

# ampersand

MAGAZINE OF THE COLLEGE OF ARTS & SCIENCES



**DEAN**

Mark Lawrence Kornbluh  
kornbluh@uky.edu

**EDITOR**

Jennifer T. Allen '00  
jennifer.allen@uky.edu

**OFFICE OF DEVELOPMENT**

Laura Sutton '89  
lsutton@uky.edu

**DESIGN & ILLUSTRATION**

Shaan Azeem, Art Director '13  
shaan.azeem@uky.edu

**WRITERS**

Jennifer T. Allen '00  
Whitney Hale '97, '99  
Jenny Wells '06, '14  
Julie Wrinn

**PHOTOGRAPHERS**

Jennifer T. Allen '00  
Joyce Anderson  
John Buckman '12  
Dana Rogers '13  
Eric Sanders '15  
Damian Tatum  
Warren Jagger Photography

Direct comments or questions to:  
Director of Communications & Creative Services  
UK College of Arts & Sciences  
901 Patterson Office Tower  
Lexington, KY 40506-0027

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We'd like to hear from you. Send letters and story ideas to Ampersand, at the address on back cover.

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**ON THE COVER**

Students access new technology and equipment in the Don & Cathy Jacobs Science Building.

Photo by Eric Sanders

**BACK COVER**

The atrium in the Don & Cathy Jacobs Science Building provides flexible space for students.

Photo by Warren Jagger Photography | Courtesy of JRA Architects

## Features

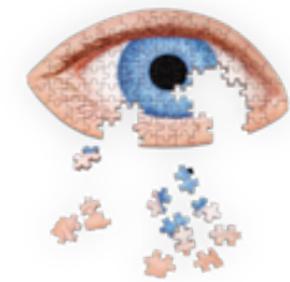
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PHOTO BY DANA ROGERS

## Dear Friends,

Welcome to the Spring 2017 issue of Ampersand. It is a privilege to share with you examples of excellence within the College of Arts & Sciences at the University of Kentucky—from cutting-edge research that is taking on some of the more challenging health and behavioral problems of the day, to our star undergraduate and graduate students whose creativity, work ethic and commitment to making the world a better place give me hope for the future. As dean, my job is to ensure that everything we do strengthens teaching and research at Kentucky's flagship institution of higher learning, and this issue offers snapshots of how we fulfill that promise.

In these pages, you will meet two stellar science students who are poised to take on the world. First, math and chemistry senior Corrine Elliott has received numerous academic awards, including a \$10,000 scholarship from the Astronaut Scholarship Foundation. As the daughter of Kathleen Elliott and UK political science professor Stephen Voss, Corinne came by her appreciation of the liberal arts and sciences early (p. 22). Next, biology freshman Paige Poffenberger came to UK from Morgantown, W. Va., as a National Merit Scholar. When she isn't busy preparing for medical school, Paige is a walk-on for Matthew Mitchell's UK Hoops women's basketball team (p. 24).

Ampersand also highlights two Department of Psychology labs engaged in research on one of society's most intractable problems: drug and alcohol addiction. One mystery of substance abuse is that many individuals are exposed to drugs and alcohol, but only a few develop an addiction to them. Professor Mark Fillmore's research (p. 16) uses techniques from psychology, behavioral neuroscience, and pharmacology to look at the differing ways individuals react to drugs of abuse. Assistant Professor Josh Beckmann's research (p. 12) stems from his background in philosophy and focuses on choice behavior and decision-making processes

in substance abuse. Read about their work and discover why our Psychology Department is consistently a Top 20 graduate and research program.

Finally, a new era of science education at UK arrived last fall with the opening of the Don & Cathy Jacobs Science Building (p. 8). This 240,000 square foot building was made possible by a \$10 million naming gift from the Don Jacobs Sr. Charitable Foundation, together with a \$65 million gift from UK Athletics, an unprecedented commitment from a collegiate athletic department. The Jacobs Science Building is changing lives and has dramatically transformed undergraduate science education at the University of Kentucky. The building harnesses the power of technology in the classroom and makes science visible and exciting for our students. I invite each of you to tour this new facility the next time you are on campus. I promise that you will be impressed.

Our faculty and staff are deeply committed to our students, to the research mission of the University and to making the Commonwealth of Kentucky a better place. None of this work is possible without the generous support of you, our alumni, donors, and friends.

Thank you for your continued interest in and enthusiasm for the UK College of Arts & Sciences.

Yours,

**Mark Lawrence Kornbluh**  
Dean, College of Arts & Sciences  
kornbluh@uky.edu

# News & Notes



PHOTO BY JOHN BUCKMAN

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PHOTO BY JOHN BUCKMAN

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1. The Reaction Attraction offered entertaining chemistry demonstrations.

2. Jeff Babbitt demonstrates scientific glassblowing.

3. Chemistry alumni enjoyed an informal reception at the Helen King Alumni House interacting with Department of Chemistry faculty.



3

## Chemistry Reunion

**MORE THAN 60 ALUMNI**, friends and faculty reunited on campus this past fall to reconnect with old friends, meet new ones and engage with the Department of Chemistry. The weekend kicked off with the annual Lyle R. Dawson Memorial Lecture and was followed by a reception in the new Don & Cathy Jacobs Science Building, which attendees were able to tour. The evening featured:

- The Reaction Attraction with an entertaining and spectacular chemistry demonstration by Anne-Francis Miller, Jack Selegue, and Erin Peters.
- Demonstrations of scientific glassblowing by Jeff Babbitt.
- A peek at the “Spirits Chemistry” course offered by Bert Lynn.
- A crime scene based on the “Forensic Science on Television” course taught by Mark Lovell.
- The Chemistry in Comics collection of Jack Selegue and Jim Holler.

The Chemistry Alumni Board held its annual meeting, and an informal reception was held at the Helen King Alumni House. Recreational activities included a guided hike with chemistry faculty at Natural Bridge State Resort Park.

**“I received many favorable comments from the reunion participants. Events like this strengthen the relationship between the University and its alumni, and we are already thinking about future activities,”** said Steve Yates, organizer of the event and professor in the Department of Chemistry. **“We are very proud of our alumni, and it is clear that they greatly value their memories and friendships from UK.”**

## BioBonanza

**THIS FALL, THE DEPARTMENT OF BIOLOGY HOSTED BIOBONANZA**, a one-day open house festival that showcased interactive displays on research taking place in the department. More than 430 people attended and were able to interact with 22 hands-on displays, such as butterflies and other insects, crawfish, zebrafish, and native plants, and how human hearts work, to name a few.

Among the researchers were graduate student Cole Malloy and his mentor, neurobiologist Robin Cooper. The pair is studying how the nervous system adapts to changes in the environment using fruit flies and crayfish.

“The breadth of the field is what drew me into biology,” Malloy said. “In high school I was more a chemistry guy, like my advisor, and when I came to UK I became more interested in biology, especially genetics and neuroscience.”

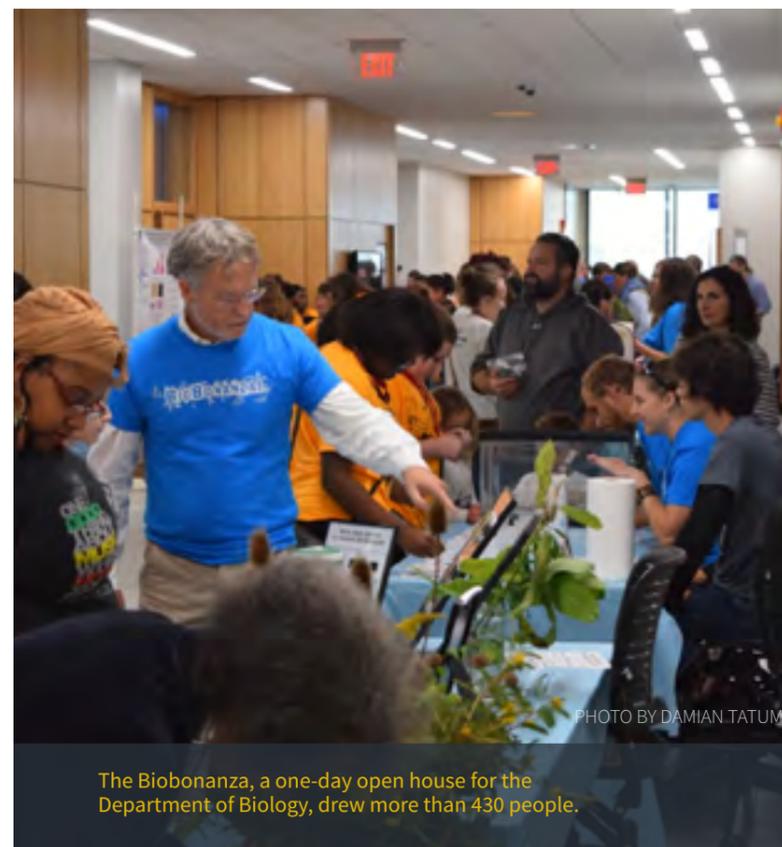


PHOTO BY DAMIAN TATUM

The BioBonanza, a one-day open house for the Department of Biology, drew more than 430 people.



## Remembering Keith MacAdam

**A PILLAR OF THE DEPARTMENT OF PHYSICS & ASTRONOMY**, Professor Emeritus Keith MacAdam died on Nov. 6, 2016, at the age of 72 after a brief acute illness. In the four decades since MacAdam first arrived in Kentucky, he strengthened the program in countless ways through exemplary teaching, research, service, and philanthropy, and his impact will be felt for many generations.

MacAdam came to UK as an assistant professor in 1977 and built a campus-based research program in experimental atomic-molecular-optical physics with students and post-docs, supported by the National Science Foundation and the Research Corporation. MacAdam’s research was widely recognized in the international physics community, focusing on crossed-beam collisions between charged particles and laser-excited atoms in highly excited “Rydberg” states. At UK, he taught students from first-year to graduate, and he introduced and taught for many years a popular non-majors’ physics course, “How Things Work.” He served as department chair in 1997–2001 and chaired the College Executive Committee in 2007–08, among many other committees.

MacAdam and his wife, Phyllis, helped create the MacAdam Student Observatory, which opened in 2008. He explained, “We won’t duplicate the Hubble Space Telescope with an on-campus observatory, but this is your eye, receiving photons that have been on their way to you for millions of years. Only you. You don’t have to be a mathematician or physicist to understand and be fascinated by what’s going on.”

MacAdam also established a Graduate Excellence Scholarship in Physics. In 2014, MacAdam was inducted into the College of Arts & Sciences Hall of Fame.

# Reinventing the Bluegrass Special

A new major was added to the College of Arts & Sciences during the fall 2016 semester—the Bachelor of Liberal Studies. The major addresses the breadth and value of various forms of knowledge in a changing world and is structured to allow students to design individualized programs of study to include humanities, social sciences, and natural and mathematical sciences. Similar to the Bachelor of General Studies, informally referred to as the “Bluegrass Special” by students in the ’70s, the Bachelor of Liberal Studies program is an individualized, nontraditional program designed to provide broader freedom of course choices than is available in traditional majors.

We caught up with A&S alumni to hear how their Bachelor of General Studies degree helped them succeed after graduation.

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*“The degree enabled me to receive a very well-rounded education from a wide variety of interesting professors. I was an Army ROTC student and even though I was not planning on a military career when I graduated, the subjects I took, particularly the humanities, gave me an excellent foundation for leading and working with people as an Army officer. It served me well during my military career and has served me equally well as an HR professional.”*

**—Anthony W. Wright ’78**

Chief Human Resources Officer at  
Columbia County, GA, Board of Education

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*“I have always been interested in different academic subjects and during my undergraduate years looked forward to choosing from among the classes offered. When the general studies major became available, it allowed me to broaden my education and pursue my varied interests. My concentrations were in sociology, psychology and telecommunications. At the time, I had no idea that my journey would lead me to law school and a career as a trial judge, but I believe my undergraduate choices prepared me well. A liberal arts education may be the best preparation for your life’s work, as it allows you to hone your skills, to develop a questioning mind, to begin to understand the world around you and to find yourself.”*

**—The Honorable Sheila R. Isaac ’74 & JD ’77**

Judge, Fayette Circuit Court; Executive Director, KY Bar Association

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*“I was a performance piano major my freshman year, which I greatly loved. I felt myself, though, gravitating towards journalism for a career. The Watergate scandal hit when I was a freshman at UK, and I would stop and watch the Watergate hearings in the student center on my way to and from classes. I was fascinated by the unfolding story.*

*Later, with the help of my advisor, I decided what I really wanted was a Bachelor of General Studies (we called it the Bluegrass Special). It gave me more flexibility in choosing my classes. I was able to take all the journalism and communication classes I needed, plus other classes that I wanted, but would not have been able to take. It was perfect for me.*

*I really came to appreciate my studies in a broad range of topics. As a general assignment reporter, I never knew where the news of the day might take me, and what the topic of my story or interview would be. While nobody can be an expert on every subject, it helped me to have a broad, general education so that I could know what to ask. I always believed my general studies degree from UK gave me a little extra flexibility with my career path.”*

**—Barbara Bailey Cowden ’77**

News anchor at WKYT-TV, Lexington, KY

## Hall of Fame 2016

The College of Arts & Sciences inducted four new members into its Hall of Fame on Oct. 7, 2016, with a ceremony in the Don & Cathy Jacobs Science Building. The inductees included Kip Cornett, General Studies ’77, Dr. Sally Mason, B.A. Zoology ’72, Honorary Doctorate ’12, Dr. Robert M. Ireland, J.D., Ph.D., Department of History, and Judith A. Lesnaw, Department of Biology.



PHOTO BY JENNIFER T. ALLEN

## Save the Date 2017

Make plans to join us for the Arts & Sciences Hall of Fame Induction Ceremony & Reception on Friday, Oct. 6, 2017.

This year’s alumni inductees are Charlie Grizzle, English B.A. ’73, Martha Rolingson, Anthropology M.A. ’60, and Tom Spalding, Geological Sciences B.S. ’80, M.S. ’82. This year’s faculty inductees are Karl B. Raitz, Department of Geography, and Daniel R. Reedy, Department of Hispanic Studies.

Visit [www.as.uky.edu/halloffame](http://www.as.uky.edu/halloffame) for more information.

## Mark Your Calendar

### Psychology

The Psychology Department is celebrating its 100th Anniversary with a reunion weekend, June 16–18, 2017. Featured events include tours, talks, and an evening at Equus Run Vineyards in Midway, Ky. Come see what’s new in the department and reminisce and reconnect with faculty and classmates.

For the latest details visit [psychology.as.uky.edu/psychology-reunion-schedule](http://psychology.as.uky.edu/psychology-reunion-schedule) or contact Meagan Coomes at [meagan.coomes@uky.edu](mailto:meagan.coomes@uky.edu) or (859) 257-9640.

### Statistics

The 50th Anniversary Celebration of the UK Department of Statistics will be Sept. 15–16, 2017, in Lexington, Ky.

For more information contact Arny Stromberg at [stromberg@uky.edu](mailto:stromberg@uky.edu).

### Geology

The Department of Earth & Environmental Sciences will host a private cocktail reception for geology alumni and friends to celebrate 125 years of geology! The reception will take place April 3, 2017, at 5:30 p.m. at the Hilton Americas Hotel in Houston, Texas, during the AAPG Annual Convention and Exhibition.

Please RSVP to [ees@uky.edu](mailto:ees@uky.edu), (859) 257-3758 or [moker@uky.edu](mailto:moker@uky.edu).

Watch for future announcements of upcoming UK geology alumni events in Crested Butte, Colo. (July 2) and Lexington, Ky (Oct. 5).

## ALUMNI SPOTLIGHT

# From Midway to Morocco

## At the Forefront of International Banking

By Julie Wrinn

**AS A SENIOR MANAGER IN FINANCIAL RISK MANAGEMENT** for the global management and investment consulting firm Accenture, Blair West (B.A. 2007) of Midway, Ky., has traveled a long way in a short period of time. She arrived at the University of Kentucky in 2004 with no Advanced Placement credits and graduated three and a half years later, obtained her M.B.A. in London, and now works in New York City.

West credits her mother with advising her to enroll in 18 hours nearly every semester at UK. "Taking 18 hours was not too cumbersome," she said. "I could still have a life. I did get a lot of parking tickets though." She even made time to take one purely fun class each year, including scuba diving, racquetball, and ice skating.

During her freshman year, West took German 101 and 102 and through those courses learned about the summer Education Abroad program offered partly through KIIS (Kentucky Institute of International Study). West had never visited Germany before but liked the idea of satisfying the German 201 and 202 requirements in one summer adventure.

"So I took the leap," she remembers. "It was a very cool program, with about 12 of us who stayed with German families in Munich. I got so lucky with my guest family. I lived with a family of four, and the mother was actually Hungarian and a concert pianist, one of those wunderkinds who had been performing since she was four years old."



PHOTO BY JOYCE ANDERSON

Alumna Blair West's post-graduation path has taken her from Midway to Morocco, landing in New York City as a senior manager in financial risk management for Accenture.

After that first summer abroad, West began taking economics courses at UK and became interested in international banking. She learned about a prestigious interdisciplinary program at UK, Foreign Language and International Economics (FLIE), with seven possible language tracks in Arabic, Chinese, French, German, Japanese, Russian, and Spanish. West chose FLIE-German, and it was the ideal preparation for her first banking job at Deutsche Bank in London, on the Pan European Equities Sales Desk. West found that most Germans were comfortable speaking English in professional settings, but she still benefitted from her language background.

"I was able to have casual conversations with people in German. It was nice to be able to do that and really helped me get to know people better," she said.

Some of West's favorite courses in the FLIE-German major were in statistics, and also Developmental Economics, a 600-level graduate course with Professor Bob Gillette. "Professor Gillette changed my whole perspective on everything," explained West. "He had a huge impact, even today, because he introduced me to microfinance, which has been a passion of mine since taking his class. It's the reason why I'm in banking today and the reason why I have a nonprofit." Traditional microfinance provides low-interest loans to small businesses in the developing world.

In 2015, West launched a nonprofit organization called Ankaa Investors, Inc., whose mission is to provide interest-free small loans to small business owners in the developing world. For her dissertation in the M.B.A. program at St. Mary's University in London, West examined the causes and effects of the Andhra Pradesh, India, microfinance crisis, concluding that there were significant flaws in traditional microfinance practices. In 2014, West and business school classmate Jessica George traveled to Morocco to attend a microfinance conference and present their ideas. Inspired by that experience, West and George decided to co-found Ankaa Investors, Inc.

In her current position at Accenture, West's focus is in regulatory and reputational risk for traditional large financial institutions, but she doesn't anticipate spending her entire career in that realm.

"Eventually I'd like to get into the FinTech business, the newer alternative to traditional banking," she said. Apple Pay, Google Wallet, and PayPal are examples of companies using new technology to change the banking industry. "The generation coming up now will definitely know and be comfortable with using those sorts of platforms for banking," predicts West.

Wherever the banking industry is headed, it seems safe to assume that Blair West will be one of the first to arrive. &

# At the Forefront of Science, Teaching and Research

**New Don & Cathy Jacobs Science Building opened Fall 2016**

**By Jenny Wells**

**THIS FALL, AS THE SOUNDS OF THE WILDCAT MARCHING BAND PRACTICES FILLED THE AIR IN THE AFTERNOONS,** campus was abuzz with the excitement of a new year—and the newest building on campus was poised to usher in a golden era of science education at the University of Kentucky.

The Don & Cathy Jacobs Science Building is a beautiful, 21st-century teaching and learning space which is now considered the epicenter of the university's scientific community. The 240,000 square-foot, \$112 million facility was made possible with funding of \$65 million from UK Athletics and \$10 million from the Don Jacobs Sr. Charitable Foundation.

“With each passing day, the University of Kentucky is a campus transformed. Nowhere is that transformation—and the profound sense of partnership—more evident than in the heart of our campus where new classrooms and learning-laboratories come to life. Today, we add another piece of that transformation with the Jacobs Science Building,” said UK President Eli Capilouto at the building's opening ceremony. “A new sanctuary of learning for our institution, the Jacobs Science Building combines the best intentions of our commitment to Kentucky: A new century of hands-on, high-tech, multidisciplinary science learning and discovery, and the manifestation of the impact levied by a collegiate athletics program deeply committed to the academic fabric of a university and committed philanthropists investing in Kentucky's next generation of scholars.”

Three years ago Capilouto and UK Athletics Director Mitch Barnhart announced the collaboration to fund a new science building. As part of a series of strategic initiatives to improve the university, this partnership was unlike any other in higher education—a major,

self-sustaining athletics program funding nearly two-thirds of a more than \$100 million academic science building.

“Our commitment to the partnership we have with our university is at the forefront of our mission as a department, as is our commitment to enriching the lives of every UK student, both those who compete in varsity athletics and those who do not,” said Barnhart. “We are proud that this state-of-the-art building will stand as a symbol of that dedication and serve our students well for years to come.”

Named for the late Don Jacobs and his wife Cathy, the building opened in August on the corner of Rose Street and Huguelet Drive and is home to the largest active learning space on campus. It includes state-of-the-art laboratories, advanced lecture halls, technology enabled active learning (TEAL) classrooms, outdoor teaching spaces and interior green space. Every science student on campus, and the vast majority of all undergraduates regardless of major, will take courses or have the opportunity to conduct research in the Jacobs Science Building.

“The new science building integrates teaching and research, makes science visible, and has sparked the joy of learning,” said Mark Lawrence Kornbluh, dean of the UK College of Arts & Sciences. “When we began this endeavor, we wanted a building that supported active learning and student engagement; a building that would be an intellectual home for UK students. We got all that we hoped for and more.” &

## What do students have to say?



“The atmosphere in this building really helps promote student learning. It brought together so many types of spaces for people to work together and help each other.”

—**Brianna Vollman**  
Political Science, Junior



“I thought JSB was such a great new building for the campus because it really caters to students’ needs and also to the courses. The lecture halls have created a really comfortable environment for students to learn.”

—**Lilly Do**  
Chemistry, Sophomore



“The open spaces, the windows, just the architecture of the building boosts moral. You see the plants, you see the big screen, the open space. It’s just beautiful.”

—**Jonathan Davies**  
Medical Sciences, Graduate Student

PHOTOS BY ERIC SANDERS



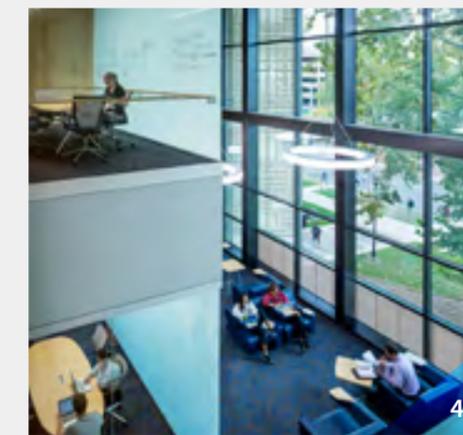
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1. The high-tech laboratory space gives students access to cutting-edge equipment in a collaborative environment.

2. The 300-seat lecture hall is outfitted for multi-media presentations and demonstrations as well as allowing for interaction between students.

3. The atrium showcases the building’s beautiful architecture and the 27 x 20 foot media wall.

4. Multiple study areas are available throughout the building.

## Inside the Jacobs Science Building

The Don & Cathy Jacobs Science Building houses centrally-scheduled classrooms, numerous chemistry and biology teaching laboratories, and office space for the Department of Chemistry, biology lecturers, and the College of Arts & Sciences Business Center. On the first floor, there is a 300-seat lecture hall; several biology teaching laboratories for physiology, general biology, and microbiology; and multiple technology enabled active learning (TEAL) classrooms; as well as a Shared Imaging

Suite and Biology Learning Center. The second floor houses eight general chemistry teaching laboratories, a 132-seat TEAL room, the General Chemistry Learning Center, and multiple small TEAL rooms. On the 3rd floor, there is a 200-seat lecture hall and multiple upper-level chemistry laboratories, including four organic laboratories and one each of synthetic chemistry, biochemistry, analytical chemistry, and physical chemistry/instrumental analysis.

The 3rd floor also houses the Organic Chemistry Learning Center and a Nuclear Magnetic Resonance (NMR) and Shared Instrumentation Suite to support all the upper-division laboratories, as well as a STEM teaching laboratory.

The exterior courtyard has two outdoor classrooms and natural slate chalkboards with geological features built into the walls. All exterior landscaping contains only native Kentucky plants.



The Jacobs Science Building brings the outside in by incorporating plants throughout the building.

PHOTOS BY WARREN JAGGER PHOTOGRAPHY | COURTESY OF JRA ARCHITECTS

Want to support state-of-the art science instruction in Kentucky? Naming opportunities for classrooms, labs and public spaces in the new Jacobs Science Building are still available. For more information, contact Laura Sutton at (859) 257-3551 or [lsutton@uky.edu](mailto:lsutton@uky.edu).

# Option 1 or Option 2

## Research in the decision-making processes of substance abuse



By Jennifer T. Allen

**JOSH BECKMANN'S INTEREST IN PHILOSOPHY** steered him through the related fields of epistemology\*, phenomenology\*\*, and the philosophy of science until he began questioning how you can blend these ideas with actual data. That question led him to get a second bachelor's degree in psychology.

After earning his master's and doctoral degrees from Southern Illinois University, Beckmann came to the University of Kentucky in 2008 as a post-doctoral student working in Michael Bardo's and Greg Gerhardt's labs. In 2014, he joined the Department of Psychology as an assistant professor with a focus on choice behavior.

Beckmann and his team of graduate students concentrate on the decision-making processes in models of substance abuse. "We are trying to understand why an organism would choose a drug of abuse over having a concurrent option to partake in some other reinforcing behavior such as eating food," Beckmann explained.

Trying to figure out what it is about drugs of abuse and how they compete with other reinforcers to create a sort of myopic drug-related behavior that is characteristic of abuse is at the core of Beckmann's research. And they are looking at it on multiple levels.

\*the theory of knowledge; the investigation of what distinguishes justified belief from opinion

\*\*the study of consciousness and the objects of direct experience

### Inside the Lab

The research begins by measuring behavior. In one scenario, they do this by asking a rat if it wants to take cocaine or eat a sugary sweet pellet. Then, they create different conditions where the rat may move toward one direction or another. Even though the environment and conditions are the same, some rats go for the cocaine and some go for the pellet.

"The idea is to understand the neurobehavioral processes that govern the behavior," Beckmann said. "We are trying to understand what it is about the rats that don't go for the cocaine. What kind of

neurobehavioral processes are underlying those drug-related decisions?"

Beckmann is also conducting similar research on obesity, which has added complexity. Being obese comes with a great deal of changes in metabolism, so it is difficult to separate the metabolic effect of obesity versus the reinforcing effects that are associated with it, Beckmann explained. To address this, the models isolate certain reward areas in the brain and ask the animal how much they want to stimulate that area.



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» CONTINUED FROM PAGE 13

“By doing so, we are trying to find out if we can separate out the metabolic effects that are associated with obesity versus reward changes associated with obesity,” Beckmann said.

Another focus of Beckmann’s lab is gambling behavior and how environmental stimuli will promote a sense of suboptimal choice behavior. This is done by giving a rat two options: the first gives them food 50% of the time and the second only 12.5% of the time. If signaled in a predictive way, such as with lights or sound, a subjective experience is created making the 12.5% more prominent, and then it becomes the preferred option. “They choose the 12.5% option with a signal, even though they

can get more reward by choosing the 50% option,” Beckmann said.

Graduate students have been integral to the success of the lab. “Without much staff in the lab, anything that is going to get done is student dependent,” he said. “That goes from designing and running the experiments to analyzing the data and programming the computers. Students are involved in pretty much every single aspect of the research.”



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PHOTOS BY ERIC SANDERS

1. Josh Lavy, lab manager, builds an electrode for neural recordings.
2. Seth Batten, 3rd year behavioral neuroscience and psychopharmacology doctoral student in psychology, calibrates a recording electrode.
3. Slide-mounted coronal slices of a rat brain.

## What does studying choice behavior tell us?

“If you want to study the rewarding benefits of a drug, you only study the drug. If you want to study the rewarding effects of food, you only study food. If you want to think about people with substance abuse disorders, they have concurrent reinforcers all the time,” Beckmann said.

Choice behavior research looks at what an individual does when offered multiple choices. “If we know what is controlling the behavior, it allows us to better intervene for therapy,” Beckmann said.

Next steps for Beckmann’s lab include applying for grants to further the research. Beckmann is currently writing a grant with colleagues in the Department of Behavioral Science focused on finding the basic mechanisms that are constant across species (rats and humans) so they can translate what they find effective in people into the rats to further study the underlying neurobiological processes. “This will hopefully help us delve deeper and find some neural targets that may lead to a better therapeutic solution down the line,” Beckmann said.

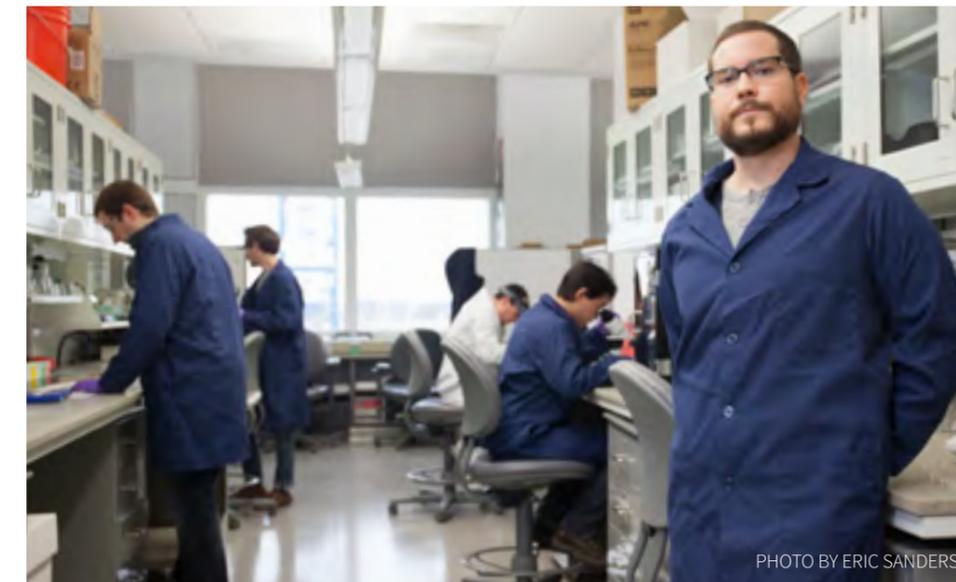


PHOTO BY ERIC SANDERS

Josh Beckmann's lab works to uncover the decision-making processes underlying substance abuse. Pictured left to right: Aaron Smith, 4th year doctoral student; Seth Batten, 3rd year doctoral student; Josh Lavy, lab manager; Jonathan Chow, 4th year doctoral student; and Beckmann, professor in the Department of Psychology

## Funding a Lab

When Beckmann joined the College of Arts & Sciences three years ago, the College and Department of Psychology provided start-up funds to get his lab off the ground. He was also able to bring a small amount of funding from a post-doctoral National Institute of Health (NIH) training grant, which transitioned into a small amount of start-up funding once Beckmann came on as faculty.

“In this day and age, grant money is really hard to come by,” he said. “The success rate of getting a Research Project Grant (RO1) from the NIH is really low and it doesn’t appear to be going up. If you want to start a new lab, it is pretty much dependent on start-up funds.”

Without funds to begin research in a new lab, there is little hope for landing a grant. “The start-up funds allowed us to expand quickly and get to the point of being ready to apply for new grants,” Beckmann said. “If we didn’t have that money, we would be dead in the water until the next grant came by.”

As Beckmann thinks of the future, he is focused on one goal.

“I hope to get to a place of knowing how we better treat people with drug abuse issues,” he said. &

For more information about how to help UK close the gap between bench research & solutions to the most pressing health challenges of our day, contact Laura Sutton at (859) 257-3551 or lsutton@uky.edu.



# Cognitive Impairment

## The complex puzzle of addiction

By Jennifer T. Allen

**ALCOHOL IS THE MOST COMMONLY USED ADDICTIVE SUBSTANCE IN THE UNITED STATES**, according to the National Council on Alcoholism and Drug Dependence. One in every 12 adults, 17.6 million people, suffer from alcohol abuse or dependence. Several million more engage in risky, binge drinking patterns that could lead to alcohol problems. Looking into the reasons individuals become addicted to alcohol is why Dr. Mark Fillmore came to the University of Kentucky from Canada 17 years ago.

“UK was actively recruiting individuals for substance abuse research in various departments,” said Fillmore, professor in the Department of Psychology. “Psychology was one of them, and I was eager to come to the United States and Kentucky because there was a lot of interest in drug abuse research here.”

Fillmore’s research is a combination of psychology, behavioral neuroscience, biology and pharmacology. Looking at the differing ways individuals react to drugs of abuse, whether the drug be alcohol, marijuana, or some other drug of abuse, may give insight into why some people become dependent on a drug over time.

“The reason we are interested in the individual difference in how people react is because it gives us clues as to why some individuals get addicted to a drug and other individuals do not,” Fillmore said. “The problem with drug abuse is that while many individuals are exposed to drugs, like alcohol, only a few develop an addiction to it, and we need to understand why these individuals develop addiction.”

Utilizing state-of-the-art eye tracking technology, Fillmore and the graduate and undergraduate students working in his lab are able to track how much time individuals look at alcohol or drug-related images or ads. There are two devices: the first is a monitor that the subject looks at while it tracks eye movements as various images rotate on the screen; the second is a mobile device the subject wears to track eye movements while looking and walking around a room.

“One of the phenomena we have noted in addiction is that addicts or individuals who are developing substance abuse problems have a heightened attention or attraction to the visual cues for the drug. They look at liquor ads in a magazine longer; they look at a billboard that shows a brand of alcohol; or they look at a bar as they are driving down the road,” Fillmore explained.

As the subjects walk around a room, the technology tracks their eye movements and records the time spent looking at objects. “This measure is called the fixation time and individuals who have a greater risk for developing alcohol abuse will look at and be drawn to these visual cues more than someone who is a moderate drinker,” Fillmore said.

Fillmore’s lab also utilizes an advanced driving simulator that can be programmed with a myriad of driving scenarios to challenge motor skills such as information popping up on the windshield or having to make a decision between two different options. The simulator takes many factors into account such as the ability to stay in your lane and not weave, the ability to maintain a safe distance from other vehicles, and the ability to maintain a certain speed.

So, what has been learned in almost two decades of research?

Fillmore’s lab has been interested in how a drug can affect someone’s ability to react quickly to a situation or to suppress a reaction. Alcohol is commonly believed to disinhibit behavior or make an individual more impulsive. The laboratory models examine the degree to which a dose of alcohol can impair someone’s ability to inhibit an inappropriate action.

Fillmore has found that under alcohol, individuals are impaired in the ability to suppress actions.

“What is interesting is that the impairment also predicts several aspects of the individual’s behavior with respect to alcohol,”

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*While many individuals are exposed to drugs like alcohol, only a few develop an addiction to it, and we need to understand why these individuals develop addiction.*

—Mark Fillmore

Professor in the Department of Psychology

Fillmore said. “Individuals who have greater difficulty inhibiting a reaction under alcohol tend to drink more when we give them an opportunity to consume alcohol in the lab. They are also more drawn to alcohol-related images.”

The lab also looks at how alcohol can affect generalized impulsivity in other aspects, such as drinking and driving. “We are now learning how alcohol does not just impair driving skills—we’ve known that for decades. Now we are seeing how alcohol can increase an individual’s proclivity to take risks behind the wheel,” Fillmore explained.

Looking at DUI offenders and people with repeated DUI offenses, Fillmore has found that these individuals do not report feeling the effects of alcohol as strongly as others and begin to display greater risk-taking when in a driving simulation situation under an acute dose of alcohol.

One of the major impacts of this research has been to identify impulsivity and impulse control as an important factor in developing addiction.

“For years prior to this work and similar work of my colleagues, the notion of addiction was that it was reward driven, that individuals take drugs simply because they feel good,” Fillmore said. “What we have shown is that outside of the realm of reward, these individuals also have impaired inhibitory control under the drug, which actually impairs their ability to stop ongoing behavior such as taking the next drink.”

As Fillmore and his team look to the future, they are taking their work on drug-induced disinhibition into the realm of social situations, beyond studying individuals in isolation. “We know that drug abuse is a social problem, and drugs, particularly among young adults, are used in social settings,” Fillmore said. “We also know from neuroimaging studies that individuals like drugs more when they take them in a group setting when among friends.”

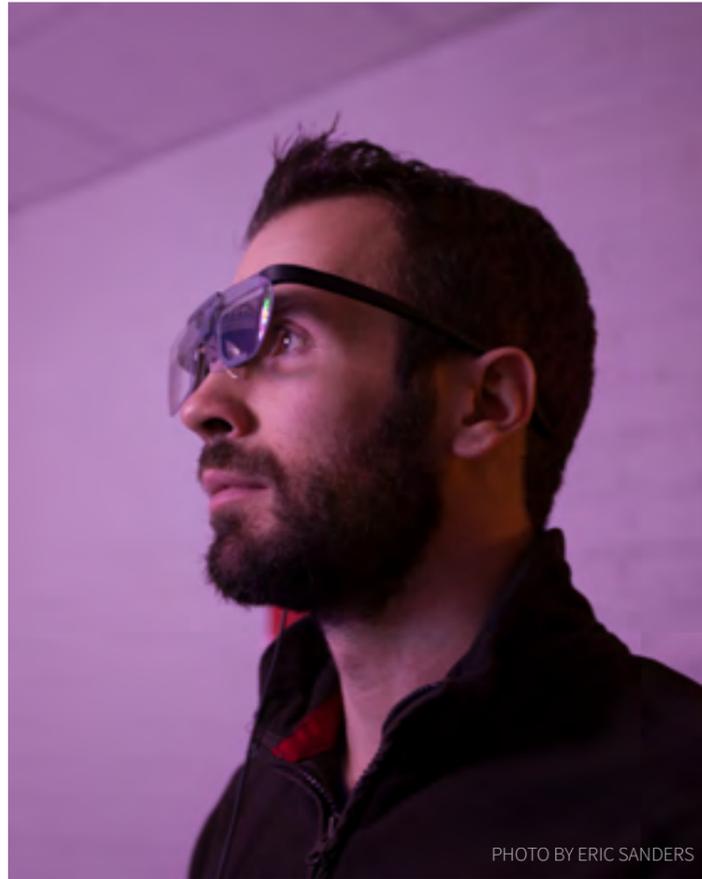


PHOTO BY ERIC SANDERS

Nick Van Dyke, a 5th year doctoral student in Mark Fillmore’s lab, demonstrates new eye tracking technology.

Fillmore’s next step includes studying how drugs may produce greater disinhibition and greater cognitive impairments when individuals are taking them in the context of parties and peer groups. He also plans to look at how individuals on social networks begin to use drugs and how their traits influence their peers.

“We are recognizing that a major contributor to drug abuse is peer influence, particularly among young adults,” Fillmore said. “We are asking: Do particular types of traits, such as disinhibition and poor impulse control, get passed along and more expressed under drugs in group settings?”

As Fillmore’s lab embarks on the next set of questions, they continue to move closer to solving the complex puzzle of addiction. &



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Sandra Martinez  
Senior - Geography

PHOTO BY ERIC SANDERS

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College of Arts and Sciences

# Outside our Borders

## Students gain invaluable experiences through education abroad

**FROM CHEMISTRY TO HISTORY**, the College of Arts & Sciences provides education abroad opportunities for every major, including study, research, service and teaching activities. Students can choose from among 14 faculty-led programs in a wide range of subject areas and locations.

“Education abroad is a life-changing experience for UK students. I have seen undergraduates hesitantly depart for a semester or summer abroad, only to see them return bursting with excitement about all the things they experienced,” said Sue Roberts, professor, Department of Geography, and UK Associate Provost for Internationalization. “As their teacher and mentor, I can’t help but notice how these students return to campus more confident, mature and engaged in the classroom.”

Through generous donor involvement and investment, A&S students are able to ease the financial burden of studying abroad through travel grants such as the Trunzo Scholars Program and Zolondek Scholarships.

## Faculty-led Education Abroad programs include:

- Studying nationalist politics in Spain
- Studying language, art and history in Italy
- Learning Arabic in Amman, Jordan
- Learning about urban sustainability in Shantou, China
- Working for a nonprofit in Cape Town, South Africa
- Researching environmental issues in Oaxaca, Mexico

## Trunzo Scholars Program

The Trunzo Scholars Program began this past summer and allowed seven College of Arts & Sciences students to participate in education abroad or professional internship opportunities. Established by Robert N. (Political Science '78) and Anne Trunzo of Brookfield, Wis., the Trunzo Scholars Program was designed to help political science and pre-law students expand their academic and professional horizons through education abroad and internship opportunities. The first class of Trunzo Scholars included students who spent the summer interning in areas of politics, government, law, or public policy and in education abroad programs based in South Africa, Morocco and Spain, England and Peru.

## Zolondek Holocaust, Winter Break and European Studies Scholarships

The Zolondek Holocaust Scholarship awards scholarships for students to visit Paris, Amsterdam/Haarlem, Berlin and two other European cities and sites related to the Holocaust. The Winter Break Scholarship allows students to travel to London, Paris and Berlin, and the European Studies Scholarship awards students the ability to independently study a theme over the summer as they travel to specific areas in Europe.

“What made my experience unique was not only increasing my understanding of Spain’s history but also learning to be independent and navigating a new environment. I learned to rely on myself and react positively in difficult situations. I learned how to navigate a foreign country completely on my own. I was able to meet amazing people who were doing some pretty incredible things with their experiences abroad. Aside from expanding my educational experience, **I truly learned more about the kind of person I am and want to be.**

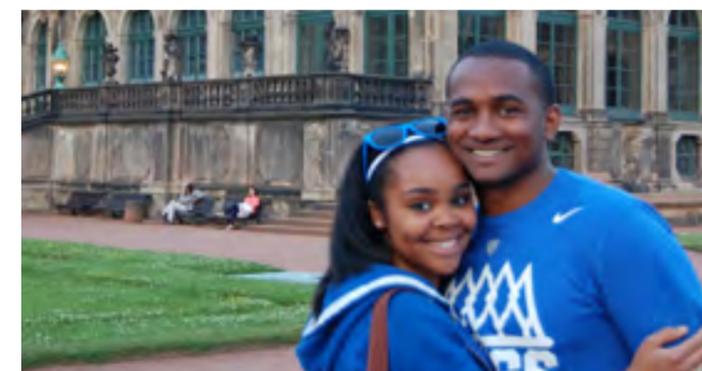
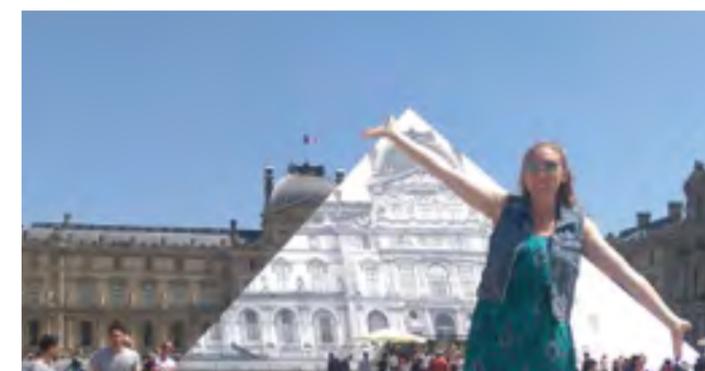
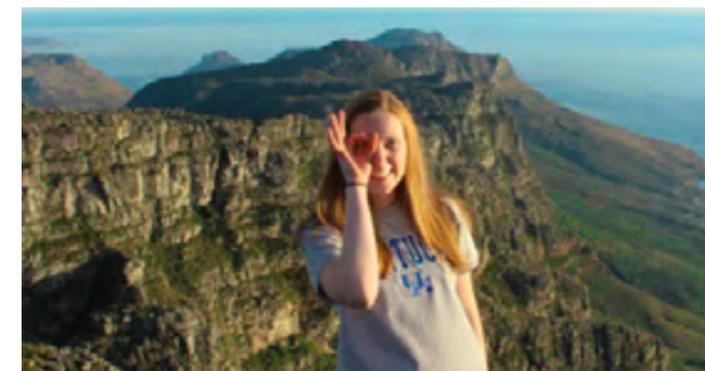
—Shiza Arshad

International Studies, Chinese Language and Literature, and Gender and Women’s Studies, '16  
Zolondek European Studies Travel Grant recipient

“I took a course on the history of South Africa prior to departing on my trip, so **visiting the places I read about in textbooks, such as Nelson Mandela’s jail cell on Robben Island, was surreal.** The summer I spent interning in South Africa only confirmed my desire to pursue a career in the legal field fighting for human rights.

—Kassandra Satterly

History, '17  
Robert and Anne Trunzo Scholarship recipient



“This trip made me step out of what I was comfortable doing. Having to plan the entire trip, be trusted with all the money, and at the same time be exposed to such heavy material at the different memorials and museums, was an experience I’ll never forget. I learned so much and the things that I learned I will take with me wherever I go.

—Rebecca Joel

Biology and German, '17  
Zolondek Summer Travel Grant recipient

“I believe that my education abroad experience will greatly expand and increase my classroom learning. I have gained a lot of confidence from the knowledge that the education I have received here at UK has prepared me well to compete with students from other universities.

—William ‘Evan’ Nixon

Political Science, '18  
Robert and Anne Trunzo Scholarship recipient

Want to help UK students take on the world? For more information about the Arts & Sciences International Education Fund, contact Laurel Hostetter at (859) 218-5551 or [laurel.hostetter@uky.edu](mailto:laurel.hostetter@uky.edu).

# Limitless Potential

Stellar student racks up prestigious awards

By Whitney Hale

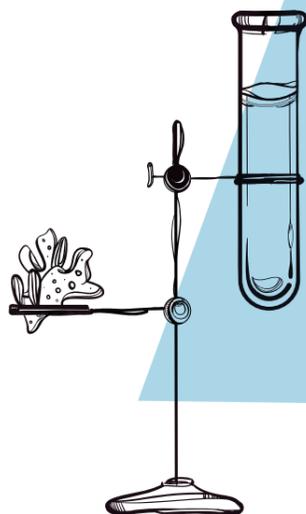
**THE ASTRONAUT SCHOLARSHIP FOUNDATION (ASF)** selected University of Kentucky senior Corrine Faye Elliott as one of this year's 40 recipients of the prestigious \$10,000 scholarship. The ASF Scholarship is presented annually to outstanding college students majoring in science, technology, engineering or math (STEM). Earlier this year Elliott was awarded the Goldwater Scholarship, which recognizes outstanding students who wish to pursue careers in the fields of mathematics, the natural sciences and engineering.

For more than 30 years, the ASF has identified and supported the best and brightest undergraduate students pursuing educations in STEM fields across the nation. The Astronaut Scholarship is known for being among the most significant merit-based scholarships awarded to undergraduate STEM students. Candidates must be nominated by faculty of the participating universities based on their display of initiative, creativity and excellence in their chosen field.

ASF has awarded more than \$4 million to deserving students around the U.S. to date. UK students have earned a total of \$171,000 from the ASF since 1998.

The daughter of Kathleen Elliott and UK political science professor Stephen Voss, Elliott is currently majoring in mathematics and minoring in chemistry, statistics and computer science at UK. A passion for mathematics started early for Elliott, an interest in science, particularly chemistry, would come later for her.

"From a very young age, I was fascinated by the logic and beauty inherent to mathematics; I never questioned adopting it as my field of specialization. My studies in chemistry came as a bit more of a surprise, arising largely from enjoyment of the research in organic chemistry that I undertook in my junior year of high school and never abandoned," Elliott said.



Corrine Elliott, a senior majoring in mathematics and minoring in chemistry, statistics and computer science, works closely with Associate Professor Susan Odom in her organic chemistry lab.

Elliott has been encouraged by family and educators alike to pursue her STEM studies. She grew up in a family headed by two teachers and an older brother, UK medical student Gareth Voss, who created an educational environment at home.

In high school, Elliott enrolled in the STEM magnet program, the Math Science and Technology Center, at Paul Laurence Dunbar High School in Lexington, which allowed her to delve deeply into mathematics and encouraged her to get involved in scientific research.

The third major event for Elliott was being accepted to work in Assistant Professor Susan Odom's organic chemistry research laboratory at UK. During her high school years, Elliott's research with the Odom Group focused on the synthesis and characterization of organic molecules for use as redox shuttles in lithium-ion batteries, and later on battery fabrication and analysis. Odom went on to encourage Elliott to pursue her more recent undergraduate research that brings together her studies in both mathematics and chemistry in the field known as computational chemistry.

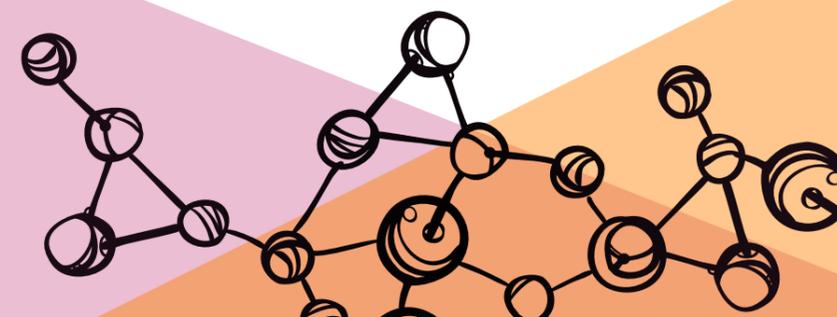
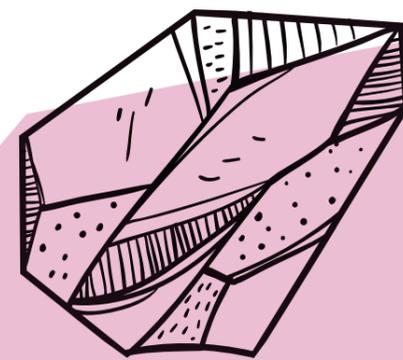
"Dr. Odom has invested a great deal of time and energy in supporting my research and my education more generally. She is

a fantastic mentor, simultaneously guiding me and allowing me the freedom to conduct the research I care about, most notably by encouraging my initial forays into computational chemistry so that I could build a bridge between my internship and my scholarly interests," Elliott said.

Elliott also is grateful for the guidance and assistance of two other mentors at UK, her advisor Grzegorz Wasilkowski, professor of computer science, and Chad Risko, assistant professor of chemistry.

Last summer, Elliott advanced her research with funding from a fellowship from the Organic Chemistry Division of the American Chemical Society (ACS). Her research proposal, "Steric Manipulation of Electrochemical Potentials in Conjugated Organic Molecules," involves the design of synthesis of phenothiazine derivatives targeted at overcharge protection of high-voltage cathodes in lithium-ion batteries. The proposal is based on preliminary results found under the guidance of research with Odom and Risko.

Elliott will earn her bachelor's degree in mathematics this May. She is also currently pursuing a master's degree in statistics as part of the University Scholars Program at UK. As part of that program, Elliott will likely complete her master's degree by May 2018. &



# Biology & Basketball

## Q&A with Paige Poffenberger

Paige Poffenberger, a freshman from Morgantown, W.Va., began her University of Kentucky career this past fall as a biology major and Spanish minor. A National Merit Scholar and recent walk-on to the UK women's basketball team, Poffenberger has a passion for volunteering, travel and art, and is a self-proclaimed nerd who loves biology and trying anything new. We recently caught up with Poffenberger to find out more about her transition to UK, life as a college athlete and her future plans.

### How did you end up at UK?

I had played basketball in the Lexington area before, so I knew that I really loved the town. That was the original reason I looked into UK. When researching UK, I really loved the study abroad opportunities and style of the core curriculum, so I went ahead and applied. When the university offered me the Patterson Scholarship for my status as a National Merit Scholar, I had no questions about taking the opportunity. I also coupled that with acceptance into the pre-med living learning program and honors program in the Biology Department. Everything just seemed to point to UK being the right school for me.

### Why did you choose to major in biology?

I love little kids and knew I wanted to work with them in some way. I volunteered in a children's hospital in high school and fell in love with the pediatric aspect of medicine and working in a hospital. Studying biology and being pre-med is a great way to combine my interest in medicine and love for children. I also had a high school biology teacher who was incredible and aided in my desire to pursue biology.

### What do you want to do with your degree?

I hope to go to medical school and go into pediatrics. In the future, I hope to spend time overseas working with a nonprofit whether it be for an extended period or for a few weeks each summer.



PHOTO BY ERIC SANDERS

### How long have you played basketball?

I've been playing basketball since I was five or six years old. I was on the varsity basketball team three of my four high school years, and we won three state championships in a row. I was the starting point guard my senior year and had some Division 2 and 3 teams show interest, but I wanted to focus on going to school for academics and didn't let being on a basketball team make the decision of where I was going to study.

### How did you end up walking on to the UK women's basketball team?

My mom saw an article about how many of the girls left the team last year and she assumed they needed players and encouraged me to contact them. This past summer was the first summer I didn't play basketball and I missed it so much. I emailed the basketball staff and let them know I was going to be at UK on a full academic scholarship and would be interested in walking on the team. I was invited to tryout and then got a call to speak with Coach Mitchell. From there it was a slow integration of working me into the program. A month and a half after the try-out, I was accepted on to the team. I never in a million years thought I would be playing basketball at the University of Kentucky!

### Are you involved in any other organizations at UK?

I had plans of having a lot of time to get involved and that is hard now with my commitments to the basketball team. The basketball team offers many volunteer opportunities, though. We go to the children's hospital a lot as a team and this semester I will be part of a program going to a local elementary school and having lunch with students on Wednesdays.



### What is the best thing so far about your freshman year at UK?

Traveling for the games. I've never been to Colorado, and Boulder was just breathtaking. We fly to every game, and it's an unbelievable experience. We were in Alabama recently and the University of Alabama campus was insanely beautiful. Soon we will be going to LSU and Auburn. I'll get to visit almost every SEC school by the time the season is over. I've traveled, but I've never traveled like this. These trips have definitely been the most special part of my freshman year. Either that or Big Blue Madness—it was crazy and seeing yourself up on the jumbotron was a surreal experience.

### What are you most proud of?

I'm someone who is very much a perfectionist, so doing things that have a completely unknown set of challenges or outcomes is difficult for me at times. I was very unsure of the walk-on process itself, not to mention how I was going to handle school and a new town with basketball if it were to work out. Being able to find it within myself to juggle the year so far has been something that I've taken a lot of pride in. I was proud of myself for taking the risk and jumping in to this year.

### How hard has it been to transition from high school to UK?

I'm about five hours away from home and my parents have visited to help me adjust to being away, but I haven't been too homesick yet. I took many AP classes in high school, so I felt prepared for college classes. I love Lexington and the balance of the countryside with the city.

The biggest adjustment has been getting used to the speed of how fast Division 1 athletes move. The 6 a.m. lifts were hard to get used to at first too. &



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