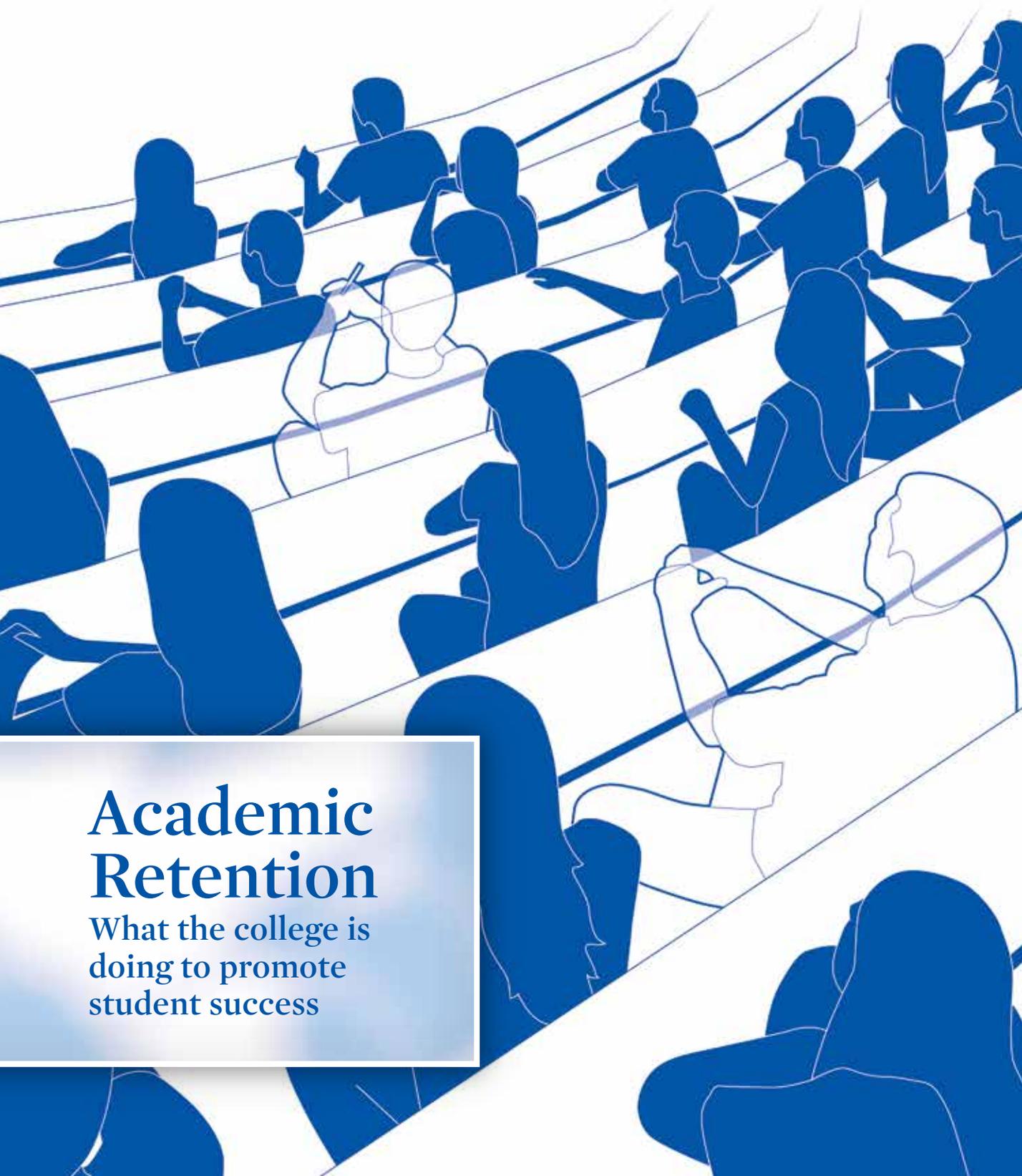


# KENTUCKY

## ENGINEERING JOURNAL

*Fall 2016*



## Academic Retention

What the college is  
doing to promote  
student success

## Mechanical engineering

senior Jon Toth is the starting center for the Kentucky Wildcats football team. The 6-foot-5, 310-pound NFL prospect had started 35 consecutive games for the Wildcats coming into the season and made the watch list for the Rimington Trophy, given to the nation's top center, for the second time.

A workhorse in the classroom as well as on the field, Toth has made the SEC Academic Honor Roll three times while pursuing his degree.



# Message from the Dean

Welcome to the fall issue of *Kentucky Engineering Journal*, the flagship publication of the University of Kentucky College of Engineering. This magazine has won three awards among universities and colleges in the southeast region over the last two years, an accomplishment that not only reflects the craftsmanship that goes into the writing, photography, graphic design, etc., but also that our students, faculty and alumni provide us with numerous outstanding stories to share.

Our undergraduate enrollment grew once again; we now have a record-total of 3,448 students to go with 462 graduate students. The freshman class also reached an all-time high as we welcomed 838 new students to campus—and no one around here thinks we're done growing!

Growth, however, means little if engineering freshmen don't become engineering graduates. That is why we are excited about recent high-impact initiatives like our First-Year Engineering program, the Garver Endowed Scholarship Fund and the James and Gay Hardymon Center for Student Success—all of which you can read about in our feature article on academic retention. We want to do our best to raise the percentage of our students who go on to establish productive and rewarding careers in engineering and computer science.

As always, please feel free to share your feedback with us. You help us produce a publication that gets better with each issue. You may send your thoughts to [alumni@engr.uky.edu](mailto:alumni@engr.uky.edu).

Sincerely,



Larry E. Holloway  
Interim Dean



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## FRONT COVER

The University of Kentucky College of Engineering is investing heavily in strategic initiatives that will help students go from orientation to graduation.



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# FROM ORIENTATION TO GRADUATION

*Academic retention, a prominent feature in UK's strategic plan, has become the college's top priority.*

When it comes to evaluating the success of a university or a college within it, the default mode of measurement is usually framed by enrollment numbers: How many incoming students this year? Is that more than last year? How big is the student body overall? Reaching milestones yields a great sense of satisfaction. Three years ago the University of Kentucky College of Engineering crossed the 3,000 undergraduate student threshold for the first time—an accomplishment worth celebrating. This fall, the college welcomed a record number of first-year students and the 3,910 undergraduate and graduate students were the most in its history.

These days, the focus on numbers hasn't changed; rather, the numbers most scrutinized have less to do with who is coming in, but who is leaving. Who doesn't make it from orientation to graduation? What kind of student changes to a non-engineering major or leaves UK altogether? Zach Fuqua, director of student success, says answers to such questions are complex.

"Our study of academic readiness reveals that whereas some students succeed whether they avail themselves to college resources, other students drop out regardless of the programs available to them. Thus, academic retention efforts find their best possibility for results in the middle—students who have the desire and work ethic to navigate the rigor of an engineering curriculum, but stand the best chance of success if the college can provide resources in a few key areas."

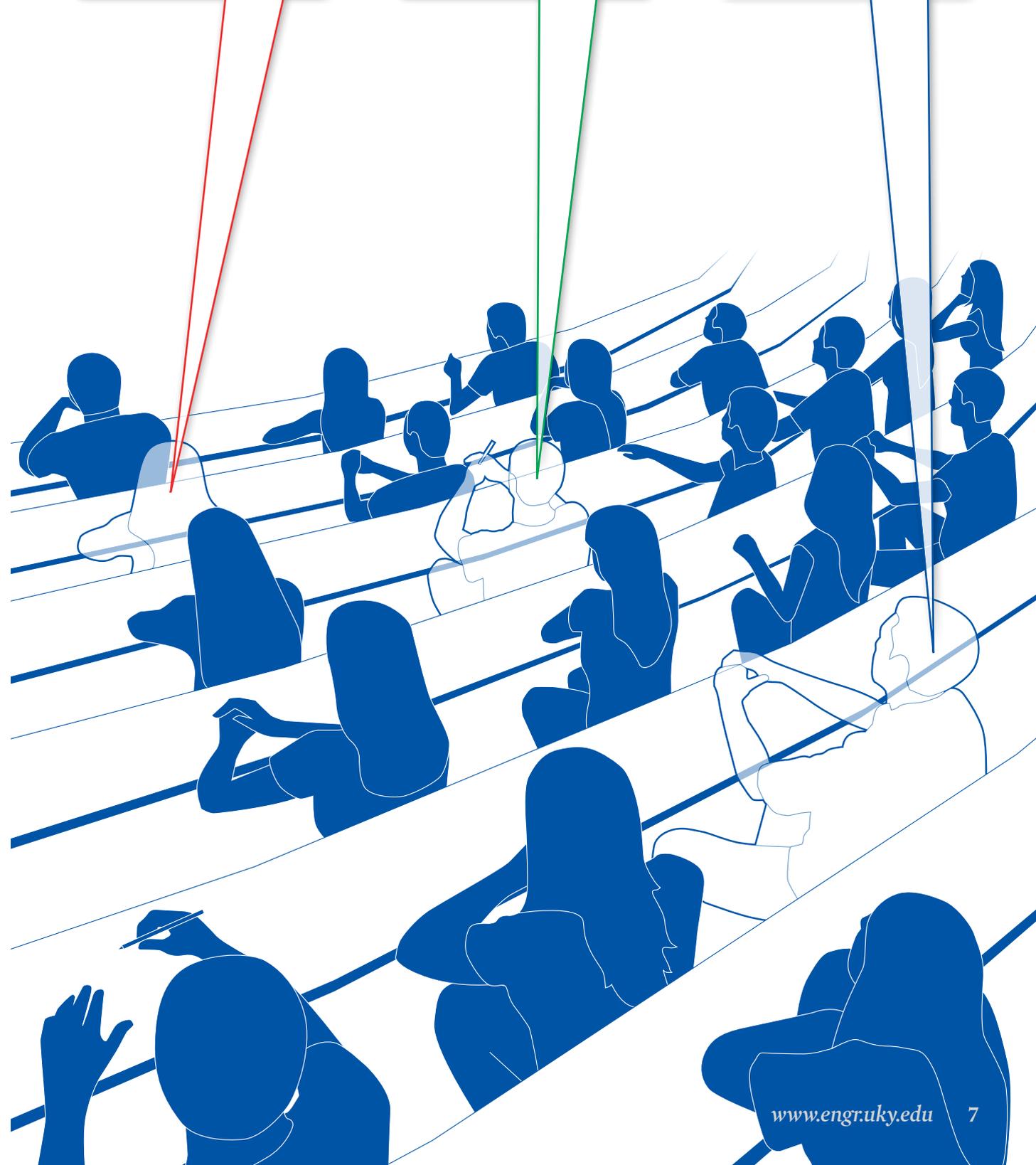
"No single answer exists to explain why students change majors or leave UK entirely," adds Kimberly Ward Anderson, associate dean for administration and

academic affairs. "We treat each student's situation as unique and provide a multitude of programs that will help students succeed."

Research is ongoing, but the college is emphasizing three "pillars of student success" in its effort to raise retention rates.



In the pages that follow, we highlight four key initiatives that undergird the college's retention strategy. Combined, they have the potential to make sure the students who have the passion to be engineers and have shown they can be successful have every opportunity to earn an engineering degree from UK.



## AN OFFER HE COULDN'T REFUSE:

### JAMES AND GAY HARDYMON'S INVESTMENT IN STUDENT SUCCESS

Ask Jim Hardymon (BSCE '56, MSCE '58) what compelled him to commit \$3.5 million to create the James and Gay Hardymon Center for Student Success and \$1.5 million to an endowment for undergraduate research and international study experiences and he will suggest it was, in part, his idea.

A longtime advocate of the need to increase graduation rates, Mr. Hardymon has also challenged students to familiarize themselves with emerging technology and avail themselves to international study and work opportunities. So when University of Kentucky President Eli Capilouto and then-Dean John Walz approached him about a giving opportunity that included nearly everything he has said necessary to be successful in engineering and business, Mr. Hardymon couldn't help but notice the irony.

Slated to open for the Fall 2017 semester, the James and

Gay Hardymon Center for Student Success will occupy the fully-renovated third floor of historic F. Paul Anderson Tower. By housing essential student services in one convenient location near engineering classrooms and faculty offices, the center promises to help the college achieve its retention objectives.

In addition to the center, the Hardymons' \$1.5 million endowment for undergraduate research and international study experiences will help students expand their engineering vision beyond the classroom, increase their professional skills and graduate with the potential for a lucrative career.

"My hope is that this commitment will lead to the college achieving higher graduation rates," says Mr. Hardymon. "We need more engineers who can make a difference in our world."



#### LEGEND

<span style="color: green;">■</span> ADVISING	<span style="color: gray;">■</span> EXISTING
<span style="color: lightgreen;">■</span> CAREER SERVICES	<span style="color: lightgray;">■</span> NON-ASSIGNABLE SPACE
<span style="color: yellow;">■</span> CIRCULATION	<span style="color: lightcoral;">■</span> RECORDS
<span style="color: lightblue;">■</span> DIRECTOR OFFICES	<span style="color: lightyellow;">■</span> SUPPORT AREAS
<span style="color: limegreen;">■</span> ELBERT C. RAY ESTUDIO	<span style="color: lightblue;">■</span> TUTORING

### THE JAMES AND GAY HARDYMON CENTER FOR STUDENT SUCCESS

#### ONE CONVENIENT LOCATION FOR:

- Elbert C. Ray eStudio
- Designated tutoring space
- Professional skills development
- Advising
- Cooperative Education program
- International study program
- Undergraduate research
- Industry interviewing rooms

*The First-Year Engineering program features two classrooms located inside Woodland Glen III residence hall, which is where the nearly 600 students in the Engineering Residential College living learning program reside.*

## CHANGING THE CONVERSATION: THE FIRST-YEAR ENGINEERING PROGRAM

“A lot of students enroll in engineering because they are told it pays well or they are good at math and science,” says First-Year Engineering (FYE) assistant professor George Ricco. “We are changing the conversation by helping students develop real enthusiasm about engineering through the FYE experience.”

UK’s new FYE program launched this fall and all freshmen and transfer students are part of the first cohort. Whereas previous incoming students spent their freshman year taking prerequisites for engineering classes, FYE students hit the ground running with brand new, custom-designed engineering courses as well as a design project.

“This program works two ways,” says Kimberly Ward Anderson, associate dean for administration and academic affairs. “It increases passion and enthusiasm for engineering in those who already have them and it signals to those who don’t that they need to find a major that is a better fit for them—before they are in academic distress. Ultimately, we want students to find the place that is right for them.”

“When I arrived here, I discovered that every single administrator and professor I spoke with really cares about student success. The institutional commitment to excellence in engineering is exceptionally high,” Ricco adds.

Ricco, who received his Ph.D. in engineering education from Purdue University, has researched several successful FYE programs around the country. Rather than approximate what is working elsewhere, our goal is to take the FYE concept and, in Ricco’s words, “Kentuckify” it by deliberately integrating UK’s cultural uniqueness and faculty expertise into the program.

“The flavor of our FYE program has to be a Kentucky flavor, not that of another institution, for this to be more than just another program. If we look at what makes us special, what emerges will be truly beautiful.”



## A RISING TIDE LIFTS ALL BOATS: THE ENGINEERING RESIDENTIAL COLLEGE

The University of Kentucky has 16 living learning programs that place like-minded students together in specially assigned residence halls for communal learning and growth. The Engineering Residential College (ERC) is the largest living learning program on campus with nearly 600 engineering majors occupying the year-old Woodland Glen III.

ERC director Tony Colella says, “In the ERC, the energy, enthusiasm, motivation and desire to achieve academic excellence is like nowhere else on campus in my opinion. The students are not only focused on their own journey in engineering or computer science, but dedicated to the teamwork and collaboration necessary to ensure they *all* become future UK graduates.”

Recent data puts a spotlight on the ERC’s effectiveness. When compared with first-year students not participating in the living learning program, retention rates were not only higher on the university level, but 12% higher within the college. In addition, ERC participants had a higher GPA.

Chemical engineering sophomore William Reedy earned

a 4.0 his first semester in the ERC and says it never would have happened without the camaraderie of his engineering peers.

“Everyone in the ERC has strengths and weaknesses, so we can’t be too prideful to ask for help. We help one another with homework, but also teach each other what we learned during the day’s lectures.”

But strenuous study sessions are only one aspect of ERC life. Colella says he encourages students to strike a balance by participating in activities like “Root Beer with an Engineer,” movie nights and visits from professors and industry leaders.

“I try and tell our students there’s a balance between majoring in ‘college’ and ‘college life.’ Your priority at UK is to earn a degree, but you can have fun doing so. The ERC offers it all under one roof. Where else on campus can you visit on a Monday evening and witness students studying for a calculus or chemistry exam and playing ping pong or foosball in same facility?” [KEJ](#)

## A GIFT FOR THE GRITTY: THE GARVER FAMILY ENDOWED SCHOLARSHIP FUND

Incoming freshmen who earn one or more of the several merit scholarships available have demonstrated through their high school GPA and ACT/SAT scores that they have the potential to take full advantage of an engineering education from the University of Kentucky. Collectively, they reveal the UK College of Engineering attracts high-caliber students who could have enrolled at other institutions but chose UK.

But merit scholars are not our only brand of student. Many others entered the college with grades and exam scores that fell below merit scholarship standards. Rather than relinquish their dream, however, they pressed on—closing down the library, becoming regulars at professors’ office hours, sticking with homework problems until they got them right and demonstrating day by day that they have the grit and determination necessary to excel.

In 2015, 1960 mechanical engineering alumnus Mike Garver and his late wife, Susan, committed \$4 million to create scholarships for students exactly like them. The Garver Family Endowed Scholarship Fund issues annual

scholarships worth up to \$10,000 for non-scholarship students who are making the grade.

Because many students who did not qualify for merit scholarships face the challenge of unmet financial need, they are at significant risk of not completing their engineering education. Garver Family Scholarships will go a long way toward not only helping the college reach its retention goals, but opening doors for hard working students.

“My vision behind the Garver Family Endowed Scholarship Fund is to ensure we don’t lose financially unassisted students who have already proven they can succeed,” says Mr. Garver.

Our first Garver Family Scholars received their awards this fall. One recipient was computer engineering sophomore Ruth Dankwah (see page 28). She personifies the liberation students experience when they are freed from financial pressure when she says, “I will now be able to focus more on my education without having to work many hours throughout the week in order to make ends meet.”





# FINAL FRONTIER

*Biomedical engineering associate professor Sridhar Sunderam has devoted his academic career to the mystery and beauty of brain rhythms.*

With all due respect to Captain James Kirk from the famed Star Trek series, Sridhar Sunderam disagrees that space is the “final frontier.” Rather, the territory with the greatest potential for discovery lies closer to us than the universe’s uncharted outposts. In fact, it’s closer than our atmosphere, the environment and even our own skin. What could that be?

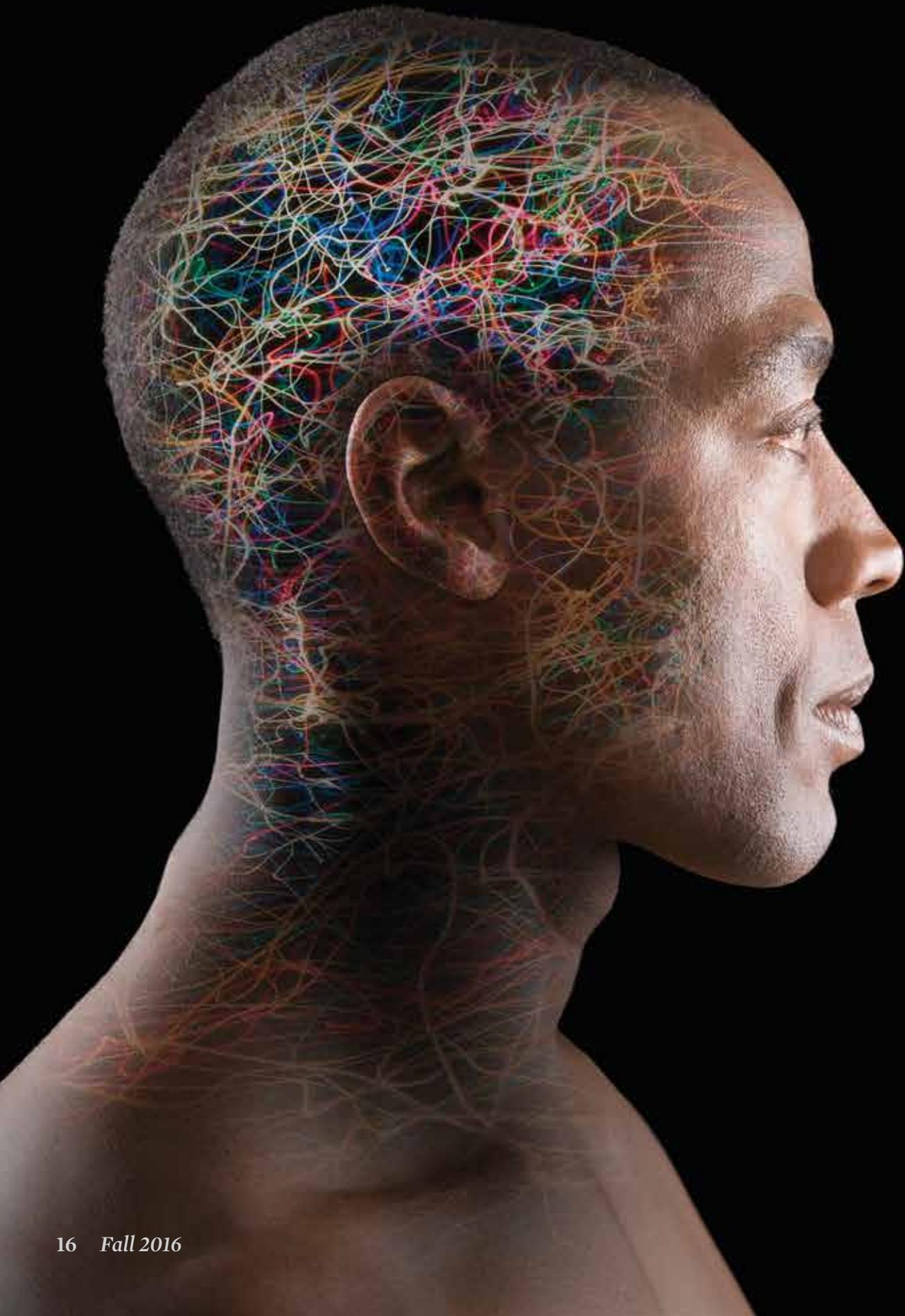
“The most fascinating thing about the brain is that it’s right here,” Sunderam says, pointing to his head, “and yet we know very little about it. When it comes to understanding the way we live—and defining how we are going to live in the future—intracranial intelligence matters at least as much as extraterrestrial intelligence.”

Sunderam, an associate professor in the F. Joseph Halcomb III, M.D. Department of Biomedical Engineering, directs the Neural Systems Laboratory. In 2015, he and his collaborators from the University of Rhode Island and the University of Oklahoma received a \$6 million award from the National Science Foundation’s Experimental Program to Stimulate Competitive Research (EPSCoR) to develop innovative and broadly accessible tools for

gaining insight into how the nervous system functions in health and disease. Sunderam’s team, which includes faculty in biomedical engineering and biology, is using imaging and diagnostic tools—including a novel device developed by the Rhode Island team—for understanding brain rhythms in relation to movement, sleep, epilepsy and autonomic function.

“It took me years to realize that sleep quality plays an important role in seizure generation,” he explains. “In epilepsy therapy, seizure control is viewed as the holy grail. But the truth is that seizures affect sleep, behavior and cognition and poor sleep can promote seizures; improving sleep may therefore improve seizure control. My goal is to enable a comprehensive therapy in which we model an individual’s sleep patterns and their interactions with seizures, and then program therapy based on this model to simultaneously improve sleep and reduce seizures.”

Because EPSCoR grants contain educational objectives beyond the research, Sunderam has incorporated innovative programs directed toward junior faculty, postdoctoral scholars and students to engage in brain research.



“In September, we began a seed grant program that encourages junior faculty and postdoctoral scholars at UK, Rhode Island and Oklahoma to collaborate with each other on projects related to the brain. Also, we also had three students from Kentucky State University spend two months with us over the summer. They got to do experiments in neural engineering and a couple of programming projects. The hope is that they will continue refining their work during the school year.”

The son of a sailor, Sunderam completed his undergraduate education in his native India and subsequently applied to graduate programs in the United States and Europe.

“I wanted to travel,” he says, smiling, “but I couldn’t be a sailor like my dad. I had to find another way.”

While working on his Ph.D. in chemical engineering at the University of Kansas, Sunderam came across a flyer for a company called Flint Hills Scientific that was advertising intern positions for projects related to brain signal analysis.

“At that time, my Ph.D. work centered on how bones heal from surgical procedures,” he recalls. “Bones take a long time to heal. I would take an image and have to wait at least another week or more until I took another. Working on the brain was a completely different dynamic. We were working on algorithms that could detect seizures from the

EEG and apply electrical stimulation to the brain to stop them. It was fascinating stuff.”

That was it for bone research. Sunderam stayed at Flint Hills Scientific for six years before taking on research faculty positions in neural engineering, first at George Mason University and later at Penn State. In 2009, eager to begin his own lab and continue his research, Sunderam was hired to join the faculty of the then-named Center

for Biomedical Engineering (now a department) at UK.

“What I liked about UK is that there seemed to be a lot of interest in collaboration, which is genuinely feasible because the hospital is right here. Testing our research ideas clinically is a lot easier because of the proximity,” he shares.

Sunderam also confides that he appreciates UK’s basketball tradition and enjoys being on a campus where basketball interest is high. In fact, Sunderam considers himself something of a good luck charm:

three of the four schools he has studied or worked in have made the NCAA Tournament’s Final Four while he was present (Kansas in 2002 and 2003, George Mason in 2006, and Kentucky four times since 2011). In 2012, UK’s men’s team won the national championship.

“One championship and four Final Fours since I arrived—I’d say I’m doing quite well!” **KEJ**

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***“The most fascinating thing about the brain is that it’s right here, and yet we know very little about it. When it comes to understanding the way we live—and defining how we are going to live in the future—intracranial intelligence matters at least as much as extraterrestrial intelligence.”***

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# GAME OF ENERGY

BY CARL NATHE, UKPR

*Nathan Wright has always wanted to go beyond the status quo and create; with his new strategic game based on a world energy crisis, he is doing just that.*

Growing up in the hills of Eastern Kentucky, near Pikeville, Nathan Wright has been a big fan of University of Kentucky sports since he can remember. Even his room was painted and decorated in UK colors. Yet his affinity for Big Blue is not what sold him on UK as the place to pursue his engineering education.

"I toured the campus and the College of Engineering and it was magnificent," he recalls. "It also didn't hurt that I received a bit of VIP treatment from UK staff after they learned I had a 35 (out of a perfect 36) on my ACT."

Nathan found himself recruited by big-name engineering schools like MIT, Rensselaer Polytechnic Institute and others, but they fell short of what Nathan saw in UK.

"UK just felt right and was where I needed to be," he affirms.

Nathan settled on mechanical engineering for a major and gained research experience by working with associate professor Alexandre Martin. He later added an MBA from the Gatton College of Business and Economics. Along the way, he discovered a way to blend his lifelong love of tabletop games with his concern about energy awareness.

Game of Energy, a board game Nathan has developed to get people thinking about energy, has its origin in a conversation Nathan had with his father, David.

"My dad was managing several surface mines in Eastern Kentucky while also watching the stock market," Nathan recounts. "One day, he started asking questions about the various energy industries of the world. Thanks to classes I had taken at UK and some additional research I had done, I was able to provide some thoughtful answers to him. My dad said, 'This is really interesting stuff. There needs to be a way to bring this to the masses.' I was thinking like a book, or a blog, but instead he said, 'a board game.' And it simply clicked in my mind."

Nathan saw a huge challenge before him: how to address each sector of the energy industry without bias in a fun and easily accessible package. He set out to meet the need. His mother, Tammy, also loved the idea and encouraged her son to pursue it. Nathan says the support has been invaluable.

"Taking this journey as a family has allowed us all to learn together and become even closer. In fact, the three of us have spent many a night play-testing the game together."

Game of Energy is designed as a highly thematic strategy game of medium-to-light complexity. The primary methods of play are placing different sized tiles to control space on the board and managing resources. It involves one to four players and usually lasts between 30 and 60 minutes. All modern, widespread technologies are represented in Game of Energy: biofuel, fossil fuel, hydroelectric, nuclear, solar and wind.

Nathan launched a Kickstarter campaign in an attempt to showcase the game and garner financial support. He met his goal of raising \$15,745 by August 30.

In addition to families playing Game of Energy at home together, there is a strong potential market for educators to employ the game in their classrooms as a way to teach students about the growing energy needs of the world.

Nathan says, "I think the youngest person who has played the game is nine years old. Even though our initial recommendation is for ages 14 and up, the numbers used in Game of Energy are either based on fives or 25s, so the math is relatively easy to understand."

In our digitized world where video games are front and center, is there really a market for a board game these days? Nathan says the evidence points to yes.

"Several recent national surveys indicate that board games are enjoying a renaissance. While electronic based games dominate the overall commercial market, studies show that board games' share of that market is up to around 11 percent from 8 percent a few years ago."

While working hard to launch Game of Energy, Nathan began working for Belcan Corporation, where he redesigns aspects of military and commercial jet engines. He is proud to call himself an alumnus of UK.

"This university has given so much to me and so many other people," he shares. "And you better believe I will be recommending my future children attend this gem of the Bluegrass." [KEJ](#)

You can find out more about Nathan and Game of Energy by checking out his website and following him on social media.



@energy\_game



game\_of\_energy



www.GameOfEnergy.com



facebook.com/groups/GameOfEnergyFans

# BACKSEAT DRIVER

*A car enthusiast, a shoot-for-the-moon internship and the imminent technological shift that will affect us all.*

Put Angelo Stekardis behind the wheel and he's one happy man. Instead of flying from Louisville to southern California, where Angelo would begin a summer-long internship, he and his father preferred to make the 31 hour cross-country drive. When the internship ended three months later, Angelo and his girlfriend took a 48 hour "scenic route" home.

To make Angelo even happier, put him behind the wheel of something sporty and muscular. Once, while in Bowling Green to stand as a groomsman in his cousin's wedding, Angelo found time to drive a Lamborghini at the National Corvette Museum. On an off-weekend during his internship, Angelo and a friend rented a Honda S2000, cruised the Pacific Coast Highway and rambled about in the mountains.

Now, here's the punchline of the joke you didn't know was coming: Angelo's engineering passion—what he thinks, talks and dreams about—is driverless vehicles. Yes, it seems that the Jekyll car enthusiast who test-drives luxury cars and roadsters is also the Hyde striving to take the steering wheel out of his own hands.

"It's quite a paradox," Angelo admits with a laugh. "But the safety benefits make it worth it. My love for driving can

take a backseat—literally—if it helps save lives."

After getting a brief taste of autonomous vehicle technology while working as a Co-op student at Toyota Technical Center in Ann Arbor, Mich., Angelo wanted more. That is how he came to intern at Faraday Future, a young start-up company in Gardena, Calif., that specializes in intelligent electric vehicles. Angelo arrived hoping to spend all of his time on driverless vehicle projects and he wasn't disappointed.

"I got to work—and I mean it when I say 'got to'—10 hour days, devoting nearly all my time thinking about solutions to real engineering work related to driverless vehicle technology," Angelo details. "And I loved it."

As a member of the Perception Team, Angelo primarily worked with sensors and cameras. His projects are strictly confidential, but the big questions behind his technical work acknowledge curiosities most of us have about driverless vehicles in general: How precisely can we determine the vehicle's location? How do we ensure that the vehicle can safely navigate a constantly changing environment? How do we effectively use all of the data collected by the sensors on the vehicle? Overall, Angelo's projects were part of a concentrated





effort to ensure maximum safety of passengers within an autonomous vehicle.

“When it comes to driverless cars, ‘close’ isn’t good enough,” he remarks.

Angelo was given more responsibility than he might have expected since he was the only undergraduate on the team. However, he believes he represented the University of Kentucky well through his contributions thanks to UK preparing him to learn on the fly.

“As I started my internship, I felt like UK gave me the logical thinking and the problem-solving mindset necessary to do independent research and quickly make significant contributions. Faraday Future has taken everything I worked on and is moving forward with it. During my evaluation they were impressed with my quality of work and how much I was able to accomplish as an undergraduate.”

Those achievements were the culmination of Angelo’s induction to the engineering profession. Some experiences can’t be simulated in a classroom. For one project, Angelo spent three weeks using trial and error to solve a single, mission critical problem. Once he was certain his idea was sound, he persisted until he found a solution that worked. For that to happen, Angelo had to learn the importance of doing whatever is necessary to avoid mental burnout.

“Most projects I get at UK take about 20 hours—part of a weekday and most of a weekend. At Faraday Future, I was working 10 hour days on just one project. When I was stuck, I had to convince myself to take a break and do something else,” he explains.

For now, Angelo can enjoy any sports car he can get his hands on; he has time before driving becomes a skill fewer people on the planet possess—but if you ask him, he believes that time is rapidly decreasing.

“Research in self-driving cars has been happening for a long time and progress is increasing exponentially. As a result, there will soon come a day when we look up and see a fleet of driverless cars on the road and think, the future is here!” **KEJ**



Photo: Andrew Milia

# FULL CIRCLE

*Chris Magruder is giving back to an endowed fellowship that gave him a chance to earn a master's degree.*

When 2006 electrical engineering graduate Chris Magruder was searching for funding that would enable him to continue graduate studies in electrical engineering, he was delighted to receive the recently established Dr. Robert D. Hayes Endowed Graduate Fellowship which was only available to graduate students studying electrical or computer engineering and who were members of Eta Kappa Nu. As a Hayes Fellow, Chris now had flexibility to customize his path to a master's degree.

"The Hayes Fellowship allowed me to explore a different graduate level experience where I was able to work with a company, Cypress Semiconductor, to complete my research and focus on something that has very current real world applications."

Chris earned his master's degree in electrical engineering in 2008. For the last five years, he has excelled as an integrated circuit designer for Analog Devices in Cambridge, Mass. Although he is far from Lexington, UK is seldom far from Chris's thoughts. He promptly joined the UK Fellows Society in October 2008 and designated his gift to the Hayes Fellowship fund—the same fellowship he had received. Further, because Analog Devices offers a match for donations to universities, Chris's contributions

double in impact.

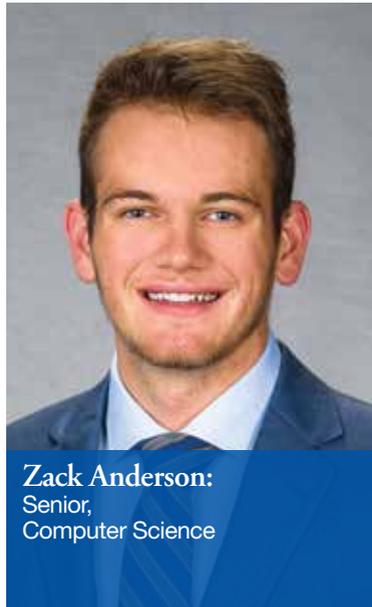
"I have found that it is important to reflect on how lucky I have been to find people at the university who were willing to help me. By giving to the endowment, my hope is that the fellowship can be distributed more frequently," he shares. "I also appreciate my company's gift-matching program. Because of it, giving a little turns into giving a lot."

For some, designing integrated circuits is one step on the way to somewhere else; Chris says that for him, it is the fulfillment of a dream. His only long-term plan is to sharpen his skills.

"For a long time, I wanted to be a circuit designer and work in the semiconductor industry. My goal now is to get better and better so I can take on more challenging designs."

Chris hopes current and former engineering students who benefited from the generosity of others will consider making similar gifts.

"If you really appreciate how fortunate you were to get an award, then it's important to enable future students to have that opportunity, too." **KEJ**



**Zack Anderson:**  
Senior,  
Computer Science



**Tom Hedman:**  
Adjunct Associate Professor,  
F. Joseph Halcomb III, M.D.  
Department of Biomedical  
Engineering



**Ruth Dankwah:**  
Sophomore,  
Computer Engineering

Surgeons and anesthesiologists prepped for their next bariatrics surgery: scrubs, masks, gowns, gloves? Check. Google Glass, connected and fully charged? Check. They headed into the operating room. The doctor and an anesthesiologist wore Google Glass technology mounted on their eyeglasses. In the top right corner of the right lenses, they could see the patient's vital signs. The software engineer, University of Kentucky computer science student Zack Anderson, watched as his work was put to the test... and passed. Working with Dr. Alex Gandsas of the Anne Arundel Medical Center in Maryland, Anderson's innovation is designed to reduce the distractions surgeons and anesthesiologists face as they operate. Applying wearable technology to glasses allows them to keep their eyes on the patient and monitor vitals at the same time. The venture began as an undergraduate research project Zack's freshman year, working with Department of Computer Science Chair and Professor Brent Seales.

Millions of Americans suffering from low back pain could soon have a quick, cost-effective and permanent solution for the debilitating ailment. The solution, an injectable liquid called Réjuve, is the creation of UK researcher and Intralink-Spine chief scientific officer Tom Hedman, and it has received promising early results from a recent clinical study. Réjuve is an injectable orthopaedic device that mechanically strengthens the spinal disc and stabilizes the spinal joint. According to an Intralink-Spine news release, one patient reported that he played 18 holes of golf three days after the Réjuve procedure, which takes 15-20 minutes to administer and costs considerably less than current and emerging treatments. Hedman joined the UK faculty in 2010 and brought Intralink-Spine to UK's Coldstream Research Campus. He credits biomedical engineering faculty for providing collegial support and advice as Intralink-Spine has translated technology from the lab to the clinic.

When a family emergency required that Ruth Dankwah begin high school after classes had already commenced, she found few classes still available for registration. With little interest in the subject, Ruth selected Introduction to Web Design as one of her electives. It turned out to be her favorite class that year and Ruth followed that interest into high school computer science classes, eventually enrolling at UK as a computer engineering major. One of the first students to receive a Garver Family Scholarship (see page 12), Ruth has joined many student organizations to build her leadership skills. During her freshman year, she joined the Resident Students Association and helped found the first multicultural sorority in Kentucky, Theta Nu Xi Multicultural Sorority Incorporated. When Ruth graduates, she hopes to work for a technology company, such as Google or Apple, either innovating or creating new technologies for consumers.

## Got a UK Engineering Graduate on Your Shopping List?



Celebrate achievement and spread holiday cheer at the same time by purchasing a brick on the Pathway of Innovation for the UK engineering graduate in your life! A personalized, engraved brick is a great way to commemorate your graduate's hard work and success. Starting at only \$100 for graduates within five years of finishing their degree, each brick is laid in the Joseph G. and Suzanne W. Teague Courtyard in the center of the engineering quadrangle. Options for messaging on your brick are endless.

Contact us at [alumni@engr.uky.edu](mailto:alumni@engr.uky.edu) to purchase your brick today!

# BY THE NUMBERS

**838**

**FRESHMEN**  
(up 39% from fall 2011)

**3,448**

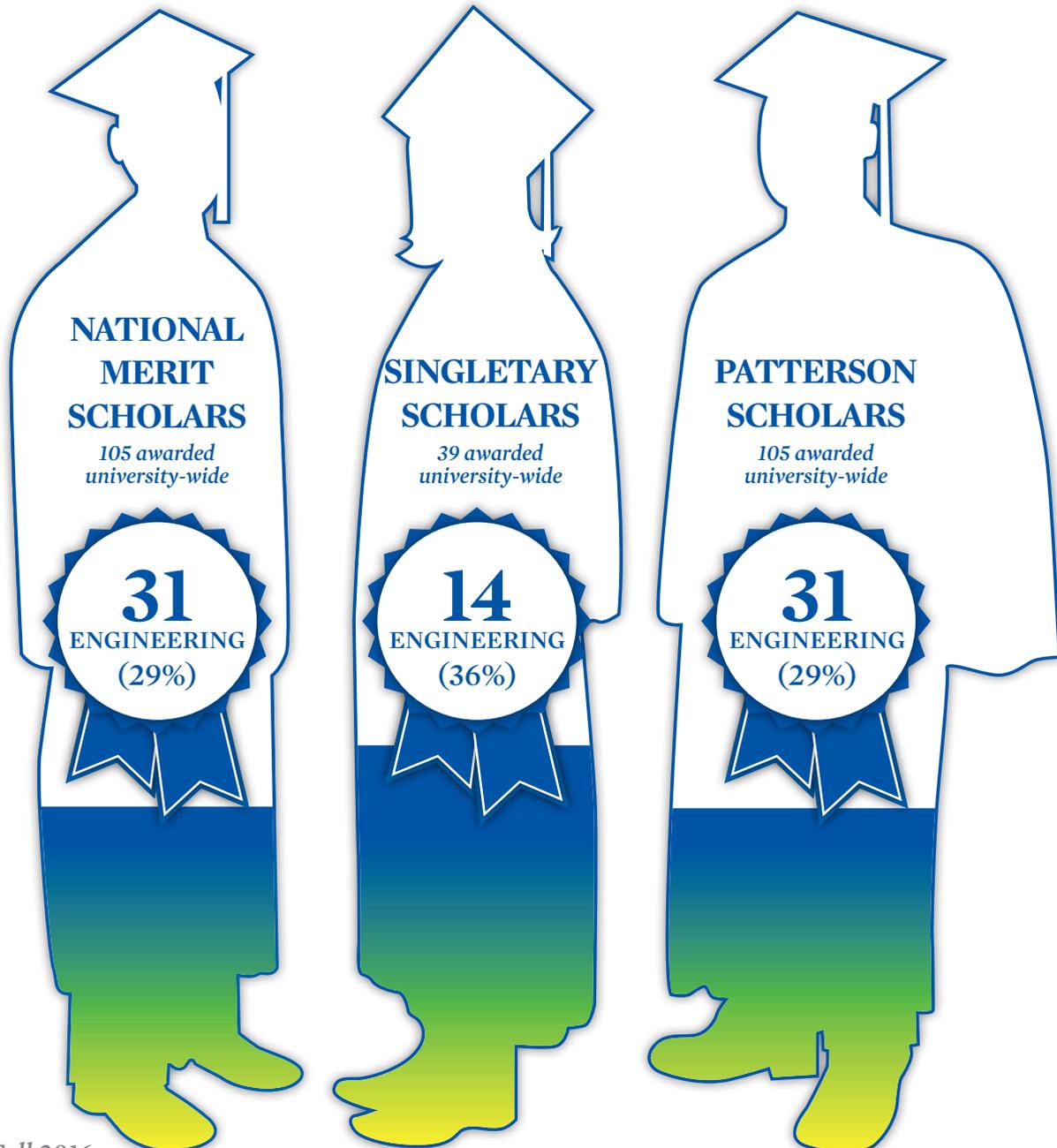
**UNDERGRADUATES**  
(up 39% from fall 2011)

**28.3**

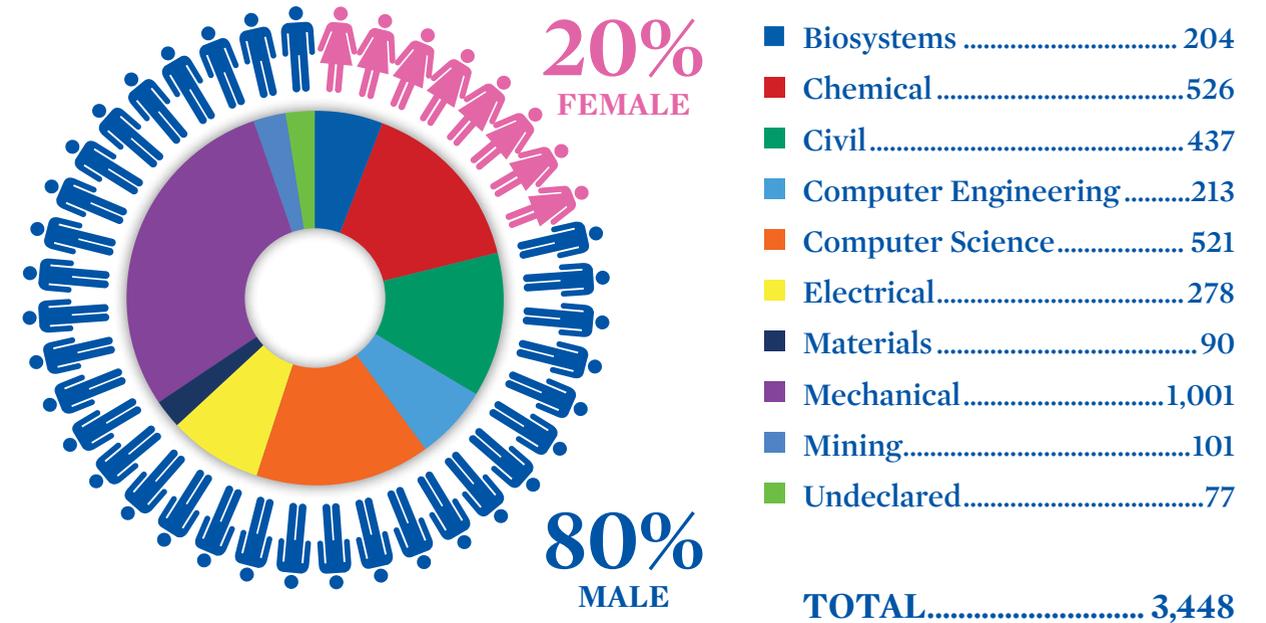
**ACT COMPOSITE**  
(comparable SAT of 1260)

**28.0**

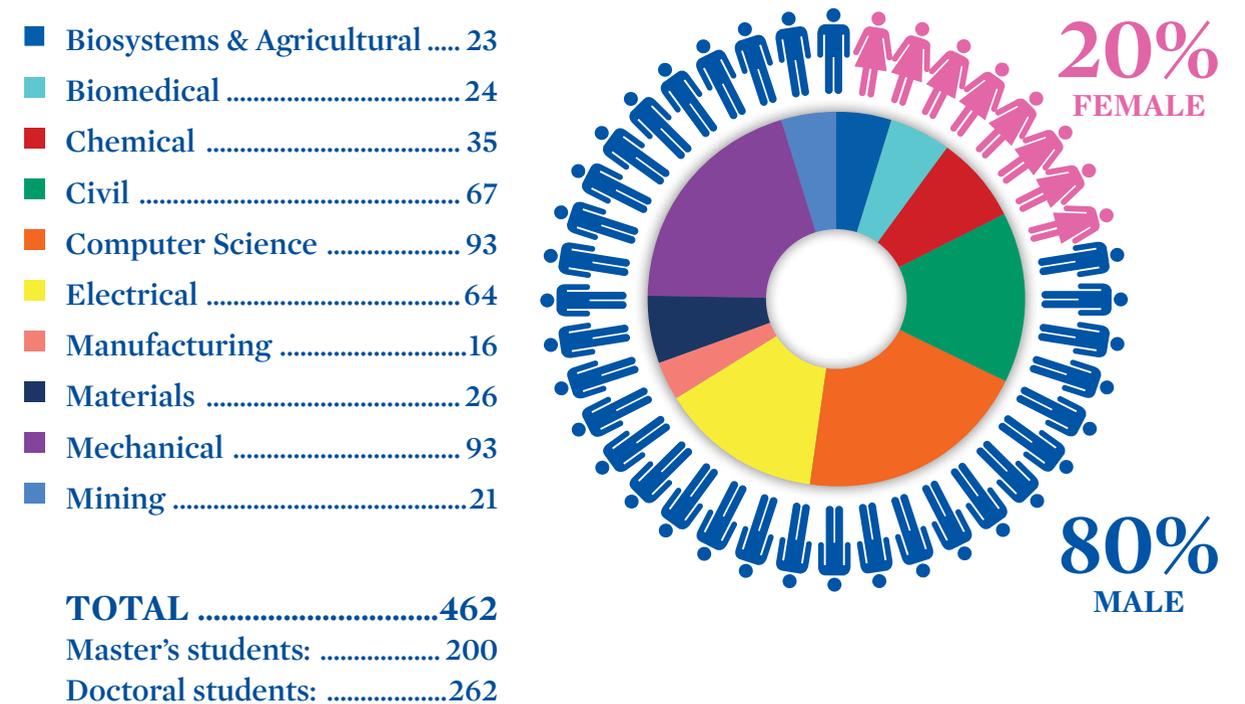
**ACT MATH**  
(comparable SAT of 630)

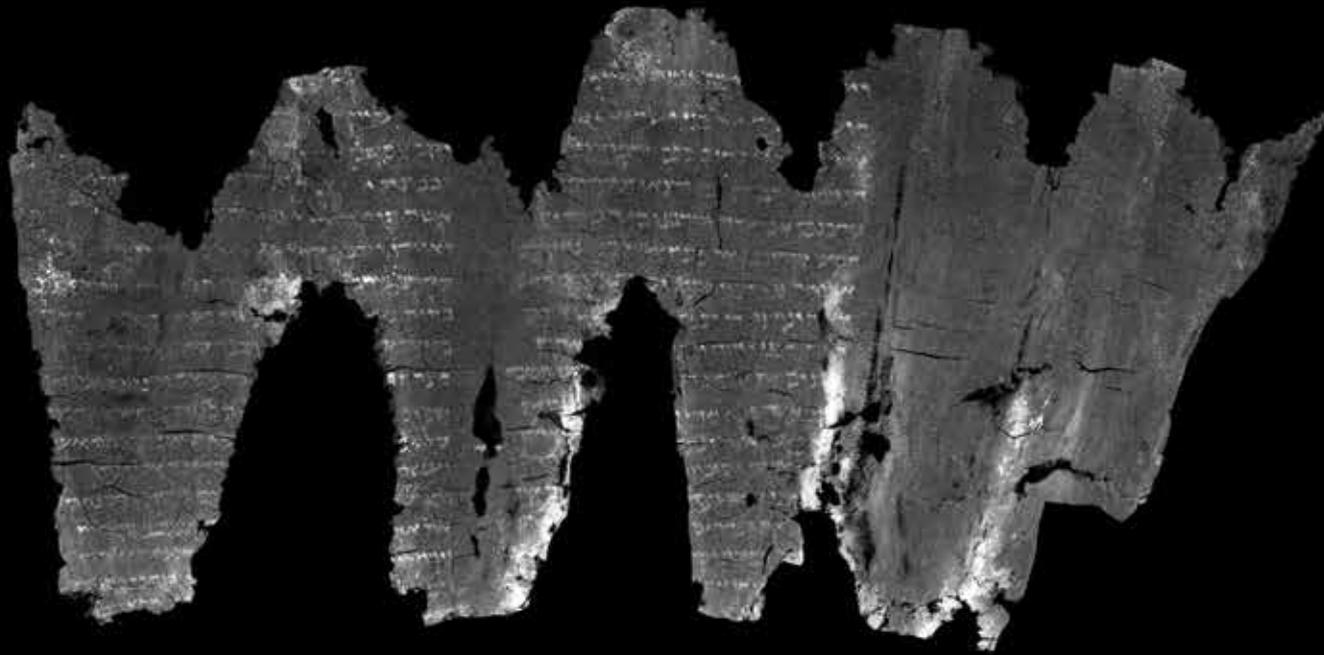


## UNDERGRADUATE MAJORS IN THE COLLEGE



## GRADUATE MAJORS IN THE COLLEGE





## Seales Makes Breakthrough – and News – with En-Gedi Scroll

University of Kentucky Department of Computer Science Chair and Professor Brent Seales and his team have further unlocked writings in the ancient En-Gedi scroll—the first severely damaged, ink-based scroll to be unrolled and identified noninvasively. Through virtual unwrapping, they have revealed it to be the earliest copy of a Pentateuchal book—Leviticus—ever found in a Holy Ark.

Seales and his team have discovered and restored text on five complete wraps of the animal skin scroll, an object that likely will never be physically opened for inspection. In a study published in *Science Advances*, Seales and co-authors describe the process and present their findings, which include a master image of the virtually unrolled scroll containing 35 lines of text, of which 18 have been

preserved and another 17 have been reconstructed.

The feat garnered international exposure with stories from BBC News, The New York Times, The Washington Post, The Wall Street Journal, The Associated Press, Fox News, The Guardian, The Economist and many others.

“This work opens a new window through which we can look back through time by reading materials that were thought lost through damage and decay,” said Seales. “There are so many other unique and exciting materials that may yet give up their secrets—we are only beginning to discover what they may hold. We are releasing all our data for the scroll from En-Gedi: the scans, our geometric analysis, the final texture. We think that the scholarly community will have interest in the data and the process as well as our results.”



## UK Solar Car Team Competes at American Solar Challenge

For the first time since 2010, the University of Kentucky Solar Car Team qualified for the American Solar Challenge (ASC)—a competition to design, build and drive solar-powered cars in a cross-country event.

The 2016 ASC was an eight-day, 1,975-mile road course that routed through seven states from Brecksville, Ohio to Hot Springs, South Dakota. Seventeen UK students competed in ASC this summer, and while motor issues eventually ended their journey early, it was an overall success for the team of talented student engineers.

“Seeing the car on the track and on the road is something that really gives all of us a lot of pride, because we get to see all of the hard work that we’ve put into this car in action,” said Senait Nuguse, 2016-2017 team manager. “The

fact that we qualified for ASC for the first time since 2010 is an accomplishment in itself, and although things didn’t really go as planned, we’re all really happy that we got as far as we did.”

This year’s car featured the team’s brand new lithium-ion battery pack.

“Before we had a split battery pack that had lithium phosphate rectangular pouch cells,” Nuguse said. “We encountered a few problems with this pack, as it didn’t really allow adequate airflow and we would always have heat problems with the batteries. The new pack is a singular battery pack with cylindrical lithium-ion cells, better airflow and is much lighter than the previous pack.”

# NEWS & RECOGNITION



## Faculty, Staff Raise over \$90,000 in Giving Campaign

In its first employee giving campaign, the University of Kentucky College of Engineering faculty and staff raised \$94,342.17 for college programs and initiatives. The total easily exceeded the campaign goal of \$60,000. The fundraising initiative, named "PI: Participate & Inspire," was led by a committee of volunteer faculty and staff.

Mike Richey, vice president for philanthropy, said, "The college's employee giving campaign is a perfect example of how we can further our efforts developing a culture of philanthropy at UK. We congratulate the college on this successful effort and encourage other colleges, centers and

units at UK to follow engineering's leadership."

The campaign officially commenced March 25 with "pie socials" in each department and ended April 15. A celebration event took place on May 2 where the final giving tally were announced. Faculty and staff giving to the campaign were able to designate their gifts to the program of their choice.

The PI campaign was coordinated through the College of Engineering Office of Advancement.



## Johnson Becomes Department of Electrical and Computer Engineering Chair

Michael T. Johnson, Ph.D., formerly professor in the Marquette University Department of Electrical and Computer Engineering, has become the next chair of the University of Kentucky College of Engineering's Department of Electrical and Computer Engineering. He began his duties August 1 with the rank of tenured full professor.

Johnson received his Ph.D. in electrical and computer engineering from Purdue University in 2000. After receiving his doctorate, Johnson began teaching at Marquette in 2000, achieving the rank of full professor in 2013. He served as director of his department's graduate studies for three years as well as on the University Board

of Graduate Studies for seven years, two as chair.

Johnson's research interests include speech and signal processing, machine learning and bioacoustics. He has received over \$2.5 million in external funding, including multidisciplinary and multi-institutional grants. In addition, Johnson has authored 38 journal papers and more than 110 total refereed publications and presentations. He also has six years of industry experience as a design engineer and engineering manager.

Johnson replaced Larry Holloway, who is now the college's interim dean.

**Fred Eastridge, BSCE**

**1978**, has been named vice president of civil engineering for ECSI, based in Lexington, Ky. He is responsible for all civil engineering projects, including site development, plans, permits, design and business development.

**Javaid Masoud, BSCS 1982**,

has been appointed chief technology officer for Cellnovo Group. Cellnovo is a medical technology company marketing the first mobile, connected, all-in-one diabetes management system located in the United Kingdom.

**R. Bruce Scott, BSCE 1982**,

commissioner of the Department of Environmental Protection (DEP), has been appointed as the deputy secretary of the Energy and Environment Cabinet. Scott has served the Commonwealth of Kentucky through the DEP for 33 years.

**Joseph Deasy, BSEE 1984**,

is now chair of the Department of Medical Physics at Memorial Sloan Kettering Cancer Center.

**Paul Boulos, BSCE 1985, MSCE 1986, Ph.D. 1989**,

president, COO and chief innovation officer of Innovyze, helped raise over \$103 million for Lebanese American University, where he is chair of the board, over a five-year period. The funds will be used to provide an unprecedented amount of financial aid and scholarships to students and prepare them for a competitive job market.

In June, Boulos was recognized with a Special Distinction Award by the American Academy of Water Resources Engineers. In September, the American Society of Civil Engineers gave him the 2016 Parcel-Sverdrup Civil Engineering Management Award.

**James K. Davis, BSCE 1990, MSCE 1992**,

is president of Denham-Blythe Company, Inc. He had previously been vice president. The company is celebrating its 40th anniversary this year.

**Rebecca Liebert, BSCE**

**1990**, is president & CEO of Honeywell's gas processing and hydrogen division, UOP, LLC. She had been vice president and general manager.

**Patty Dunaway, BSCE 1994**,

became state highway engineer for the Kentucky Transportation Cabinet May 1. She is the second woman in Cabinet history to assume the role. Dunaway began her career at the Kentucky Transportation Cabinet as a UK scholarship student in 1990.

**Wade Clements, BSCE**

**1995**, was appointed to serve as chief engineer of the Kentucky Transportation Cabinet's District 2 highway office in Madisonville. The district has more miles of highway and more four-lane miles than any other district in the state.

**William M. Quenemoen, MSCE 1997**, is now executive vice president at Denham-Blythe Company, Inc. He had previously

been vice president; prior to that role, he was a structural design engineer.

**Greg Brumagen, BSEE 2002**,

is an electrical engineer at CMTA Inc., in Lexington, Ky. In May, he received one of Consulting-Specifying Engineer's 40 under 40 Awards. The award is given to 40 nonresidential building industry professionals age 40 and younger who stand out in personal and professional aspects of their lives.

**Jason Stith, BSCE 2004, MSCE 2005**,

was named the 2016 National Society of Professional Engineers "Young Engineer of the Year." Stith is a structural engineer in Michael Baker International's Louisville, Ky., office. Earlier this year he had been named the Kentucky Society of Professional Engineers "Young Engineer of the Year." Stith has been instrumental in several landmark bridge repair and construction projects throughout Kentucky.

**Chad A. Manley, PE, BSME 2007**,

is a senior mechanical engineer for Walt Disney Imagineering Hong Kong developing new attractions and rides for the theme park in Hong Kong. He was previously working for WDW in Orlando, Fla.



## Mechanical Engineering Alumnus Junghänel Wins Olympic Gold in Brazil

Mechanical engineering alumnus Henri Junghänel experienced the thrill of a lifetime this summer when he won the Olympic Gold Medal in the 50-meter prone rifle at the 2016 Olympic Games held in Rio de Janeiro, Brazil.

The UK Class of 2013 graduate broke the Olympic final record with a score of 209.5. He was the eighth and final qualifier into the final with a 624.8 in qualification.

Junghänel now holds the Olympic record and the world record in 50-meter prone finals.

## Staley F. Adams, Beloved Civil Engineering Professor, Dies

Staley Fields Adams, professor emeritus in the Department of Civil Engineering at the University of Kentucky, died June, 20, 2016 in Lexington, Ky. He was 95. Adams served as an officer and an Air Force pilot during World War II and was honorably discharged as a captain. He received a bachelor's degree in civil engineering from UK in 1947 and a master's degree in civil engineering in 1948. After Adams received his master's degree, he was employed as a full-time instructor in Applied Mechanics at UK. In 1957 he was elevated to associate professor of applied mechanics in the Department of General Engineering. He was honored as an Outstanding Civil Engineering Professor in 1973, 1977, 1978 and 1990, and was a member of five academic honor societies.

Elise Moretti	Mechanical Engineering	1933
John H. Baughman	Civil Engineering	1941
James C. Conner	Electrical Engineering	1942
Lou Cummins	Civil Engineering	1942
Robert J. Calvert	Mechanical Engineering	1943
R. Donald Jessee	Electrical Engineering	1943
Maynard D. Van Horn, Jr.	Civil Engineering	1945
Irvin H. Stern, Jr.	Civil Engineering	1948
Paul T. Thomas	Electrical Engineering	1948
Othniel Alsop	Civil Engineering	1949
S.J. Amato, Jr.	Civil Engineering	1949
John R. Hook	Mechanical Engineering	1949
William E. Howard	Civil Engineering	1949
John R. Harbison	Civil Engineering	1950
William C. Martin	Civil Engineering	1950
George H. Talbott	Civil Engineering	1950
John D. Witt	Civil Engineering	1950
Herman D. Regan, Jr.	Civil Engineering	1951
Alfred M. Levy	Mechanical Engineering	1954
Earl C. Bevins	Mechanical Engineering	1955
D. Harry Jones	Civil Engineering	1955
James M. Tierney	Metallurgical Engineering	1957
Darrell A. Veach	Civil Engineering	1957
Robert L. Florence	Civil Engineering	1958, 1959
Frank Hamilton, Jr.	Civil Engineering	1958
John A. Meiners	Civil Engineering	1958
Billy Ray Kersey	Mechanical Engineering	1959
Roger Ladenburger	Civil Engineering	1959
Aloysius I. Reisz	Mechanical Engineering	1961
Donald A. Lorenz	Civil Engineering	1962
Johnnie H. Curtis	Civil Engineering	1963
William E. Nicholson	Electrical Engineering	1963
Stephen Jasper	Electrical Engineering	1966
William F. Irving	Engineering Mechanics	1969
William C. Adams, Jr.	Civil Engineering	1970
Bruce E. Waespe	Civil Engineering	1971
John D. Yates	Electrical Engineering	1971
Raymond L. Wilkins	Mechanical Engineering	1972
Roger C. Westman	Chemical Engineering	1973
David G. Carson	Chemical Engineering	1979
Michael J. Parker	Civil Engineering	1993
George A. Ellis	Civil Engineering	1994
Walter Luke Bubbenzer	Computer Science	2009

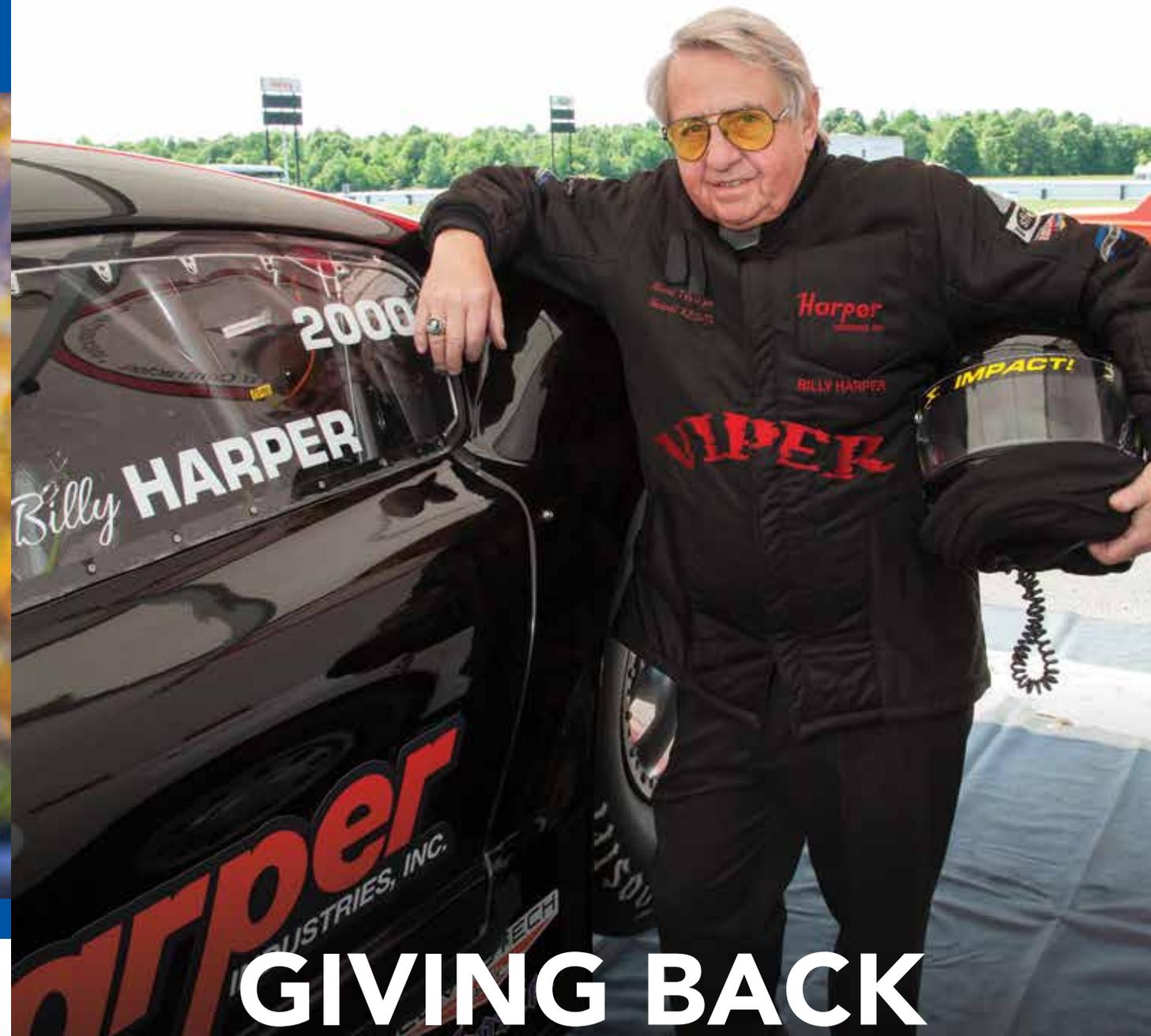
## BE INCLUDED

Please send Class Notes to [alumni@engr.uky.edu](mailto:alumni@engr.uky.edu)

# NOW YOU KNOW



Most students and visitors passing through the Joseph G. & Suzanne W. Teague Atrium of the Ralph G. Anderson Building may not notice them, but two elegant stained glass windows adorn the windows above each entrance. These beautiful panes, which illustrate the conversion of power from one form to another, have a long history within the college. They were originally made for the first engineering building on the current campus, Mechanical Hall, which was built in 1891-92. When Mechanical Hall was demolished in the early 1960s to make way for the F. Paul Anderson Tower, the windows were moved to the engineering Quadrangle, where they hung in the student lounge known by engineering students as “The Pit.” When the Quadrangle was demolished to make way for the Oliver H. Raymond Building, the college rescued the windows and stored them for safe keeping until the Ralph G. Anderson Building—their current home—was dedicated in 2002.



## GIVING BACK

1966 mechanical engineering graduate and 2016 International Hot Rod Association champion Billy Harper loves racing; he is also passionate about racing’s educational applications. In addition to using his race car as a teaching tool during engineers and career days at the UK Paducah campus, his “Race for Education” program improved attendance among middle school children.

Recently, Harper created a \$1 million planned gift to support student teams participating in racing competitions such as the UK Solar Car Team and Society of Automotive Engineers teams in Lexington and Paducah. The gift will enable future UK racing teams to make technological advances, participate in student competitions and pay for travel expenses. It is yet another example of the power of planned gifts.

For more information about supporting engineering education through estate planning, contact Jeff Snow, Director of College Advancement at (859) 257-9191 or [jeff.snow@uky.edu](mailto:jeff.snow@uky.edu).

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