

THE MAGAZINE OF THE UNIVERSITY OF KENTUCKY COLLEGE OF ENGINEERING

KENTUCKY

ENGINEERING JOURNAL

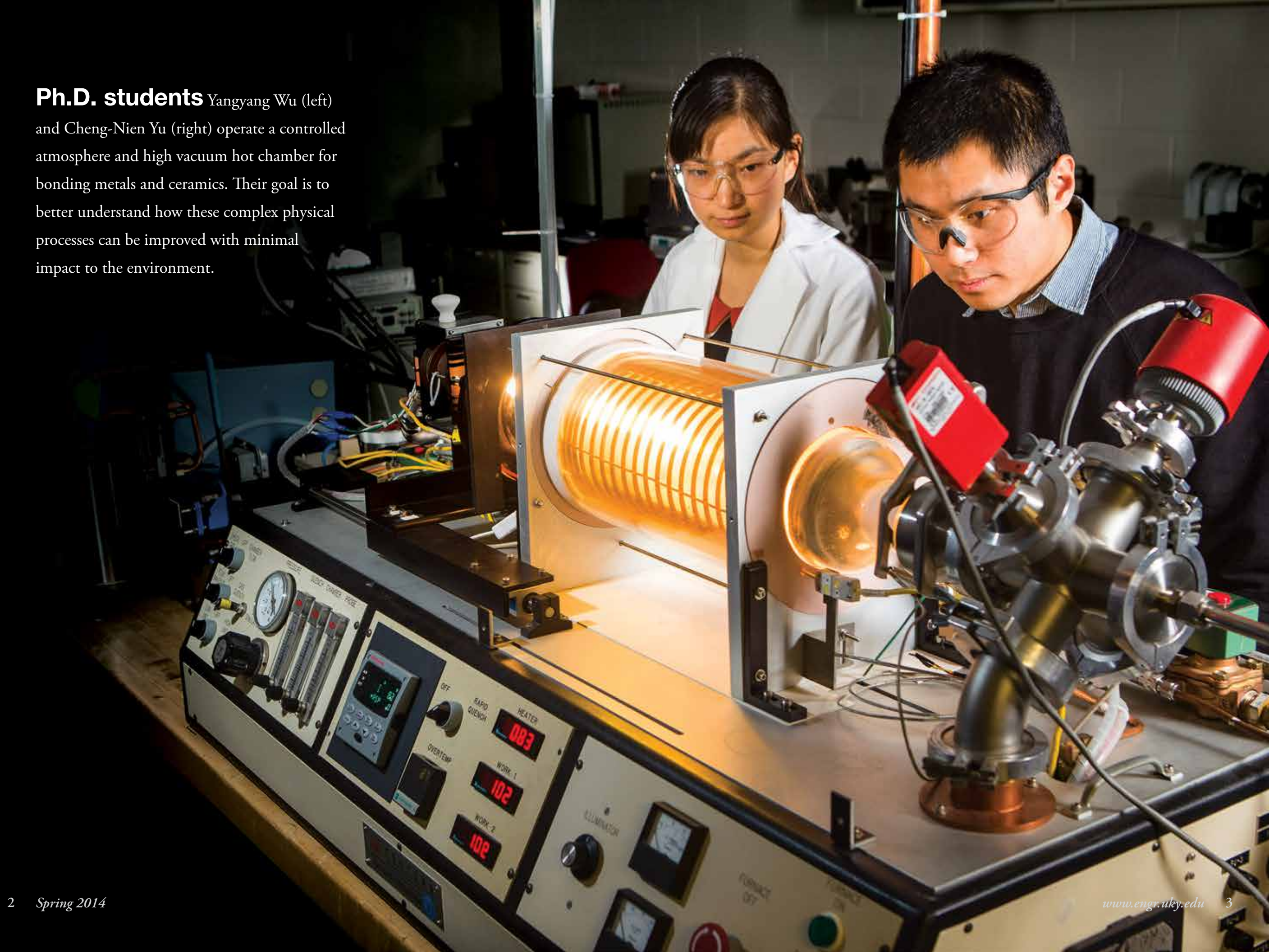
Spring 2014



**W. Brent
Seales**

on imaging history with
the Google Cultural
Institute in Paris.

Ph.D. students Yangyang Wu (left) and Cheng-Nien Yu (right) operate a controlled atmosphere and high vacuum hot chamber for bonding metals and ceramics. Their goal is to better understand how these complex physical processes can be improved with minimal impact to the environment.





Message from the Dean

Welcome to the spring issue of *Kentucky Engineering Journal*, the University of Kentucky College of Engineering's biannual print and digital publication. Feedback from our inaugural issue has been overwhelmingly positive; we look forward to hearing what you have to say about this issue as well.

Since arriving at UK in September 2012, I have worked on developing a vision that will guide the direction of the college and lead us to a compelling future. After numerous discussions with faculty, alumni and friends of the college, I have identified several key areas that will help us achieve a national ranking within the top 50 of all colleges of engineering. In my essay, "Top 50," I detail each of these areas as well as why the goal of becoming top 50 will strengthen us throughout the college.

Other feature articles include an interview with computer science chair Brent Seales, who spent last year working with the Google Cultural Institute in Paris, and a story about mechanical engineering student Mary Fralick, who was UK's first intern at Boeing Corporation. We also tell the stories of civil engineering alumnus Mike Ritchie, who has built a world-class geospatial solutions company, and donors Stanley and Karen Pigman, who financially support 25 students within the college. Finally, don't miss our back page article, "Out of the Lab," where you can find chemical engineering professor Tom Dziubla discussing the finer points of home brewing.

Please feel free to contact us regarding your thoughts about *Kentucky Engineering Journal* by emailing alumni@engr.uky.edu. We are committed to providing a publication that represents the professionalism of the college, our alumni and our discipline, and your comments help us know how we are doing.

Sincerely,

John Y. Walz
Dean

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FRONT COVER

Behind Dr. Seales is a composite image of a page from the St. Chad Gospels. Dr. Seales and his team imaged this 8th century Gospel book in England.

UNIVERSITY OF
KENTUCKY
College of Engineering



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“The University of Kentucky College of Engineering will be internationally recognized for educating students to meet the global engineering challenges of the 21st century, for conducting pioneering research for the advancement of our society and for serving the needs of the citizens of Kentucky and the nation. We will be ranked as one of the top 50 colleges of engineering in the United States by 2020. ”

— Dean John Y. Walz



TOP 50

Dean John Walz shares his vision for the University of Kentucky College of Engineering

“Why top 50?”

That is a question I am often asked with regard to my vision for the college. Behind the question is another question, often unspoken: Do rankings really matter? I believe they do, and I hope by the end of this short essay, you will understand why.

Let me start with a challenge that is larger than our university. The Commonwealth of Kentucky lags behind in the number of engineers it produces each year. In 2012, the colleges and universities in Kentucky graduated 42% fewer engineers and computer scientists per capita than the national average. In today's technology-driven society, there is little doubt that this deficiency is a significant obstacle to economic growth. Lexington mayor Jim Gray and Louisville mayor Greg Fischer understand this limitation and have publicly stated we need to double the number of engineers graduated each year in Kentucky. As the Commonwealth's flagship university with the largest college of engineering, the responsibility for meeting this challenge is clearly ours.

Fortunately, momentum is on our side. Over the last five years, rapidly growing interest in engineering has led to a 62% increase in our undergraduate enrollment; that is, we have over 1,000 more students in our college today than we did in 2008. While students are certainly attracted to a profession that is always in demand and pays well, I also

believe our young people see the deep-seated problems our world faces and ask themselves, *Who is going to fix all of this?* Their answer? *I'll do it!*

Naturally, when undergraduate students begin to think about an engineering education, they research which institutions will give them the best training. We believe becoming a top 50 engineering college will allow us to attract top undergraduate students from Kentucky and beyond. In addition, what better place for prospective graduate students to hone their research skills and earn advanced degrees than at a top 50 college? Extrapolate this idea beyond our student body, and you will see that the benefits of being top 50 extend even further. Faculty members who conduct groundbreaking research and possess superlative teaching skills are enticed by the

distinction that comes with being a top 50 college. Finally, moving into the top 50 would make a powerful argument to companies eager to recruit outstanding engineering graduates or develop research partnerships with leading-edge faculty members that they look no further than UK.

Greatness begets greatness. To grow our undergraduate and graduate student body, increase the depth and quality of our already outstanding faculty and attract businesses that will utilize our well-trained graduates to generate economic opportunities for the Commonwealth, we need to aim higher. We need to manifest the excellence one would expect from a top 50 college of engineering.

So how do we get there? How do we become top 50? By thriving in six key focus areas.



#1: Faculty Recruitment, Development and Retention

Offering a first-rate faculty to students and businesses is a necessary competitive edge. Our present roster is truly impressive—27 of our current faculty members have received the prestigious National Science Foundation CAREER Award; however, we cannot afford to be complacent. To become top 50, we must attract the best faculty around the globe, help them develop into outstanding researchers and educators, provide the physical and administrative infrastructure that allows them to succeed and properly recognize and reward them for their achievements.



#2: Undergraduate Education and Student Success

Not only has the college experienced an unprecedented influx of new undergraduate students over the last five years, the academic quality of those students is impressive. The 2013 incoming class had an ACT composite average of 28.1 (28.7 math). Of the university's 105 National Merit Scholars, 24 are engineering majors (23%) and 17 of the 59 Singletary Scholars are in our college (29%). The trends are encouraging, but to become top 50, we will need to attract the best and brightest students from throughout the Commonwealth and the world and provide an education that will prepare them to tackle the complex and global engineering challenges faced by our society.



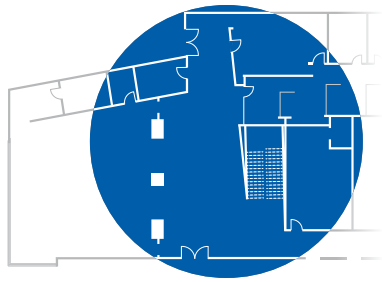
#3: Research and Graduate Education

Faculty research results in the creation of new knowledge that advances our society; however, behind every great researcher stands a team of exceptional graduate students that runs experiments, analyzes data and contributes to academic publications. The graduate students who receive advanced training through our graduate programs will be the technology leaders of the future and the drivers of economic development in the Commonwealth, the nation and the world. Therefore, we must offer graduate fellowships and stimulating research opportunities that bring future stars to the UK campus if we are going to become top 50.



“Moving into the top 50 would make a powerful argument to companies eager to recruit outstanding engineering graduates or develop research partnerships with leading-edge faculty members that they look no further than UK.”

— Dean John Y. Walz



#4: Facilities and Infrastructure

If you have been inside the remarkable Davis Marksbury Building, you know how first-rate facilities foster creativity, promote collaboration and ensure safety. Forward-thinking physical infrastructure is critical for attracting the best faculty and students to our program, as well as allowing our faculty, staff and students to achieve their fullest potential. To be a top 50 college of engineering, our buildings need to reflect the high standards and passion for innovation of the people working inside them.



#5: Communications and Marketing

The caliber of achievement among our faculty and students is astounding, yet without proper communications and marketing strategies, they will not receive the acclaim they deserve. Recognizing the accomplishments of our faculty and students nationally raises the level of prominence of our college and substantially improves our faculty and student recruiting efforts. Thus it is important that we inform the engineering academic community about the many great achievements of our faculty and students.



#6: Diversity

Our student population should reflect the diversity of the Commonwealth. Further, a diverse student body allows for a richer and broader educational experience. By increasing our international enrollment, as well as the number of students from underrepresented populations, we will widen the scope of vocational and financial opportunity throughout the world and right here in Kentucky. Of all of the objectives, this one says the most about who we want to become. Frankly, I don't want us to be a top 50 college of engineering if the education and workplace we offer lacks the diversity that makes up our world.

I believe that working toward, attaining and retaining the status of a top 50 college of engineering will have a palpable ripple effect. Students will win because they will enjoy an engineering education taught by renowned professors in modern facilities. Faculty members will win because they will have brilliant students who not only comprehend the material but can apply it and make new discoveries. Businesses will win because they will have access to a rich talent pool for filling internships and full-time employment, as well as expert researchers in their field. The Commonwealth will win because its people will benefit from new technologies and new streams of commerce, which will encourage more future college students to select UK for their engineering education. I see an ever-widening loop of technological and economic success that emanates throughout Kentucky, the nation and the world.

Everybody wins.

We're engineers. We can do this.

KEJ



The 25,000 square foot Davis Marksbury Building houses the Department of Computer Science and the Center for Visualization and Virtual Environments.



IMAGING IMAGINING:

AN INTERVIEW WITH W. BRENT SEALES

On June 21, 2011, University of Kentucky computer science professor W. Brent Seales received an email from a man who had recently read one of his papers and was inquiring to know more about his research. Such requests aren't new to Dr. Seales, an imaging expert who has digitized antiquities such as the Herculaneum scrolls, Homeric manuscripts, the Chad Gospels and petroglyphs in Puerto Rico. This request, however, didn't come from students, industry scientists or faculty from other universities; it came from Steve Crossan, founder and head of the Google Cultural Institute in Paris, France.

In Dr. Seales' words, "I had gotten an email from Google. There was no way I was going to just trade emails. I worked to get us together so we could see if we had parallel interests."

Their ongoing dialogue and mutually recognized synergy culminated with Google extending an offer for Dr. Seales to become a visiting scientist in their group. With a sabbatical on the horizon, Dr. Seales accepted and spent the next year in Paris where he assimilated into Google's celebrated culture of speed and execution.

In the midst of his sabbatical, Dr. Seales applied for and received the position of chair of the Department of Computer Science, which he assumed upon returning in August. Recently, we asked Dr. Seales about his research, his experience with Google, the progress made and what he hopes his year in Paris will enable him to accomplish as chair.

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What are the Google Cultural Institute's goals and how did you fit into them?

Dr. Seales: The Google Cultural Institute was already consolidating a platform that encompassed several projects they had already done, including the Dead Sea Scrolls project, the World Wonders project, a Holocaust memorial and the Art Project, which made deals with big art institutions to put images of their art online. The Institute was wrapping all of that into a huge platform for storing and doing storytelling around it. Aligning with that, I said, "I know some ways we can improve the user experience in terms of how they engage this material," and created layers and features for each project.

Beyond that, I also wanted to tap into Google's penchant for thinking big. I said, "You guys are putting your arms around a huge engineering project. Give me the chance to think through this with you." So I looked at how we could represent cultural pieces in 3D, multi-spectral, x-ray and other formats. Google loves working with researchers and scientists in universities because their relentless pace doesn't always give them the ability to do research. So they were willing to listen to my ideas and consider what I've learned from my research experiences. I gave talks, had conversations and got them up to speed on years' worth of research efforts. But I also said, "Tell me all you know," so it was a symbiotic relationship.



The science aside, did their ambition resonate with you personally?

Dr. Seales: Very much so. My vision is to make venerated texts accessible under a non-commercial agreement

so that anyone, anywhere, can do scholarship around the material. That's one reason why I was willing to accept Google's offer, because the Institute has the same perspective. They have handwritten letters from Nelson Mandela, images from the Holocaust and more available

online for people to view and share their stories. Imagine the possibilities as we are able to access more historical artifacts! The world's cultural treasures are for everyone, not just scholars.

What did you appreciate about the culture at Google?

Dr. Seales: Google engages in what's called "blue sky thinking," asking, "Wouldn't it be amazing if we could do *this*?" My blue sky thinking contribution was asking,

Cross-section x-ray of a 2,000 year old carbonized Herculaneum scroll.

“Wouldn’t it be amazing if we could read anything non-invasively—without opening it?” In other words, you could scan a book and the data that emerges would allow you to read the whole thing without ever opening a single page. Now, of course, eventually you have to start asking, “What’s possible, what’s not possible, what are the constraints, etc.?” But the dreaming comes first.

Another thing that impressed me was their culture of enthusiasm rather than a culture of cynicism. Google doesn’t have the budgetary constraints universities do, true, but I actually don’t think their enthusiasm is premised on money; it’s premised on people who know they are doing what they were built to do. Google is really good at matching people with roles. They give their engineers freedom to find projects they are really excited about and then roles on that project in which they can excel. When that happens, a culture of enthusiasm emerges because people are excited about what they are doing and they’re good at it.

What led you to apply for the department chair position?

Dr. Seales: I wanted to continue to be challenged. I didn’t want to come back and say, “Wow, that was an amazing experience...and now I’m going to spend the rest of my career looking back on how awesome that was.” The department chair position presented a huge opportunity to begin experimenting with leadership concepts I had seen at Google.

A general career principle I ascribe to is that you always want to be moving forward and thinking about how you and only you can do the next thing. I felt like I was

well-positioned to provide leadership in the department and I was enthusiastic about the challenge. It’s not clear that I’m going to be a great chair, but it is clear that I am going to try to be one. For me, it was a no-brainer to at least apply.

After working at Google, what do you appreciate about working in a university setting?

Dr. Seales: The university is a place that offers a process of becoming. We don’t stay who we are. Not only is that true

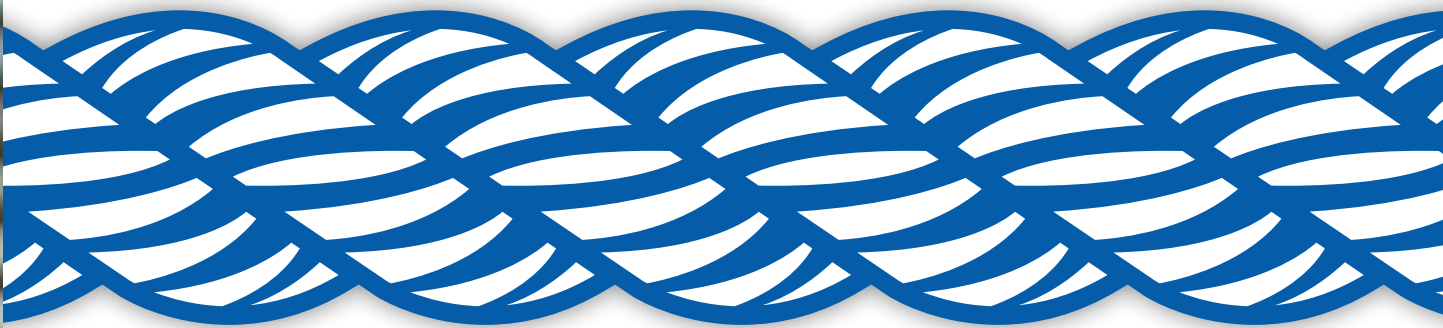
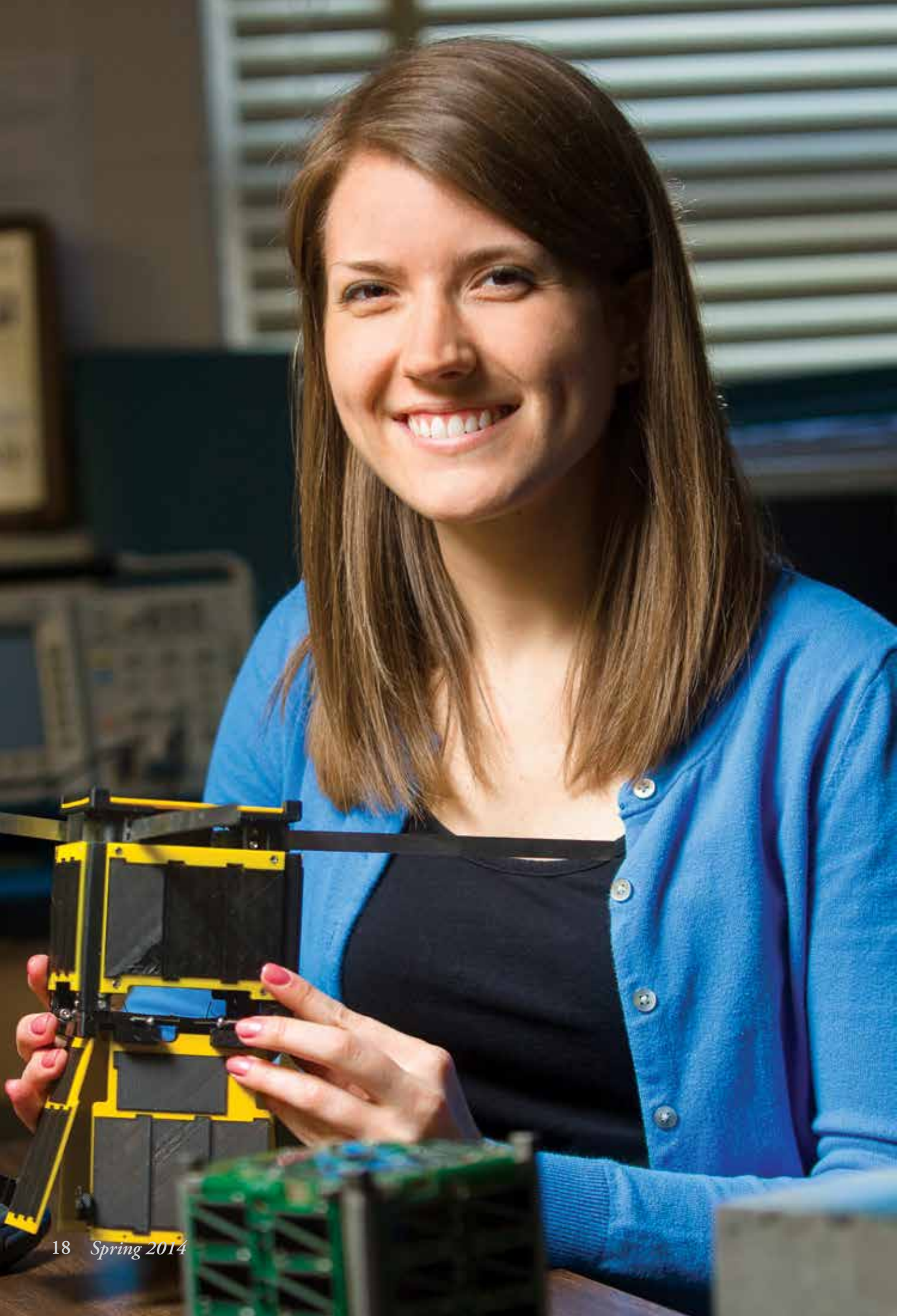
for our students, it’s also true for our faculty. Being a faculty member is also a process of becoming a better teacher, a better researcher and sometimes becoming an expert in an area other than what we originally trained for. I think helping our students and faculty understand that this is what the university is all about—becoming something and embracing the process—is the best way to understand why we’re

here. I think the university is a perfect fit for who I am and I’m excited about what we do.

So what’s next?

Dr. Seales: I can’t divulge specifics, but 2014 is going to be a huge year. Breakthroughs in propagation-based phase contrast x-ray tomography are getting us closer to making any ancient text available to the world. Projects that stalled because the ink on the scrolls wouldn’t appear on the scan are about to re-launch. I have been at this 10 years and I’ve never been more hopeful about seeing my vision achieved than I am right now. **KEJ**

“My vision is to make venerated texts accessible under a non-commercial agreement so that anyone, anywhere, can do scholarship around the material.”



TUG OF WAR

Aeronautics or aerospace? Mary Fralick would choose an engineering focus if both weren't so much fun.

OCTOBER 2012:

Mary Fralick is home. That is not to say she is in Louisville, her hometown and the city in which she just finished her second co-op rotation at GE Appliances; rather, she is on the University of Kentucky campus in Lexington, transfixed by a bank of screens used by UK's Space Systems Lab to communicate with the International Space Station.

Appliances are fine—we all need them; but since childhood, Mary has been fascinated by aerospace and rather than design a new control system for washing machines, her passion is to fire something into space. When fellow student Jason Rexroat invites Mary to work on the KySat-2 project that will send a student-made satellite into orbit, she agrees without hesitation.

She is home.

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Like most high school seniors considering all options for their engineering education, Mary looked near

(Louisville) and far (Virginia Tech), before visiting UK. During her tour of the college, Mary saw her future falling into place.

“Seeing the labs and meeting the faculty helped me make my decision,” she reminisces. “There are so many people who care about the students, and I was definitely looking for that in a school. I knew I would be able to achieve my dreams here.”

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JUNE 2013:

Mary is observing an army of technicians as they assemble Boeing jumbo jets in the Boeing Everett factory. Twenty-five miles north of Seattle, the facility is the largest building by volume in the world. Mary is the first UK student to ever intern at Boeing. Assigned to a team called Innovation Center, Mary's work bridges the gap between research and product implementation. Her days are filled with projects pertaining to drilling processes and composite materials,

but when time permits, she likes to watch approximately 375,000 pounds of metal come together in a machine able to traverse the clouds.

It is an inspiring sight, one powerful enough to momentarily bump aerospace to the periphery of her thoughts. She reflects on the beauty of the mountains in Washington and the plentiful opportunities for hiking and kayaking that would accompany a promising career at one of the largest global aircraft manufacturers in the world. Perhaps she could even obtain a pilot's license.

This—aeronautics—could be home as well.

.....

When Boeing's internship offer arrived, Mary was also entertaining two offers from Lockheed Martin and two offers from NASA—both aerospace juggernauts. After focusing primarily on aerospace, would a few months of aeronautics research be worth saying no to potential future aerospace employers?

"I liked both aerospace and aeronautics and wanted to see which route was best for me," she explains. "Boeing is very selective and I figured if I said no, I wouldn't get another chance. I was pretty sure I would still have opportunities at NASA."

So Mary moved 2,450 miles and three time zones away to pursue an area of research she wasn't 100% certain fit into her career plans. Then again, how many students are able to view employment with NASA as a viable back-up plan?

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AUGUST 2013:

Mary awaits takeoff from Seattle-Tacoma International Airport en route to Louisville. Her internship has ended and the fall semester looms. Ironically, she is aboard a Boeing 737, and through her window she scours every visible aerodynamic feature of the plane—especially the wing, which she worked on over the summer. In her mind, she disassembles and

reassembles the plane, thinking back to those awe-filled moments in the Boeing Everett factory.

For Mary, the Boeing 737 is more than a vehicle for transportation; it's a learning environment.

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This summer, Mary will return to Boeing for a second stint—her last internship before graduating in December. She is looking forward to beginning new projects with Innovation Center and enjoying the serenity of summer in the Pacific Northwest. Additionally, Mary is confident she has a strong chance at full-time employment at Boeing after graduation.

If she wants it, that is. Because...

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NOVEMBER 2013:

After enduring an 11 hour van ride to Wallops Island, Va., Mary and the KySat-2 team crane their necks skyward as their CubeSat piggybacks a rocket into the night sky. The satellite, developed by students from UK and Morehead State University over the course of a year, houses a camera that will take pictures on command and transmit the images to the Space Systems Lab in Lexington. Mary helped design the mount for the camera.

Mary thinks about the people who made such an achievement possible. As their work becomes a barely visible fleck against the vastness of space, she ponders the software, the design, the lab hours, the setbacks, the whole collaborative enterprise—and treasures all of it. Every challenge was worth overcoming in order to be on that beach, celebrating with her teammates.

The satellite makes its first orbital pass over Lexington a little more than 90 minutes later. Mary hears a tinny voice triumphantly proclaim, "Oh yes, she's on, she's working!"

*And amid the shouts of euphoria, Mary feels her vocational tug of war resume once again. **KEJ***

“At the end of the work day, I couldn't wait to get outdoors and enjoy the beauty of the Pacific Northwest.”

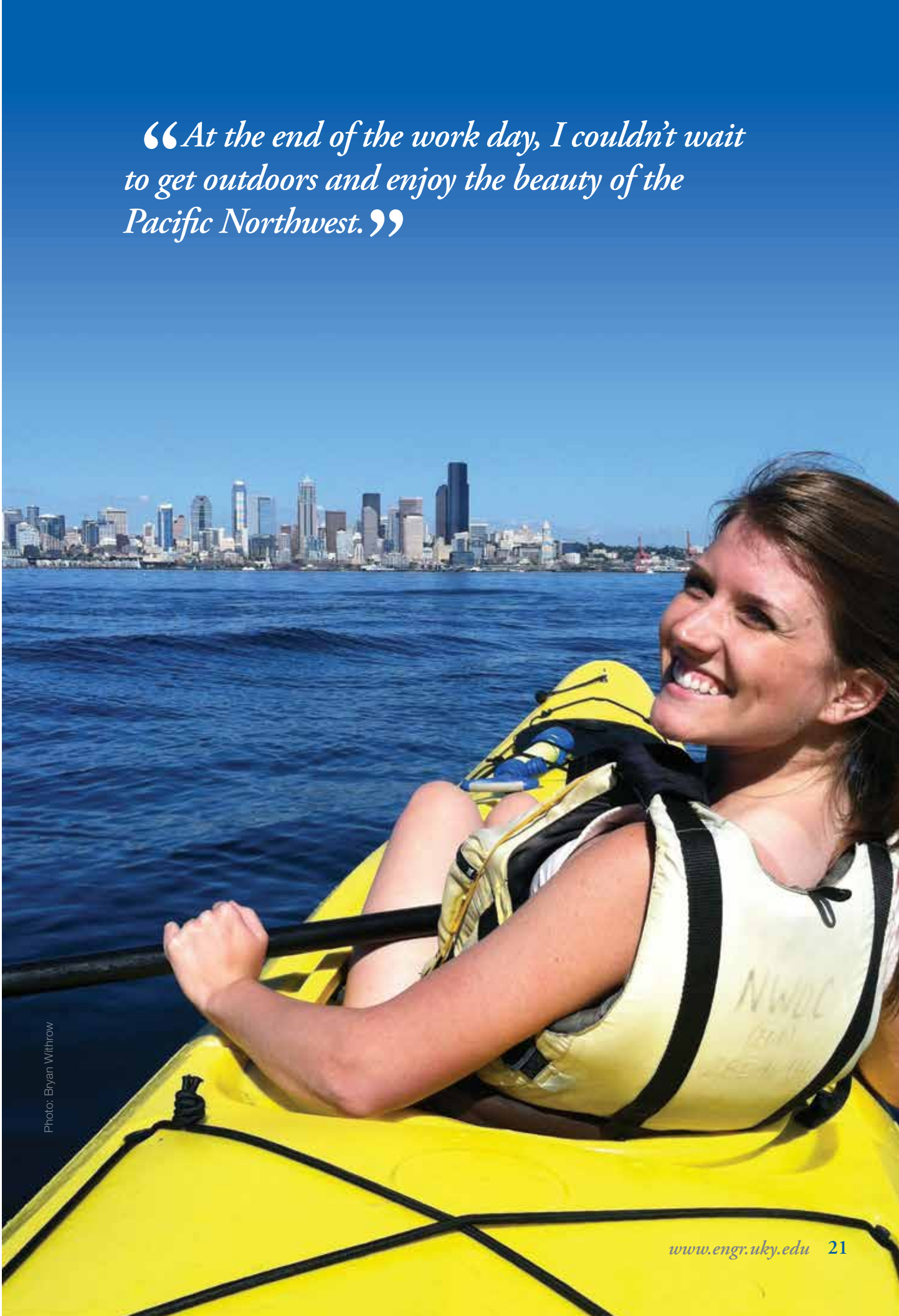


Photo: Bryan Withrow



MAKING HIS OWN MAP

Civil engineering alumnus Mike Ritchie has built Lexington-based Photo Science into a world leader in geospatial solutions

Mike Ritchie has no problem taking charge. Where others make excuses, he executes plans. Here is an anecdote that illustrates Mike's tenacity: When Mike's company, Photo Science, purchased a new building in Lexington, he had a tenant waiting to rent one of the building's first floor offices and needed quick turnaround on several structural and cosmetic renovations. Contractors told him the scope of the job would require 16-19 weeks. Mike was incredulous; after all, he had an engineering background and knew exactly what needed to be done. Unable to come to terms with any of the contractors, Mike decided to hire his own crew and oversee the job himself.

Five weeks later, the office was move-in ready.

That's Mike Ritchie. He gets things done.

The oldest of 13 children, Mike majored in civil engineering and joined the U.S. Army Reserves while at the University of Kentucky. Upon graduating in 1972, he began working for GRW Engineers, which, not long after, acquired a photographic surveying and mapping firm based in Lexington. That was Mike's foray into the field of aerial mapping. He learned everything he could about the industry during the 17 years he was with GRW. In 1990, he joined a similar aerial mapping company called Photo Science of Kentucky, Inc., and bought the company the same year. Since then, Mike has increased annual revenue from \$1 million to \$42 million.

Located in Lexington with nine regional offices across the U.S., Photo Science is a geospatial solutions provider specializing in aerial acquisition. Its 13 FAA-certified planes are outfitted with precision digital sensors, airborne Global Positioning Systems (GPS) receivers, Inertial Measurement Units (IMU), Forward-Motion Compensation (FMC) and gyro-stabilized camera mounts. From low-altitude acquisition for engineering applications to data collection for federal government program use, Photo Science's sophisticated photogrammetric mapping capabilities routinely earn the company unique job requests.

Among Photo Science's portfolio of services rendered:

- Flying the Grand Canyon 3,000 feet *below* the rim of the canyon—just 1,800 feet above the river—to capture images of endangered species.
- Using infrared cameras and remote sensing technology to identify healthy oysters for strategic oyster harvesting in the Carolinas.
- Providing aerial imagery of southern Mississippi after Hurricane Katrina from 25,000 feet, which helped officials assess damage to the area.
- Employing brand new technology to collect two-inch pixel on the ground imagery from Texas to New Jersey for a petroleum company pipeline.

Photo Science has won numerous national awards for its work, which is split among private businesses, transportation cabinets and federal government contracts; however, because technology develops rapidly, Mike is constantly on the lookout for the next big thing.

“I haven’t read for entertainment in years,” he laughs. “Almost all of my reading is on the technical side and related to cameras, planes and data collection.”

Both of Mike’s sons, Michael and Derrick, attended UK and play crucial roles in Photo Science’s success. Michael oversees Photo Science’s information technology department, and he helped design the company’s unparalleled data center. Derrick handles administrative responsibilities and assists with different aspects related to the regional offices. The staff itself numbers over 200 employees comprising professional engineers, software developers, land surveyors, mapping scientists, geographers, data analysts and more.

A relentless networker, Mike has served as president of two national councils and president of three state councils and foundations, including the Kentucky Society of Professional Engineers. In 2008, he was appointed by President George W. Bush to advise the federal government on how to implement geospatial technology.

Even in his sixties, Mike operates with an energy level that eclipses most men half his age; in fact, Photo Science recently merged with two other similar companies in the U.S. to form Quantum Spatial, Inc., the largest company of its type in North America. Mike will serve as Quantum Spatial, Inc.’s chief operating officer. It is another opportunity for Mike to build upon his many accomplishments and experiences. Reflecting on the past and the future, he can’t help but grin.

“I’ve done so much of everything in the engineering field and loved it all.” **KEJ**

Aerial color infrared image of the Mississippi Gulf Coast post-Hurricane Katrina. Bright red sections illustrate healthy vegetation, whereas brown and gray areas signify distressed vegetation.

How Mike Ritchie Leads

All good leaders have a set of core beliefs they rely on to effectively run their business. Mike enthusiastically shared his philosophical imperatives with us.

1. Hire stars.

Mike insists on getting the best people possible for his team. A collaborative effort reliably leads to what Mike calls “the most complete solution” to any given challenge; and, by having stars on the team, Mike’s delegated authority ensures three or four people can solve a problem without him having to be involved.

2. Debate, debate, debate.

In order to arrive at the most complete solution, team meetings have a pugilistic atmosphere. “I get great people around me and then we debate like heck,” says Mike. “I want everyone to voice their opinion.” By the end of the discussion, Mike knows which direction to take because everyone offered their perspective.

3. Entrust and empower.

“Entrust people with \$5,000 today so you can entrust them with \$500,000 tomorrow,” Mike offers. With stewardship comes authority and accountability; at the end of the day, that \$5,000 needs to have created value for the company.

4. Constantly explore ideas.

Mike acknowledges that it takes a lot of energy to build a company and a large percentage of that energy is directed toward pushing the envelope and investigating ideas that will give the company a competitive advantage. “For every 20 ideas, maybe one idea will turn out—but you have to look at the 20 to get the one!”

LIKE FAMILY

When Stanley and Karen Pigman give scholarships to financially-challenged students seeking an engineering education, they offer far more than money. They offer personal mentoring.

At the beginning of each fall semester, Stanley and Karen Pigman like to take the students they support through scholarships out for pizza. But this is far from an informal, get-to-know-you appointment; for one thing, Stanley, who finished his B.S. in mining engineering in 1981, lets the students know exactly what goes into a successful engineering education.

For another, there are twenty-five students present.

“This isn’t high school,” he warns the group. “You are going to have to work harder than you have ever worked in your life. If you get into trouble—and you probably will—get help fast. Don’t get wiped out before you get started. Your greatest risk is your first year, but look around: everyone in this room is here to help you.”

It’s a deep-dish slice of reality, doled out with the friendly concern of one who has been there. By his own admission, Stanley arrived at the University of Kentucky totally unprepared for the rigor of engineering studies.

“I came from a poor school system and was ill-equipped for calculus, chemistry and physics,” he recalls. “Our scholarships are need-based and the vast majority of our students are first-generation college students, so if they are able to get an engineering degree, it will not only

elevate them but possibly set up a whole new line of future graduates. But, they have to be *on* their game or they’ll be *out* of the game.”

That initial meeting is just the beginning of a mentoring relationship between the students, who must be Kentucky residents, and the Pigmans, who frequently call, visit and bring their scholarship students together for dinners, UK basketball games and professional development opportunities like an annual etiquette dinner.

“Sometimes, when having dinner with students, Karen and I would realize they didn’t know certain things about proper etiquette. So, with the help of the college, we put together a class where students not only learn table etiquette, but also the importance of thank you notes, how to introduce themselves and other important lessons they will need to know for their careers,” Stanley explains.

Stories about the Pigmans’ influence are moving. Rick DeLong was in his early 30s when he moved his wife and their four children—all under the age of 10—to the UK campus while he finished his mechanical engineering degree. The Pigmans played an indispensable role in Rick securing the means to a successful second career.

“I realized I had the ability and skills to make a difference,

but didn’t have the opportunity financially to make it work. Mr. and Mrs. Pigman not only helped me financially, but have been excellent mentors and role models for me. They took time out of their busy schedules to help me in ways I never imagined,” Rick shares.

Stanley says his motivation stems from the mining engineering scholarship he received that enabled him to come to UK.

“I was helped. Why not give someone else a chance? That’s a lesson we communicate to the students we support as well. One day they will be successful and we would like

them to consider giving back to the college so others can have the same opportunity.”

Supporting and mentoring twenty-five students wouldn’t be possible without the generosity of Karen’s parents, Earl and Kitty Congdon. Their contributions enabled the Pigmans to add eleven new students in 2010. When asked how many students the Pigmans would like to sponsor, Karen is unabashed in her enthusiasm.

“Fifty!” she yells.

Now *that’s* a lot of pizza.

KEJ



HALL OF DISTINCTION

Initiated in 1992, the Hall of Distinction recognizes and honors those alumni who have demonstrated distinguished professional accomplishments, outstanding character and commitment to community service. This recognition serves to encourage exemplary achievements by current students and others. It is a symbol of the respect and admiration held by the University of Kentucky College of Engineering for these esteemed individuals.



MICHAEL W. BOWLING
B.S. IN ELECTRICAL ENGINEERING, 1990

While a student at UK, Michael Bowling was a two-term president of UK's Student Activities Board and president of Kappa Sigma fraternity. As a result, he received the honor of being named the Otis A. Singletary Outstanding Senior Male. After graduation, Mr. Bowling joined AT&T (then BellSouth) in 1990 and began a career that has spanned 13 positions within the company. He has led projects in several South American countries and spent three years as president of AT&T Mexico. Mr. Bowling's achievements include adding over 1.6 million DSL subscribers and increasing revenue from \$500 million to \$1.2 billion between 2002-2006 and leading an organization of 4,000 people that accounted for approximately half of AT&T's revenue. Mr. Bowling is currently senior vice president of corporate strategy and works alongside AT&T's senior management and leadership.



F. JOSEPH HALCOMB III, M.D.
B.S. IN MECHANICAL ENGINEERING, 1974

After graduation, Joe Halcomb received his M.D. degree from UK in 1978 and studied biomedical engineering at MIT. In 1980, he set his sights on the orthopedic industry and began working at Zimmer, a Bristol-Myers company. In 1990, he was promoted to senior vice president of operations and later became president of Zimmer's Hall Surgical Division, the world's leading supplier of powered surgical instruments. In 1995, Dr. Halcomb joined Amgen, a biotechnology pioneer, and helped launch three new products with breakaway potential, generating incremental revenue and expanding Amgen's reach to millions of patients around the world. After 30 years in the medical device and biotechnology industries and additional experience as a private equity investor, Dr. Halcomb now leads Phoenix Initiare, a private equity firm dedicated to helping business start-ups.



REBECCA B. LIEBERT
B.S. IN CHEMICAL ENGINEERING, 1990

After earning her Ph.D. from Carnegie Mellon University in 1995, Rebecca Liebert joined NOVA Chemicals, Inc. As NOVA's global business development leader, Dr. Liebert produced annual sales revenue in excess of \$25 million. Shortly after earning an MBA from the Kellogg School of Management at Northwestern University, Dr. Liebert took responsibility for Alcoa's \$750 million food packaging business. In 2006, she joined Honeywell Electronic Materials to become vice president and general manager. In 2012, Dr. Liebert was made senior vice president and general manager of Honeywell's gas processing and hydrogen division, UOP, LLC. In one year, Dr. Liebert grew the division's revenues from less than \$300 million per year to over \$900 million. She was named Honeywell's International 2012 Executive Grand Prize Winner for Leadership.

CLASS OF 2014

INDUCTED APRIL 25, 2014



EDWARD T. SAAD
PH.D. IN CHEMICAL ENGINEERING, 1977

After graduating from MIT with bachelor's and master's degrees in chemical engineering, Ed Saad earned his Ph.D., and began working at Ashland Oil Inc. He then spent six years as a technical advisor to the Minister of Oil and Mineral Reserves in Saudi Arabia. In 1990, Dr. Saad took over as president and CEO of Gulf Interstate Oil Company. Headquartered in Dubai, Gulf Interstate Oil provides commercial consultancy services on major oil and gas projects in the Middle East and generates approximately \$400 million annually through crude oil, gas and refined products trading. In 2001, Dr. Saad entered the restaurant industry and launched the first Shakespeare & Co., restaurant. There are now 19 restaurants in the United Arab Emirates, plus two in the United States and franchises throughout the Middle East with annual revenues at an estimated \$60 million.



BETH A. WEEKS
B.S. IN COMPUTER SCIENCE, 1985

Beth Weeks' career began at Alabama-based Intergraph as a customer engineer. Her contributions led to several promotions, culminating in a test manager position in 1996. Desiring a greater challenge, Mrs. Weeks left Intergraph for Vignette Corporation—a startup company in Austin, Texas. In two years, her team of quality assurance engineers grew from two to 100. She eventually became senior director of engineering, leading a team of 80 engineers and leveraging rapid development engineering processes to deliver Vignette applications. In 2004, Mrs. Weeks took a position with Zilliant Corporation, where she is now senior vice president of engineering. In her current role, Mrs. Weeks is responsible for developing innovative and scalable software products and oversees the delivery operations of the applications in data centers around the world.



GAREY L. WHITE
B.S. IN CIVIL ENGINEERING, 1951

In 1961, Garey White founded White & Congleton, which would become the largest non-residential construction employer in central Kentucky. The firm billed \$950,000 in projects its first year and grew to increase this by an average of \$1 million per year. White & Congleton would build Murray State University's football stadium, the Pattie A. Clay Hospital, H.K. Porter manufacturing plant, Chandler Medical Center power plant, 10 major bank buildings and several other projects at UK and Eastern Kentucky University. He also joined the college's faculty as a full time associate professor and formed UK's Construction Engineering and Project Management program, which continues to be a vital part of the Department of Civil Engineering. Among his many honors, Mr. White is a recipient of the Association of General Contractors of Kentucky Lifetime of Excellence Award.

IN THE SPOTLIGHT



Bruce Walcott:
Professor, Department of
Electrical and Computer
Engineering



Christine Goble:
Lecturer, Department of
Mechanical Engineering



Jacob Ingram:
Mechanical Engineering
Junior, Student Government
Association President-Elect

A fixture in the College of Engineering since 1987, Dr. Bruce Walcott has worn numerous hats, won several awards connected to teaching and advising and touched many lives. Having served as professor, associate dean, co-founder and center director, Dr. Walcott consistently participates in a number of engineering-related extracurricular activities such as *FIRST* LEGO League, Future Cities Competitions, UK STEM Camp and much more. On a given Saturday during the school year, it is not unusual to see Dr. Walcott engaging future engineers through competitions and presentations. Esteemed by students and faculty alike, Dr. Walcott has been lauded not only at the college and university level, but also received national recognition for his service. Last November, he was named the 2013 Tau Beta Pi Outstanding Advisor at the national convention in Ames, Iowa (see p. 34).

When it comes to the burgeoning industry of online education, effective engineering courses are still in the nascent stages of development. The problem is primarily one of logistics: How are students exposed to labs, equipment and hands-on experiments? Dr. Christine Goble, a lecturer in the Department of Mechanical Engineering and faculty liaison to the joint baccalaureate program between UK and Western Kentucky University, is spearheading an initiative to answer such questions. Last fall, Dr. Goble's EM221: Statics course became the first engineering class to be offered online during a regular semester. Feedback has been positive, and future courses in circuits and thermodynamics are currently in the works. While enthused about UK's prospects for engineering education online, the Lexington campus has a special place in Dr. Goble's heart: she earned her bachelor's and master's degrees in civil engineering here.

Jacob Ingram, a junior mechanical engineering major, is the Student Government Association (SGA) vice president at UK. Elected to represent all of the university's 29,000 students, Jacob has a unique opportunity to lead a student organization and also interact with campus administrators and community leaders. Involved in student government since his freshman year, Jacob's passion for public service has given him the opportunity to serve on numerous leadership committees, including the Provost's Strategic Planning Work Group and Student Success Task Force. His service has paid off; in March, Jacob was elected SGA president for the 2014-2015 school year. After graduating in May 2015, Jacob plans to work as a design or field engineer in the aerospace or nuclear energy industries. Long-term, he would like to earn an MBA, and eventually become a leader in a global engineering corporation.



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UK Launches Unmanned Systems Research Consortium

by Keith Hautala, UKPR

The University of Kentucky has announced the formation of an Unmanned Systems Research Consortium (USRC) to advance unmanned aerial, ground and underwater systems, and to explore commercial applications for the technology in Kentucky.

Unmanned aerial systems (UAS) technology has increasingly captured private-sector interest—as well as the public's imagination and news headlines—over the past year, with prospective applications being developed in agriculture, remote sensing, materials transport, forest fire detection, weather surveillance, mine exploration and minerals production, search and rescue and even point-to-point delivery of small consumer items.

Dean John Walz announced the USRC's launch at a Kentucky summit on unmanned aerial systems, held Dec. 11 in Lexington. The USRC will partner faculty, students and businesses to focus on development and performance evaluation of systems, platforms, components, sensors and software, in addition to sharing resources for increasing statewide industry awareness and understanding national directions and policies.

"This is exactly the kind of scenario where everybody wins," Walz said. "Our researchers are able to make significant strides and then pass on the fruit of their labor to businesses, who give feedback and introduce new problems to solve—it's a loop that enhances research and has real-world implications."

The consortium includes affiliated faculty from the College of Engineering as well as a diversity of academic disciplines across campus, and it boasts a 1,200-square-foot laboratory with in-house manufacturing and access to high precision machining.

Walz said consortium partners will benefit from being able to work directly with faculty experts, as well as meet hopeful future employees from among the student body. And to ensure that consortium partners have a deep talent pool to choose from, he said, the College of Engineering is working diligently to increase its number of graduates.

Those who would like to find out more about the USRC may contact Professor Suzanne Weaver Smith at suzanne.smith@uky.edu or (859) 323-4545.



Hall of Fame Skylab Astronaut Honors Astronaut Scholarship Winners

by Whitney Hale and Amanda Miner, UKPR

On October 23, 2013, NASA Hall of Fame astronaut Joe Kerwin visited UK to present students Tyler "T.J." Flynn (middle) and Josiah Hanna (right) each with a \$10,000 scholarship from the Astronaut Scholarship Foundation (ASF). Astronaut Scholarships are the largest monetary awards available to United States science, technology, engineering and math students based solely on merit.

Flynn, of Lexington, is a senior working toward a dual degree in mechanical engineering (with aerospace certificate) and physics. As an avid undergraduate researcher, he has developed untethered micro-robotic systems as well as a suite of novel microfabrication techniques and nanocomposite materials. Flynn, a Chellgren Fellow, is a co-author on two academic publications. His goals for the future include achieving a doctoral degree in applied fluid dynamics and becoming a research engineer and professor.

Hanna, of Lexington, is a senior with a double major in computer science and mathematics and member

of the Honors Program. Hanna's research interests in mathematical models of stochastic systems have taken him to Paris, where he worked with researchers on sophisticated problems in decision and planning theory. A Chellgren Fellow, Hanna was named a Goldwater Scholar last spring. Hanna's future goals include pursuing a Ph.D. in computer science, specifically focused on artificial intelligence, decision-making and machine learning.

"Our students continue to represent the University of Kentucky in amazing ways through their scholarly achievement and creativity," said President Eli Capilouto. "The entire UK family is deeply proud of T.J. and Josiah—our first two Astronaut Scholars named in the same year—as they join a selective list of promising student-scholars."

During his remarks, Kerwin shared his experiences living and working on the Skylab space station for a period of 28 days in 1973.

ASF has awarded 16 scholarships to UK students since 1998.

Tau Beta Pi Kentucky Alpha Chapter Sets National Record



The Kentucky Alpha chapter of Tau Beta Pi, the national engineering honor society, traveled to Iowa State University in early November for the annual convention of its 241 chapters. The conference was held at the University of Kentucky in 2012 and the group of five students and chapter advisor Dr. Bruce Walcott anticipated enjoying the conference without the logistical pressures of organizing the event.

What they did not anticipate was figuring out how to haul home a lot of hardware.

The chapter achieved an unprecedented sweep of honors and awards at the convention. During the recognition

luncheon, they received three honors: the Secretary's Commendation Award (for the third year in a row), a Project Award (also for the third year in a row) and a Membership Growth Award. Of the 241 Tau Beta Pi chapters, Kentucky Alpha was the only one to receive all three honors.

At the awards banquet, three national awards were given: The J.D. Froula Award for most improved membership, the R.H. Nagel Award for most improved chapter and the R.C. Matthews Award for the outstanding chapter of the year. Kentucky Alpha not only swept the national awards; they became the first chapter to win all three awards in the same year. In addition, Dr. Walcott was given the 2013 Tau Beta Pi Outstanding Advisor Award.

Current president David Smith signaled Kentucky Alpha won't become complacent; rather, they plan to build on their success.

"It's a huge honor to receive any one of these awards, so receiving all three is phenomenal. I am extremely excited to continue to grow our chapter and to keep the Tau Beta Pi message alive."

Professor Jurek Jaromczyk Named a 2014 Great Teacher

While helping students get ready for a final exam, computer science professor Jurek (Jerzy) Jaromczyk suddenly found his classroom invaded by people carrying balloons. To his pleasant surprise, he discovered he had been named one of 2014's Great Teachers at the University of Kentucky—the second time Dr. Jaromczyk has received the honor. He was nominated by students Nickolas Graczyk, Matthew Fahrbach and John Walker.

The UK Alumni Association recognizes six professors each year for outstanding teaching, presenting them with Great Teacher Awards. Each professor is awarded a plaque and cash award at a recognition dinner. It is the oldest continuously given award teachers can receive from the university and all nominations are made by students.

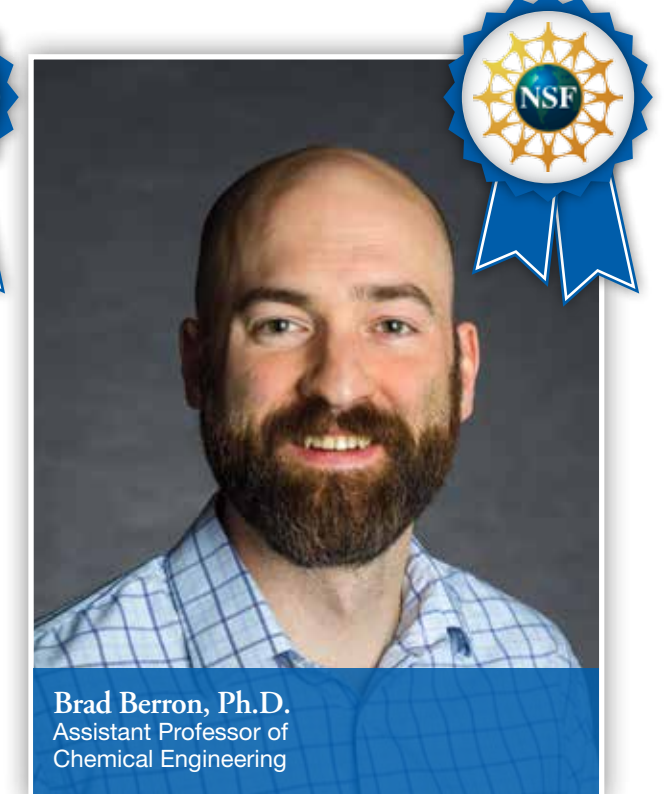


Professors Sean Bailey and Brad Berron Win NSF CAREER Awards

Earlier this year, mechanical engineering professor Sean Bailey and chemical engineering professor Brad Berron each earned prestigious CAREER Awards from the National Science Foundation. The CAREER Award is the NSF's most prestigious award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.



Sean Bailey, Ph.D.
Assistant Professor of
Mechanical Engineering



Brad Berron, Ph.D.
Assistant Professor of
Chemical Engineering

Dr. Bailey, who has been at UK since 2010, will use the award to further his research into the spatial structure of turbulence in the atmospheric boundary layer using unmanned aerial vehicles. An educational component of the project will enable Dr. Bailey to engage undergraduate and graduate students interested in UAV research in research-based, hands-on learning through team-based design challenges and competition.

"This is a really exciting opportunity to use developing technology to tackle fundamental scientific questions. I owe a debt of gratitude to Dr. Suzanne Smith and her students who let me use the resources of Unmanned Systems Research Lab to get this research program off the ground...literally," said Dr. Bailey.

Dr. Berron, who arrived in 2011, is investigating improved techniques for cell-based therapies—transplanting cells to naturally restore biological function.

"It means a lot to me that my peers in research think highly of what my lab is accomplishing," said Dr. Berron. "The students and postdocs in my lab have made significant progress in developing a completely new method of finding the cells we want within mixtures of cells. By only protecting the cells we want to keep, it makes it easy to expose the entire mixture to some harsh conditions to kill off all of the other unprotected cells. This research award will investigate multiple ways of killing cells to see if we can design coatings to protect the cells we want."

CLASS NOTES

Wayne Cornelius, BSEE 1953, Professional EE 1966, has published a book titled, *Some of My Thoughts*. Much of it is a product of his WWII combat, many years of armed forces weapon systems development and professorships at Penn State and Miami Universities. He lives in Louisville, Ky.

Clyde R. Carpenter, BSCE 1959, is an architecture professor in the UK College of Design. He received the Henry Clay Ambassadorship Award from Lexington mayor Jim Gray in recognition for his dedication to Lexington and its architectural heritage. He resides in Lexington.

Ron Ebelhar, BSCE 1975, MSCE 1976, is a senior principal with Terracon. He was elected as vice chairman on the ASTM International (formerly the American Society for Testing and Materials) board of directors for 2014. He lives in Cincinnati, Ohio.

Mike Hancock, BSCE 1978, was elected as president of the American Association of State Highway and Transportation Officials. He currently serves as secretary of the Kentucky Transportation Cabinet. He lives in Frankfort, Ky.

Mark E. Hall, BSMET 1982, was recently promoted to planning and environmental coordinator with the Winnemucca District Office, Bureau of Land Management with the Department of Interior. He resides in Winnemucca, Nev.

Mark A. Westfall, BSME 1985, recently retired as commander, U.S. Naval Reserves. He served 22

years in the Civil Engineer Corps where he held multiple positions within NAVFAC and the Naval Construction Force (SEABEE's). He resides in Pikeville, Ky.

Jim Pauley, BSEE 1986, was elected president of the National Fire Protection Association. He is senior vice president of external affairs and government relations for Schneider Electric. He lives in Lexington.

Greg Harper, BSME 1987, was appointed president of gas pipelines and processing at Enbridge Inc. He resides in Katy, Texas.

Vaughn Williams, BSCE 1990, is president and chairman of the board of directors at Kenvirons. He resides in Frankfort, Ky.

Joe Arnold, BSCE 1992, was named a senior vice president for HBE Corporation, the leading hospital design-build firm in the U.S. He resides in Reston, Va.

Scott Pennington, BSCE 1992, MSCE 1994, was named county engineer and director of public works for Boone County, Ky. He most recently was an engineering supervisor with the Kentucky Transportation Cabinet District 6 office. He lives in Independence, Ky.

Jason Stoltz, BSMNG 1993, MSMNG 1998, has joined ESCI, LLC as director of engineering services for the Midwest region. He lives in Lawrenceville, Ill.

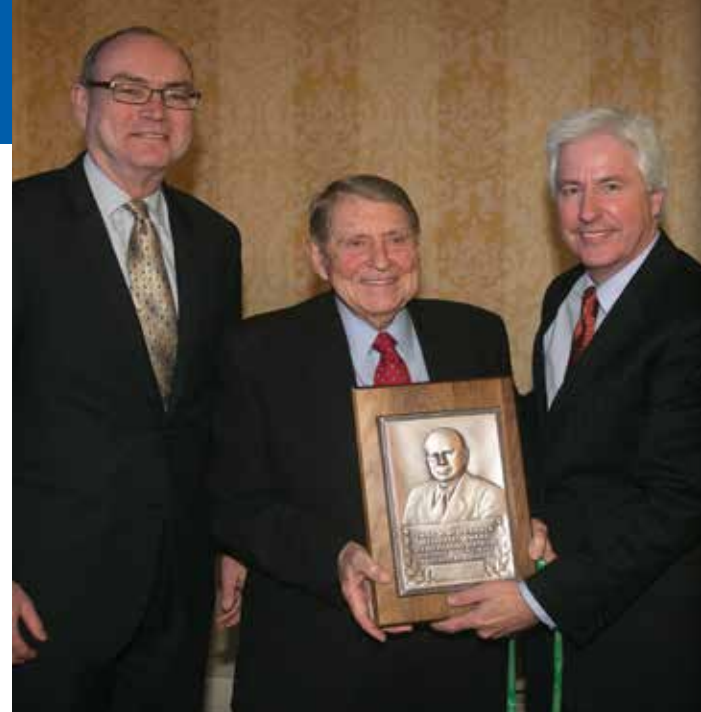
Kelley Coy Rehm, BSCE 1997, MSCE 2000, was appointed the North America business development lead for bridges & major crossings at CH2M Hill. She resides near Nashville, Tenn.

Christa Smothers Hestekin, BSCE 2000, associate professor of chemical engineering at the University of Arkansas, has been selected to hold the Ansel and Virginia Condray Endowed Professorship in Chemical Engineering. She received a Ph.D. from Northwestern University in 2006.

Scott Wolf, BSCE 2001, was named the 2013 Young Engineer of the Year by the National Society of Professional Engineers. He serves as a safety and geometric design engineer for the Federal Highway Administration's Resource Center, based in Baltimore, Md.

Aroop Kodali, MSME 2004, was named director of strategic planning and market analysis for the Aerospace Group at Eaton. Previously, he was director of strategy and business development for Siemens' transportation sector. He is based in Irvine, Calif.

Derick Tanning, BSCE 2007, is a project engineer with New York City's Department of Environmental Protection. He is managing the installation of hundreds of right-of-way bioswales and storm water green streets in the vicinity of the Bronx River, Flushing Bay, the Hutchinson River and Newtown Creek. He resides in Brooklyn, N.Y.



Calvin Grayson (center) received the Thomas H. McDonald Award from Kentucky Transportation Cabinet secretary Mike Hancock (right) and AASHTO executive director Bud Wright (left).

Calvin Grayson, BSCE 1949, was awarded the Thomas H. McDonald Award at the American Association of State Highway and Transportation Officials (AASHTO) annual meeting in October. The award is considered to be the highest award given by AASHTO, made to a person who has rendered continuous outstanding service over an extended period of time or has made some exceptional contribution to the art and science of highway engineering.

Mr. Grayson's career spans seven decades. He was the first professional engineer to serve as commissioner of highways and secretary of the Kentucky Department of Transportation. Founding the Kentucky Transportation Center is often recognized as the capstone of his career. He was also a 50-year advocate for Kentucky's primary seatbelt legislation, finally passed in 2006.

He is a member of the college's Hall of Distinction and the UK Alumni Association's Hall of Distinguished Alumni.

IN MEMORIAM

Jarred M. Barron	Mechanical Engineering	1939
Morris E. Broyles	Electrical Engineering	1949
Melvin L. Tinsley	Metallurgical Engineering	1949
Clyde W. Hamm	Electrical Engineering	1951
Philip A. Yelton	Civil Engineering	1954
William E. Brummett	Mechanical Engineering	1960
Clifford C. Linkes	Civil Engineering	1966
Robert B. McFarland	Electrical Engineering	1970
Robert S. Dahlin	Chemical Engineering	1976
Donald G. Cummins	Electrical Engineering	1981
C. Dale Randall	Chemical Engineering	1986
E. Wayne Lyons, Jr.	Mechanical Engineering	1997

Dr. James E. Black III, adjunct professor in the Department of Civil Engineering, passed away December 3, 2013. Dr. Black received his bachelor's and master's degrees from UK in civil engineering in 1973 and 1976, respectively. He taught the basic civil engineering course and surveying. He was a professional civil engineer, land surveyor and geologist and the owner and operator of J.E. Black, PLLC.

Dr. Charles E. Hamrin, who taught chemical engineering at UK from 1968-2011 and served as chair of the Department of Chemical Engineering from 1988-1992, passed away October 19, 2013. Dr. Hamrin exhibited a passion for chemical engineering and thoroughly enjoyed working with college students.

Dr. James F. Lafferty, who taught mechanical engineering and biomechanics at UK for 32 years, passed away on November 3, 2013. The Center for Biomedical Engineering (now the Department of Biomedical Engineering) at UK owes its inception largely to Dr. Lafferty. He graduated from UK in 1955 with a bachelor's degree in mechanical engineering.

BE INCLUDED

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

OUT OF THE LAB



As a hobby, chemical engineering professor Thomas Dziubla enjoys applying his love for experimentation and problem-solving to a different arena: home brewing. Instead of worrying about oxidative stress and polymers, he worries about mouthfeel, aromatics and flavor. Recently, we interviewed Dr. Dziubla at his home “lab” to get his take on home brewing and sample his wares. Enjoy responsibly.

How long have you been brewing your own beer?

Dr. Dziubla: I started around 1999, while I was a chemical engineering graduate student at Drexel. Philadelphia had a phenomenal network of home brewers and microbreweries in the area and a lot of my fellow chemical engineering grad students got into it, too. I fell out of it when I became a postdoctoral student, but a few years after I moved to Lexington, I discovered one of my good friends from high school, Chris, lives in nearby Winchester. He was interested in brewing beer, so we began getting together to experiment with brewing and catch up.

What styles have you made?

Dr. Dziubla: We’ve made American ales, India pale ales and triples. We produced a caramel apple stout based on an idea Chris had that wasn’t too bad. For our next batch, we’ll be using a recipe given to me by a Clemson professor who won a home brewing competition in South

Carolina. We’re getting better. We changed how we go about converting grain to sugar and the result was a triple that is probably my favorite of the beers we’ve made. It’s a long way from our first attempt, where everything went wrong and Chris named it “Almost Beer.” Surprisingly, it was still pretty good.

Would you recommend home brewing to budding engineers (21 and older of course!)?

Dr. Dziubla: If you enjoy something, then you should consider trying to actually make it. If you like sushi, you should attempt making a sushi roll. Here’s why: it increases your appreciation of it tremendously. You get a better grasp of the craftsmanship that goes into it. I also tell freshmen that we’re engineers because we’re makers—we want to create what doesn’t currently exist. With brewing, you can take raw materials and produce something completely new. It takes seriously the fact that art and science coexist in one space—the engineer’s playground! [KEJ](#)

GIVING BACK



D. Ralph Young holds the UK College of Engineering dear to his heart.

After graduating with an electrical engineering degree in 1953, Mr. Young devoted nearly 40 years to overseeing international power projects. In addition to the scholarship he and his wife, Janice, award annually, Mr. Young has created a planned gift for a scholarship in memory of his late wife, Charlotte.

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.

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