clark Beauchamp          | Mechanical Engineering    | 1951             |
| George B. Morgan            | Electrical Engineering    | 1952             |
| William E. Sell, Jr.        | Electrical Engineering    | 1952             |
| Robert C. Ward              | Electrical Engineering    | 1952             |
| Dr. William L. Mitchell     | Metallurgical Engineering | 1953, 1956, 1958 |
| Robert E. Rogers            | Mechanical Engineering    | 1953             |
| Philip C. Miller            | Electrical Engineering    | 1957             |
| James A. Moore              | Mechanical Engineering    | 1957             |
| William E. Clay             | Mechanical Engineering    | 1958             |
| Gerald L. Nichols           | Civil Engineering         | 1958             |
| Kenneth N. Robertson        | Civil Engineering         | 1958             |
| William B. Burgie           | Electrical Engineering    | 1960             |
| Carl E. Riebel, Jr.         | Civil Engineering         | 1962             |
| William L. Black            | Civil Engineering         | 1964, 1965       |
| Wilson M. Routt, Jr.        | Electrical Engineering    | 1964, 1971       |
| Noah L. Anglin              | Mechanical Engineering    | 1965             |
| H. Karl Kuehner             | Mechanical Engineering    | 1966             |
| Ralph K. Anderson           | Civil Engineering         | 1969             |
| Perry D. Potter             | Civil Engineering         | 1971             |
| Robert B. Greenwell         | Electrical Engineering    | 1978             |
| Harrison Smith              | Mechanical Engineering    | 1978             |
| Capt. Kenneth Stephen Dalga | Mechanical Engineering    | 2010             |



## THOMAS NOVAK

*Chair, Department of Mining Engineering*



Thomas Novak has become the next chair of the University of Kentucky College of Engineering's Department of Mining Engineering. He has been professor and Alliance Coal Academic Chair since joining UK in 2010.

Novak received a Ph.D. in mining engineering, as well as a minor in electrical engineering, from the Pennsylvania State University in 1984. He taught at the University of Alabama for 18 years before becoming C.T. Holland Professor and Head of the Department of Mining and Minerals Engineering at Virginia Polytechnic Institute and State University. While at Virginia Tech, Novak was part of the National Institute for Occupational Safety and Health (NIOSH) investigation team for the Sago Mine Disaster. His work with NIOSH led to a full-time position as division director for mining science and technology in the Office of Mine Safety and Health Research, a position he held until his arrival at UK.

## GUIGEN ZHANG

*F. Joseph Halcomb III, M.D. Chair in Biomedical Engineering, and  
Department Chair of the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering*



Guigen Zhang, the inaugural F. Joseph Halcomb III, M.D. Chair in Biomedical Engineering, is a fellow of the American Institute for Medical and Biological Engineering and a national leader. He currently serves as the executive editor of Biomaterials Forum and the president of the Institute of Biological Engineering. Zhang pursues research to advance biomedical science and innovation through utilization of integrated investigative approaches based on coupled experimentation and computation. He has published extensively in the areas of biomechanics, biomaterials and biosensors. Over the years, his research has been funded by diverse funding sources ranging from federal agencies such as National Institutes for Health and National Science Foundation, to private foundations like the Bill and Melinda Gates Foundation, to venture groups and major industry. Zhang holds numerous patents and has published three books.

## MICHAEL MONTROSS

*Chair, Department of Biosystems and Agricultural Engineering*



Michael Montross, a longtime UK educator, researcher and farmer, is the new chair of the Department of Biosystems and Agricultural Engineering. Montross has been a member of the department since 1999. He holds bachelor's and master's degrees from Michigan State University and earned his Ph.D. at Purdue University.

While at UK, Montross has received nationally competitive grants, and he is currently engaged in several multidisciplinary projects. His research has focused on drying, storage and granular mechanics of grains and oilseeds, as well as biomass collection, characterization and processing.

Montross' research projects have often put him in contact with Kentucky farmers. He is a firm supporter of the land-grant mission and believes strong extension, research and teaching programs are all critical to the success of the department, college and state.

# GIVING BACK



Born in Rockcastle County, Kentucky, Henry Mason Lutes received his bachelor's degree in mechanical engineering from the University of Kentucky in 1934. Although he became a highly successful salesman and investor, Mr. Lutes never forgot his beloved UK. Wherever he went, whenever he spoke, Mr. Lutes praised UK and the education he had received in engineering.

In 1980, Mr. Lutes established an endowment for engineering scholarships. His generosity has already benefitted hundreds of students, and the endowment will enable many more to obtain an engineering degree. The annual Henry Mason Lutes Excellence in Engineering Education Award is also generated by Mr. Lutes' gift.

Mr. Lutes stated, "My career work was simply to keep the wheels turning. I have been successful and now I view the situation as paying back for the good education that I received."

**For more information about supporting engineering education through estate planning, contact Matthew Briggs, director of development, at (859) 218-3506 or [matthew.briggs@uky.edu](mailto:matthew.briggs@uky.edu).**





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## *Leadership Rendezvous Group Photo*

*Photo: Jean-Paul Rose*

