

ampersand

MAGAZINE OF THE COLLEGE OF ARTS & SCIENCES



IT'S TIME TO SHOW
THE WORLD WHAT

KENTUCKY CAN

ACCOMPLISH.

DEAN
Mark Lawrence Kornbluh
kornbluh@uky.edu

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

OFFICE OF PHILANTHROPY
Laura Sutton '89
lsutton@uky.edu
Debra Gold
debra.gold@uky.edu
Sydney Baker '17
sydney_baker@uky.edu
Teresa Waddle Gotthardt
teresawg@uky.edu

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

WRITERS
Jennifer T. Allen '00
Madison Dyment
Barbara Rylko-Bauer
Julie Wrinn

PHOTOGRAPHERS
Mark Cornelison | UK Photo
R. Wayne Cross
Julia Browning Harris
Sydney Janda
Eric Sanders '15
Callaway Stivers

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

Ampersand is published for alumni, faculty and friends of the College of Arts & Sciences at the University of Kentucky.

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

The University of Kentucky is committed to a policy of providing opportunities to people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, or physical or mental disability.

ON THE COVER
Students (l to r) Lindsay Tucker, Lilly Do, Sara Rastoder and Bear Brown, relax in the new Gatton Student Center. Dean Mark Kornbluh sat down with them to discuss their experiences as A&S students (p. 32). Photo by Sydney Janda.

BACK COVER
The new 378,000-square-foot Gatton Student Center opened this fall with high-tech spaces for students and visitors, dining and retail space, and extensive upgrades. Photo by Callaway Stivers.

NEWS & NOTES

2

HALL OF FAME

4

LETTERS FROM THE FIELD

Remembering Elizabeth Adelski

6

FULFILLING A DREAM

UK and the College of Arts & Sciences are helping former students complete their degrees

12

RHODES SCHOLAR

Q&A with Hadeel Abdallah

14

KENTUCKY CAN: THE 21ST CENTURY CAMPAIGN

17

ONE DAY. ONE GIFT. ONE ENORMOUS IMPACT.

20

REACHING FOR THE STARS

Biology senior Esther Putman has combined her love of biology, astronomy and engineering to follow her dream of a career in aerospace medicine

22

THE CHEMISTRY OF CANCER

Two A&S researchers are working toward redefining cancer treatments

26

MATERIALS CHEMISTRY AT UK HAS NEVER BEEN SO "FAB"

30

STRAIGHT FROM THE STUDENTS

A&S undergrads talk about campus life, learning and the value of connections

32



PHOTO BY ERIC SANDERS

Dear Friends,

As Dean, I often have the pleasure of sharing stories about the exciting work our students and faculty are doing in the College of Arts & Sciences. This edition of Ampersand captures a few students' stories. Rhodes Scholar Hadeel Abdallah (p. 14) and future aerospace physician Esther Putman (p. 22) are two of these students whose remarkable undergraduate careers demonstrate how the best and brightest of their generation can fully realize their potential at the University of Kentucky. I hope you find their aspirations and accomplishments as inspiring as I do.

Alumna Barbara Rylko-Bauer (Ph.D. 1985, M.A. 1980) pens a story in this issue bringing to life the indelible bonds that are often forged in graduate school. As she explains on p. 7, a small item in a recent department newsletter brought back memories of her long friendship with fellow graduate student Elizabeth Adelski. Their camaraderie in the Anthropology Department in the 70s and 80s is richly captured in Dr. Rylko-Bauer's article.

Several articles in this issue highlight the Department of Chemistry. Its new "Fab Lab" (p. 30) is offered as a course for students to gain real-world experience creating materials and models used in modern electronic devices. Graduate school, job opportunities and research positions are all more attainable for students who complete this course, and those like it, which allow students to gain practical experience. Another highlight in the Department of Chemistry is the work of researchers Phoebe Glazer and David Heidary (p. 26), who are exploring inorganic compounds for new cancer therapies. They are investigating how to kill cancer cells without harming healthy ones. Their research is funded by numerous external grants, but have also benefited from the support of the Arts & Sciences Academic Excellence Fund.

The Academic Excellence Fund and innovative health research are two of several funding priorities for the College of Arts & Sciences for Kentucky Can: The 21st Century Campaign. Launched last fall, this momentous campaign aims to raise \$55 million for the College, and we are counting on our alumni to take leadership roles in meeting that goal. You will read more about the campaign on pp. 17-19. My conversation with undergraduates Bear Brown, Lilly Do, Sara Rastoder and Lindsay Tucker (pp. 32-33) showcase several examples of how your generosity can impact our students and their range of opportunities both in and out of the classroom.

Please consider returning to campus for the 20th anniversary Arts & Sciences Hall of Fame celebration on October 4, 2019, to see for yourself the experiences of our impressive students and faculty and what Kentucky can do.

Sincerely,

MARK LAWRENCE KORNBLUH

Dean, College of Arts & Sciences
kornbluh@uky.edu

News & Notes



"Black in Blue," a documentary about the integration of the UK football team, directed by A&S alum and Academy Award winning documentarian Paul Wagner, premiered at the Virginia Film Festival this past November and was screened on campus this semester.

"Black in Blue" focuses on the story of the first four African-American players to play for the University of Kentucky. Wagner got the idea for the documentary when fellow UK alum Paul Karem, former quarterback who played for the University during its integration, brought to his attention that the role UK played in integrating the SEC is often glossed over. Wagner and Karem, who serve as the executive producers of the film, wanted to rectify this situation.

The first African-American football player in the SEC, Nate Northington, signed with the University of Kentucky in December 1965. The second, Greg Page, signed soon after that. However, they had to wait until the 1967 season to play, at which point two other black players had joined the team, Wilbur Hackett and Houston Hogg. Wagner's documentary tells the stories of these four men and the legacy they left on Southern football culture.

Wagner earned his bachelor's degree in English and linguistics, and a master's degree in communications research design at the University of Kentucky. Learn more about the documentary by visiting www.blackinblue.org.



(L to R) Paul Wagner and Paul Karem, "Black in Blue" filmmakers, spoke with Nate Northington, former UK football player; Mel Page, brother of former UK football player Greg Page; and Wilbur Hackett, former UK football player, during a panel discussion after the documentary premiere on campus.

Centennial of William Lipscomb's Birth

This December marks the centennial of the birth of notable UK alum and Nobel Prize recipient William Nunn Lipscomb, Jr. Born Dec. 9, 1919, Lipscomb lived most of his young life in Lexington, Ky., where he attended the University of Kentucky on a music scholarship and obtained a B.S. in chemistry. Following graduation in 1941, Lipscomb attended the California Institute of Technology, earning his doctorate in chemistry in 1946. From there, he taught at the University of Minnesota until moving to Harvard University to teach in 1959. Among his numerous achievements and honors, Lipscomb is most noted for his Nobel Prize-winning research on boranes, securing him the Nobel Prize in Chemistry in 1976. The College of Arts & Sciences and University of Kentucky are proud to be linked with Lipscomb's legacy and intend to continue to honor him with a celebration of his birth centennial hosted by the Department of Chemistry on Oct. 24, 2019.

UK to Transform Chemistry-Physics Building

The University of Kentucky Chemistry-Physics building is getting a much-needed transformation.

The central campus staple is currently under a two-phase construction project that will result in a renovation of the third floor, as well as a completely new exterior façade of the building, including a three-story entrance/atrium.

The first phase of the transformation, the third floor renovation, will produce 15 wet-bench research labs, plus support spaces, equipment spaces and offices. The second phase will be the new exterior façade, which includes replacement of the building exterior, stair tower, freight elevator and roof; construction of a new loading dock and entrance additions; and mechanical upgrades in the penthouse.

"When the renovation is complete, this building will be a much more pleasant, open and inviting place to learn," said Mark Meier, chair of the Department of Chemistry. "For students engaged in research projects, they will have modern laboratory spaces that are designed with modern science practice in mind."

Stay up-to-date on the renovation and watch as the Chemistry-Physics building, originally completed in 1962, transforms at www.as.uky.edu/chem-phys-transformation.



Department of Geography Celebrating 75 Years

The UK Department of Geography celebrates its 75th anniversary this year. Founded in 1944, the department's establishment was due in no small part to the need for cartographers and students of human geography demonstrated by the military during the second World War. In an official announcement, then UK President Herman Lee Donovan explained his decision to recommend the establishment of the Department of Geography, stating, "The war has made everyone more conscious of the need of a knowledge of geography. The Army and Navy have recognized that it is essential that the soldiers and sailors know a great deal about the peoples of other lands, their habits and customs, climate, land masses, resources and many other things that are essential information for a citizen of the world."

The Department has grown significantly since its inception. While early majors were taught standard mapmaking skills and human geography, undergraduates in 2019 have the opportunity to take classes covering topics as advanced as geographic information systems and sciences, computer cartography and remote sensing technology. The Department of Geography's 75th anniversary is being celebrated with a series of events throughout the 2018–2019 academic year and will conclude with the 47th annual Ellen Churchill Semple day on April 26, 2019. Professor Karl Raitz will open the day with a talk, "An Archipelago of Risk: Making Bourbon, and Heritage, in Nineteenth-Century Kentucky," at 2 p.m. in the W.T. Young Library UK Athletics Association Auditorium. Attendees will reconvene at the Lyric Theatre at 6 p.m. for a banquet celebration. For further information, visit geography.as.uky.edu/75th-anniversary.



Celebrating Excellence Hall of Fame 2018

THE COLLEGE OF ARTS & SCIENCES INDUCTED SIX NEW MEMBERS INTO ITS HALL OF FAME



PHOTOS BY CALLAWAY STIVERS AND R. WAYNE CROSS

Alumni Inductees

Jennifer L. Garr, Topical Studies B.A. '86, was inducted for her contributions to the branding and communications industry, leading brand strategy and communications initiatives for successful brands all over the world. In addition to her professional pursuits, she has proved an active and productive citizen, serving on the board of directors for a number of philanthropic ventures and sharing her expertise as an adjunct professor at the College of Charleston, as well as serving on the Arts & Sciences National Strategy Council.

W. Bruce Lunsford, Political Science B.A. '69, has founded and led multiple businesses in Louisville employing over 100,000 individuals nationwide. In addition to his business pursuits, he has maintained a close relationship with UK, serving as a member of the Board of Trustees from 1983 to 1987, and has proven himself a dedicated civil servant, serving as Kentucky's Secretary of Commerce from 1981 to 1983.



Jennifer L. Garr



Rodney F. Page



Dr. David M. Allen



Dr. Sheldon M. Steiner



INDUCTION CEREMONY
& RECEPTION

SAVE
THE
DATE

OCTOBER 4 2019

Faculty Inductees

Rodney F. Page, Political Science B.A. '68, was inducted for his successful career in law. Having graduated from Harvard Law School in 1971, he joined Washington, D.C., law firm Arent Fox Kinter Plotkin & Kahn, remaining until 1997. He then moved on to Bryan Cave Leighton Paisner, where he worked in a number of leadership positions. He has also been active in his community, serving as a member of his local school board and in a number of positions in his church.

LaVon Williams Jr., General Studies B.G.S. '80, was a member of the 1978 national champion UK basketball team and is now known as an artist. Using traditional wood-carving techniques passed down through his family, he creates art depicting contemporary African-American life. A retrospective of his artwork, "Rhythm in Relief," was mounted by the Kentucky Folk Art Center of Morehead, Ky., in 2009 and traveled extensively in Kentucky and Ohio.

Dr. David M. Allen, Agriculture B.S. '61, M.S. '64 (Department of Statistics), was raised on a farm near Sebree, Ky. He discovered the field of statistics while conducting his master's research and was the first faculty member hired by the Department of Statistics when it was founded in 1967. Over the course of his career, he served five years as department chair, two terms as director of graduate studies and mentored many students who have gone on to successful careers.

Dr. Sheldon M. Steiner, Microbiology M.S.'64, Ph.D. '67 (Department of Biology), returned to UK as an associate professor in 1978 after spending a decade building his skills at other universities. Over the course of his long career at UK, he was the chair of the Department of Biology for three years and associate chair for another. A beloved mentor, his research has made significant contributions in the fight against cancer through his focus on the development of methods to inhibit cancer growth.

Make plans to join us for the Arts & Sciences 20th Anniversary Hall of Fame Induction Ceremony & Reception on Friday, Oct. 4, 2019.

This year's alumni inductees are Anne C. Deaton, English BA '67; Gerald L. Smith, History BA '81, MA '83, Ph.D. '88; Stephen B. Sullivan, Geology BS '79 MS '83; and Robert N. Trunzo, Political Science BA '78. This year's faculty inductees are Dr. Bradley C. Canon (Department of Political Science) and Dr. Penny Miller Harris, Political Science B.S. '64, Ph.D. '86, (Department of Political Science).

We will honor not only this year's new class of inductees, but every previous class since 1999.

Visit

www.as.uky.edu/halloffame
for more information.



Elizabeth Adelski (left) and Barbara Rylko-Bauer (right) during their time as graduate students in the Department of Anthropology.

ALUMNI SPOTLIGHT

&

LETTERS FROM THE FIELD:

Remembering Elizabeth Adelski

This story, a first person account written by an alumna of the Anthropology Department, highlights the deep friendships formed in the College of Arts & Sciences that, in many instances, transcend location and time.

By Barbara Rylko-Bauer ('80 M.A., '85 Ph.D.)

When I received a copy of the Anthropology Department's newsletter last summer, one item announcing the recipients of the Adelski Dissertation Research Award brought back memories of my graduate school experience at UK and the special relationships forged during those formative years.

Elizabeth Adelski arrived in Lexington in 1977, the year after I started graduate studies in anthropology. She had a crazy sense of humor, an infectious joie de vivre and an appreciation for good food—so it was not surprising that we became fast friends, finishing our dissertations within a couple years of each other. We went our separate ways but continued to stay in touch—it was a friendship that time and distance never diminished and it lasted until Elizabeth's unexpected death from a sudden heart attack on May 29, 2011.

I was not surprised to learn that Elizabeth remembered the Department in her will. In later years, we would talk about the camaraderie among our fellow students lasting well past graduate school. We appreciated the support we received from various faculty and the well-rounded training that helped to prepare us for the "real world," both inside and outside of academia. Last, but not least, we'd remember the great parties. The departmental tradition of passing around a bottle of mezcal and having to "eat the worm" as the final act on the Ph.D. journey—this began when we were students at UK. I was six weeks pregnant at my defense, so I passed on the mezcal, but I did eat the worm.

CONTINUED ON PAGE 8»

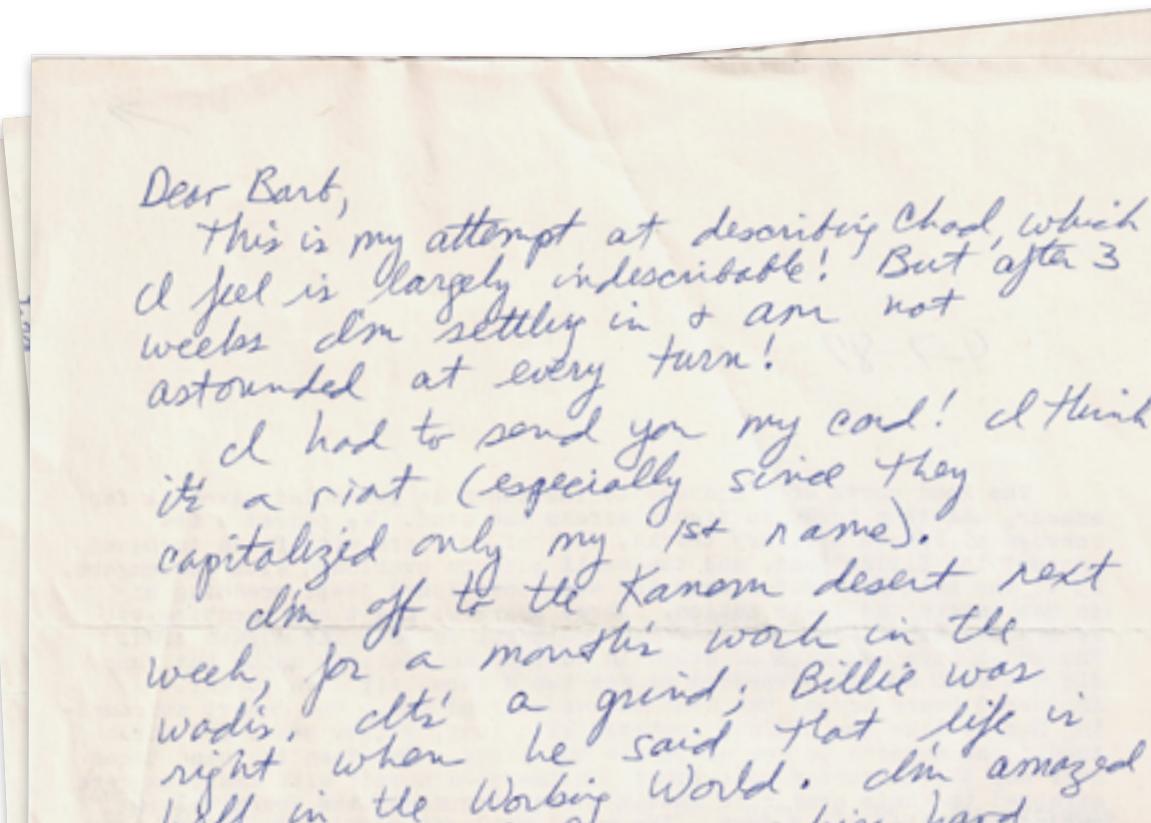
» CONTINUED FROM PAGE 7

Elizabeth was a great letter writer. When she began her first post-dissertation job, working for CARE in Chad, she sent me a five-page letter soon after her arrival: "My attempt at describing Chad, which I feel is largely indescribable!" It read like part fieldnotes, part travelogue, as did the second letter, written three weeks later—in which she even included some sand from the desert! I still have these and subsequent letters, the majority from her period of longer-term development work in Chad (1987–88) and Burundi (1989–1993), and they bring Elizabeth back to life.

The road north of N'djamena to the Kanem is pot-holed pavement for an hour, and then turns to tracks across the sand. We passed a few convoys of French military trucks, full of soldiers with faces turbaned against the flying sand... Three hours of heat and lurching til we reached Massakory, an old French colonial outpost and market town. The local dive was full of Arabs in turbans and wailing music but they did not seem at all surprised to see two Nazaras sit down to eat.

Thus starts Elizabeth's first letter, dated April 7, 1987. She was on her way to Nokou, Chad, a town of 1,000 souls perched on the edge of the desert, the end of the world.

This is home for the next month. The wadis are... palmy, shady, and patchy green in the midst of the desert, but they aren't paradise. The stagnant water stinks, salt encrusts the earth, the dirt looks like sand. The [farming] parcels are almost pathetic, 10 by 20 meters of scraggly tomatoes, manioc, onions. The chadoufs are everywhere, with people hauling up buckets of water, pouring it down an earthen



Elizabeth's first letter
from Chad, April 7, 1987.

channel to let it soak into the ground. Women bend over in the sun, chopping out a space to plant grain. Kids chase the burros away from the crops, loading them up with firewood and marching them home. Everything is hot, dusty, painful; the peoples' feet and hands are large and calloused at the end of long thin limbs. Is it possible that people survive like this? Looking at the fierce desert frightens me; how can they live here? It is my turn to come to understand their knowledge.

These early letters reveal a common theme found in doing fieldwork in unfamiliar places, as Elizabeth acknowledges in another letter sent four months later:

I realize now that my 1st 3 months here were a shock—culture shock and to my health—and now that I'm used to the scene I feel better. I also boil and filter my water, or I get sick. The desert and heat and isolation and Arabs with their daggers no longer make me feel on edge; familiarity is a great advantage.

And a half-year later, she admits:

Chad has a hold on me now: my French is good and I can understand most of the Arabic I hear though my speaking is limited. I have a great time holding fractured conversations; the Chadians I work with crack up and say they have to be careful what they say about the honkies now, and the peasants laugh in delight... I really enjoy it and regret that I don't have the time to study it formally... Plus there's so many things here that fascinate me, that I'll regret the day I leave.



(Right): Elizabeth with women in Niger, 1994.
Photographer unknown.

Of course, such familiarity did not eliminate the challenges of living with extreme heat, the ever-present sand, dirt, scorpions and flies, and the loneliness that sets in when one is away for long periods of time from family and friends. Elizabeth would repeatedly urge me to write more often and to send reading material—books, magazines, the National Enquirer, news of the outside world, ending one letter with the exhortation: "Eat ice cream for me!!! And frozen yoghurt and salads and watch TV (I miss it!) and enjoy all the Consumer Goods!" I, in turn, would send her care packages with items she yearned for, like underwear, chapstick, Flair pens, mint tea and jelly beans.

In rereading the letters, I was struck by Elizabeth's sensitivity to both the beauty and the suffering of those she was privileged to work with and learn from:

The women here are incredible. They have such endurance; their work is like slave labor. They have such beautiful faces—rings in their noses, huge earrings, amulets/jewelry. In the south, some still wear big lip-plugs... I am interviewing the women about agricultural work and food use/preparation. I can tell you—it's backbreaking—in addition to domestic chores (day-long searches for firewood on foot, 2 x/week, pounding grain, hauling water) and I have pictures of women in the fields, hoeing.

Elizabeth would often mention wanting to photograph the people but hesitated to intrude. With time and familiarity, this changed and I understand that she was an excellent photographer. I only have a few of such photos from the field. At other times she wrote about the hospitality of the local people—despite their poverty:

They brew tea—green with TONS of sugar, thick like syrup, and pass it around in small tumblers. They send me home with piles of yams, a squawking chicken, some eggs... I cannot refuse their hospitality, but it is hard to be gracious when I know that these people are eating only 2 times/day... living on ground sorghum mixed with powdered milk and water and unripe dates and jujubes, a wild fruit that is mostly pit. And after taking their time and food, I have to tell them that this is just a study; I cannot promise them anything. I find it hard to do, although they never ask for anything but always are glad to say hello and talk.

In some of her letters, Elizabeth expressed frustrations with unrealistic project deadlines, long working hours, endless paperwork and the dilemmas of gathering data from local people while realizing that their problems and the forces at play

CONTINUED ON PAGE 10 »

» CONTINUED FROM PAGE 9



(Right): Women at work; postcard sent March 1, 1994, from Niger.

in shaping their lives were much more complex and harder to impact. Writing again from Chad, this time in 1989, she complains about the unrealistic questions she is expected to ask:

[They] want to know what the farmers think of the project, where they expect to be in 5 years (!), what their aspirations in life are—all those American, unanswerable-except-in-hypothetical-terms questions that, at this point in my fieldwork, I find so trying and useless to ask. How ridiculous, to ask a struggling subsistence farmer where he ‘sees himself’ 5 yrs. hence. When I pull myself together and pose the question, they look at me like I’m a naïve imbecile and answer, ‘Right here, struggling along.’... This development game is so frustrating.

And yet from personal conversations, I know that Elizabeth believed it was important to try to make this work more relevant to the needs, issues and concerns of local communities. As she saw it, an anthropological perspective had potential for shaping international development, and without this input, things could be a lot worse. And she was good at doing this work.

Reading these letters brought back many memories of Elizabeth—as friend and anthropologist. The Adelski Dissertation Research Award offers another way of remembering a unique colleague. &

Barbara Rylko-Bauer (M.A. 1980, Ph.D. 1985) is a medical anthropologist, adjunct Associate Professor at Michigan State University and author of "A Polish Doctor in the Nazi Camps" and co-editor of "Global Health in Times of Violence." She also serves on the Society for Applied Anthropology Oral History Project, whose collection is located at the Louie B. Nunn Center for Oral History at the UK Libraries.

To support graduate students in Anthropology or any department in the College of Arts & Sciences, please contact the Arts & Sciences Office of Philanthropy at givetoas@uky.edu or (859) 323-7068.

17 colleges. 30,473 students. 280,000 alumni.

ONE UK.



**It only takes one — one day,
one gift — to make a difference.
Be the one who shows the world
what Kentucky can do.**

#ONEDAYFORUK 
UNIVERSITY OF KENTUCKY GIVING DAY 4-17-19

Fulfilling a Dream



There is no easy way to make entry again unless you know the new processes and people. Once you step out, you lose contacts and it's hard to find your way back. The Project Graduate program is a godsend.

— Joe Best, BLS '17
Veteran, Firefighter and UK Graduate

UK AND THE COLLEGE OF ARTS & SCIENCES ARE HELPING FORMER STUDENTS COMPLETE THEIR DEGREES

By Jennifer T. Allen

Joe Best had many life experiences in the short time he was an undergraduate student at the University of Kentucky. While a history major, he was also engaged, married, divorced and active in the Army Reserve. When his reserve unit was called up for Desert Storm in January 1991, it marked the end of his college aspirations. At least for right then.

"I guess you could say it was a storm of things that didn't make college very successful for me at the time," Best said. "I had no idea what I wanted to be or why I was going to college, and I was less than motivated."

While he was stationed at Fort Knox, Best was notified that he had a job with the Lexington Fire Department. That solidified his decision to leave college, just shy of a few credits to graduate, and begin a 28-year career as a firefighter.

"When I joined the fire department, you only needed a high school diploma," Best said. "I thought it was a no brainer and that I didn't need a degree."

Fast-forward 31 years from when he began college the first time and Best is in a cap and gown in Rupp Arena receiving his Bachelor of Arts in Liberal Studies.

"I wanted to put the lingering, nagging regret of not finishing my college degree behind me," Best said. "Also, as I progressed through the ranks of the fire department, it became clear that a college degree was necessary to move up."



Joe Best after the graduation ceremony with his son, Eric; sister, Susan; and mother, Fay.

Coming back to college after being out for so long was no easy feat, but the Project Graduate program made it much easier for Best. Project Graduate is a statewide initiative to assist adult learners who have accumulated 80 or more credit hours to return to finish their first bachelor's degrees. The program has been active at UK for more than 15 years and the College of Arts & Sciences has led the way, especially the last two years with its Bachelor of Liberal Studies degree and availability of online classes.

A&S is really at the forefront of looking at the students and offering a way for returning students to complete their degree with relative ease and flexibility.

— Aaron Vaught
Assistant Registrar

"As the largest college on campus, the College of Arts & Sciences has great depth and breadth in fields of study. This gives the Bachelor of Liberal Studies (BLS) flexibility in how past classes count toward the degree," said Ruth Beattie, associate dean of advising in the College of Arts & Sciences. "It's not that the BLS is any less stringent than any other degree. It is a rigorous degree, but the immense diversity of the college gives us the ability to place classes toward the degree that may not count for other majors. That expansive background in study also gives students the work life skills they need for any career."

In order to help as many students as possible obtain their degree through Project Graduate, an initiative to offer BLS classes online kicked off the spring 2018 semester and classes are continually being added. Courses are also being offered in eight-week sections to help make classes friendly for those who work full-time and have other obligations. Finances can also be a concern for many students, including those returning to school after an

absence. UK has launched an institutional loan specifically for select Project Graduate students to help with the financial strain of coming back to school to complete a degree.

"There are many resources available from the University and the College to help make sure Project Graduate students can be successful," said Aaron Vaught, assistant registrar.

Those resources extend to one-on-one advising, special registration times and BLS restricted classes. With almost 350 students enrolled in the program since 2016 and 221 degrees awarded in that time, the program is helping many students fulfill their goal of obtaining a college degree.

"Students may have halted their studies before graduation for personal, family, or health reasons, or work or armed forces obligations. This program is really giving students an opportunity to complete a degree they started in the past and then stopped," Beattie said. "It is improving the University's graduation rate, but more than that, it is affecting individuals that now have a university degree which opens more doors for them."

Once a student decides to stop pursuing a degree, it can seem daunting to try to navigate the system and come back after many years away. "There is no easy way to make entry again unless you know the new processes and people," Best said. "Once you step out, you lose contacts and it's hard to find your way back. The Project Graduate program is a godsend."

Now retired from the Lexington Fire Department, Best still feels there is time for another adventure or career which will only be positively impacted with his new bachelor's degree.

"I recommend the Project Graduate program 100 percent," he said. "I don't have the words to describe what it meant to walk in graduation and have my wife, son, mom and sister there. It meant so much to me." &

Rhodes Scholar

Q&A with Hadeel Abdallah

One of the highest honors for any student is having the chance to make history at their school. Hadeel Abdallah is one of those students. Having been the first woman from UK to become a Rhodes Scholar, Abdallah, a double major in political science and Arabic and Islamic studies from Lexington, Ky., has made strides not only for female students, but also for the Muslim community she so strongly advocates on behalf of. We had the chance to sit down with UK's latest Rhodes Scholar to discuss her passion for her community, public service, social justice and formative life experiences.

&: Did you always know what you wanted to do and what you wanted to major in when you went to college?

(HA): I came to UK undecided. Initially I was an English major, and I wanted to be an English professor. Now I'm a political science major, and I'm comfortable enough to say I don't know what I'm going to do yet. But you know what belief always gave me comfort in what I wanted to do? I always knew whatever work I will do will be undergirded by a lifelong desire to work towards an equitable society, a passion for social justice and a journey to uplift platform causes that are important to the world. For me, my journey at UK was about taking advantage of every opportunity, forever aware of these end goals. Though I still remain undecided about the exact career path I will take, I am certain in my beliefs that support profound, meaningful social justice for all.

&: Could you talk a little bit about what you got involved in at UK as a student and how that has helped you find your passion?

(HA): My sophomore year I became president of the Muslim Student Association at UK. The people I worked with were heavily engaged in the community. We started looking at the Syrian refugee crisis and wanted to channel our sense of hopelessness into something more positive and more beneficial, so we got in contact with Kentucky Refugee Ministries and the Islamic Society of Central Kentucky Refugee Resettlement Program, among other partners, to organize a benefit gala. We raised over \$30,000, and experiencing that impact we had on the refugee community was life-changing. It's where I realized students had the power to make such a difference, and community investment became even more important to me.

CONTINUED ON PAGE 16 »



PHOTO BY MARK CORNELISON | UK PHOTO

» CONTINUED FROM PAGE 15

That amazing experience led me to help create the Bilal Ibn Rabah scholarship endowment, which provides funding and mentorship for underrepresented UK students, including students from our undocumented community. I believe this approach is crucial because mentorship has been invaluable to my intellectual development at UK. My mentors in the College of Arts & Sciences have exposed me to different aspects of academia, activism and community engagement, challenging me to think critically. Knowing their diverse perspectives on how to apply classroom knowledge to the real world has enabled me to think within an empowered framework to help my community.

&: How did you feel when you found out you received this prestigious award?

(HA): I instantly thought of my mother and father. They've done such an incredible job instilling positive attributes of faith, perseverance and integrity in my siblings and me, and without their amazing, selfless guidance and sacrifice I wouldn't have been able to even dream of what I have done. They've always emphasized the importance of family and community, and it is because of how they've taught me to think that I am now able to do what I do.

Everything else has been great—the opportunities and the connections—but I think when you make the people you love really proud of you, it's a special type of feeling.

&: What does it mean to you to be the first female to be awarded the Rhodes Scholarship at UK? You are now a significant part of UK's history.

(HA): It is always humbling to be told that you are part of a history. The gravity of this award makes it even greater because it's disproved a lot of stereotypes people have about Muslim women. It's really changed the way a lot of people hold conversations with me. It went from, "So, are you comfortable in your own skin? Are you okay with looking like that?" to "You're such an inspiration for my daughter." It has created opportunities to have conversations about topics that before, people were too shy to discuss.

&: What message do you have for other girls who may be interested in attaining something like a Rhodes Scholarship?

(HA): Do not doubt yourself. Find a mentor who believes in you and stick with them. Don't be afraid to ask questions about things you're unsure of, and don't be afraid to be straightforward. I have a pretty goofy personality, and I think that part of me shined through in my interviews. I know how difficult staying true to oneself can be in these situations, but it's totally worth it in the long run. Once you break out of acting upon the expectations you think others are placing on you, you will



Hadeel Abdallah, political science and Arabic and Islamic studies senior, at the White House.

respect yourself more over time, and that will have an effect on how others view you. Act like yourself. People appreciate you.

&: Where does your passion for public service come from?

(HA): I think this enthusiasm to give back is something that's been instilled in me since I was a kid. My family had a huge part to play in all of it: both of my parents are very giving people, and my siblings Kasem, Taha, Bader, Hanean and Nima don't hesitate to help me develop in my character and in my outlook on life. Their immense generosity towards me shows that positive action starts with your inner circles and expands outward.

KENTUCKY CAN.

THE 21ST
CENTURY
CAMPAIGN


In September 2018, the University of Kentucky launched *Kentucky Can: The 21st Century Campaign*, a comprehensive, historic undertaking that will support our core mission of educating the next generation, advancing knowledge through world-class research and bettering the lives of the people of the commonwealth, the nation and the world, today and long into the future. Over the next few years, UK aims to raise \$2.1 billion to support programs that make a difference every day. Through a focus on student success, research and increasing our endowment, this campaign will build upon the enormous progress of the university over the last decade and ensure our place as one of the nation's preeminent public universities for future generations.

For the College of Arts & Sciences, we hope that our alumni, who number over 50,000, will take a leadership role in our monumental effort. We are the oldest and largest college in the university, teaching 85 percent of general education credit hours and almost half of all undergraduate credit hours. We aim to raise \$55 million towards the University's overall goal, and we are well on our way—as of March 1, 2019, \$45.5 million has been raised. Much of the credit for this incredible progress is owed to the generosity and tireless efforts of our A&S Campaign Committee, whose 17 members began their work behind the scenes a full year in advance of the Campaign launch in September 2018. The breadth and depth of their service to the College, UK and Kentucky is hard to overstate.

There are many ways that you can join our dedicated committee members in making a difference. Consider attending a UK alumni event regularly held in many regions of the U.S. or an Arts & Sciences event featuring one of the College's 440 faculty members speaking about their teaching and research. Meet with a volunteer Campaign Committee member in your area—their cities of residence are listed on page 19—to learn more about how you can participate in the campaign. Our philanthropy officers travel widely and are available to meet you where you live or work. Finally, return to Lexington for Homecoming weekend on October 11-12, 2019, or visit us anytime your schedule brings you to Lexington. We would love to see you, and I know you will enjoy reconnecting with your department, seeing for yourself how the campus has been transformed and meeting our students.

Kentucky Can is essential for ensuring the College's continued growth and success. More important, it will expand our mission of education and service to the state. We are undertaking an ambitious effort but a necessary one. It is time to inspire others, to stand together, to show everyone that there is no limit to what the University of Kentucky can do.

Sincerely,



MARK LAWRENCE KORNBLUH

Dean, College of Arts & Sciences

KENTUCKY CAN FUNDING PRIORITIES FOR THE COLLEGE OF ARTS & SCIENCES

- A major focus of the campaign is support for innovative research, particularly research focused on Kentucky's health disparities. Disproportionately, Kentuckians suffer from cancer, diabetes, obesity, cardiovascular disease and substance abuse. UK is assembling teams across disciplines, including A&S faculty in Biology, Chemistry and Psychology, to study these concerns and develop solutions that will not only help Kentuckians but also strengthen and cure communities nationally and globally.
- The Arts & Sciences Academic Excellence Fund supports scholarships to deserving students, summer internships that lead students towards a career path and hands-on research that introduces a myriad of opportunities for exploring science or preparing for medical training.
- The Wimberly C. Royster Arts & Sciences Graduate Excellence Fund provides support to attract and retain the most talented graduate students. Graduate education is the linchpin of teaching and research, and the College produces the most doctoral degrees at UK.
- Endowed support is critically important to the long-term success of the College, enabling us to attract and retain top faculty, create innovative programs and expand and support the research enterprise, distinguishing the University among its peers.
- The magnificent Don & Cathy Jacobs Science Building is an example of how modern, thoughtfully designed space can have an impact on our mission and student success. We have a vision to transform the Chemistry-Physics (p. 3) and the Psychology buildings in the same manner. Campaign gifts will provide the space and resources students and faculty need to make groundbreaking discoveries.
- Increasing our scholarship fund also will increase our graduation rates. The College of Arts & Sciences is committed to helping students stay in school and graduate on time. We are graduating more students than ever before, and most of those are graduating in four years or less. We plan to build upon this momentum, graduating more students with less debt who are eminently prepared to join the workforce.



College of Arts & Sciences Philanthropy team (l to r): Sydney Baker, Julie Wrinn, Debra Gold, Teresa Gotthardt and Laura Sutton.

A&S CAMPAIGN COMMITTEE

Ethelee Davidson Baxter (Lee), '61 English; resides in San Francisco

Kip Cornett, '77 Bachelor of General Studies; resides in Lexington. Committee Co-Chair

James C. Eaves, Jr. (Jim), '68 B.S. Math; resides in Louisville

Mary G. Eaves, '72 B.A. Political Science; resides in Louisville

Charles L. Grizzle (Charlie), '73 B.A. English; resides in Miami and Washington, D.C.

Sandra L. Helton (Sandy), '71 B.S. Mathematics; resides in Chicago and Tuscon. Committee Co-Chair

Milton Huffaker, '57 B.S. Physics; '13 Honorary Doctorate; resides in Boulder, Colorado

Curtis Hull (Curt), '78 B.S. Geology; resides in Arvada, Colorado

Karl B. Raitz, Ph.D., 1970–2013 faculty in Geography at UK; resides in Lexington

Jill Rappis, '80 B.A. English; resides in Chicago

Robert E. Rich, '66 B.A. English; resides in Cincinnati

William F. Schweri II (Bill), '69 B.A. and '78 M.A. in Anthropology; resides in Lexington

Robert A. Stokes (Bob), '64 B.S. Physics; resides in Golden, Colorado

Stephen B. Sullivan (Steve), '79 B.S. and '83 M.S. in Geology; resides in Louisville

Gregory J. Swanberg (Greg), '85 Bachelor of General Studies; resides in Scottsville, Virginia

Joan Swanberg, '81 B.A. in English; resides in Scottsville, Virginia

Thomas F. Whayne Jr. (Tom), M.D., Professor of Medicine at UK; resides in Nicholasville, Kentucky

Students Sara Khandani, biology senior (left), Sierra Hatfield, political science senior (top) and William Jackson III, psychology senior (bottom), spoke at the Capital Campaign kickoff in September 2018.

Dean Mark Kornbluh (middle) spoke with alumni and friends at the College of Arts & Sciences annual Hall of Fame celebration.

ONE DAY. ONE GIFT. ONE ENORMOUS IMPACT.

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

Many areas throughout the University have targeted specific funds for One Day for UK and the College of Arts & Sciences is raising money for the Arts & Sciences Academic Excellence Fund to support:

**SCHOLARSHIPS
EDUCATION ABROAD OPPORTUNITIES
STUDENT SUCCESS PROGRAMS**

"The College of Arts & Sciences Academic Excellence Fund helps prepare our students for a global world by making sure they have access to well-rounded, enriching experiences while at UK. The generosity of our donors enables the College to allocate funds quickly toward innovative solutions and opportunities for our students and faculty. The impacts of this fund are far-reaching and have many lasting benefits."

MARK LAWRENCE KORNBLUH

Dean, College of Arts & Sciences

IN ITS FIRST YEAR, THE GOAL OF ONE DAY FOR UK IS TO RAISE AWARENESS ABOUT THE CAMPAIGN AND TO GENERATE SUPPORT FOR UK.

"This is a chance for people to show their UK pride," said Sarah Fitzgerald, associate director of annual giving and One Day for UK organizer. "Many people are unaware of the many areas they can support at UK. This is a chance for us to spend one day celebrating UK, teaching people about the different ways they can support the University and showing them how they can help us continue to grow."

By conducting the campaign online, UK hopes to reach a broader audience, including reconnecting with alumni, engaging young alumni and motivating its strongest supporters to make a gift. In addition to financially supporting the college, unit or cause of their choice, supporters can repost messages, spark conversation about UK online and encourage their friends and family to give.

"It is a community effort," Fitzgerald said. "Together, we can make a huge impact on campus through One Day for UK. We can provide more scholarships and research opportunities for students, give our colleges and departments the resources they need to be successful and strengthen our creative and outreach efforts, which help transform the Commonwealth."

One Day for UK also supports the University's comprehensive campaign, *Kentucky Can: The 21st Century Campaign*, which increases opportunities for student success, funds innovative research, improves health care, strengthens the alumni network and supports athletic programs.

UK will be mailing information about One Day for UK to all alumni. People can make a gift through the mail or at <https://uky.networkforgood.com> before April 17 to the college, unit or cause of their choice. Once they complete the gift information on Network for Good, donors can check a box to have their gift applied to the overall One Day for UK total.

On April 17, all supporters should visit <https://onedayforuk.uky.edu> to make a gift, to track the campaign's progress and to read stories about how the campaign benefits UK. All of the college, department and unit funds will be listed on that page.

To join the online conversation, people should follow **#OneDayforUK** on all social media platforms throughout March and April to learn more about the campaign and to discuss how donor support and UK shaped their lives. &

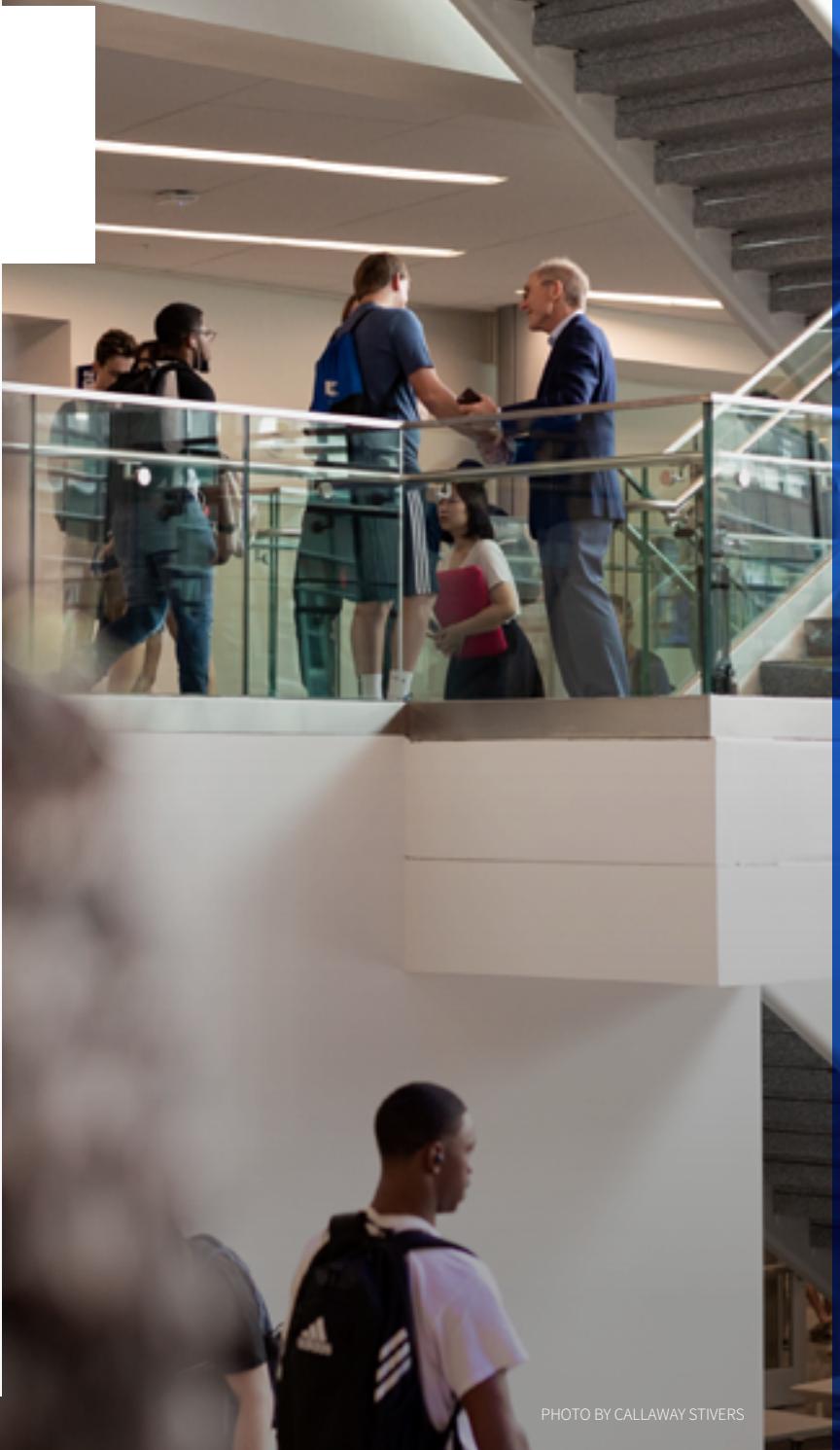
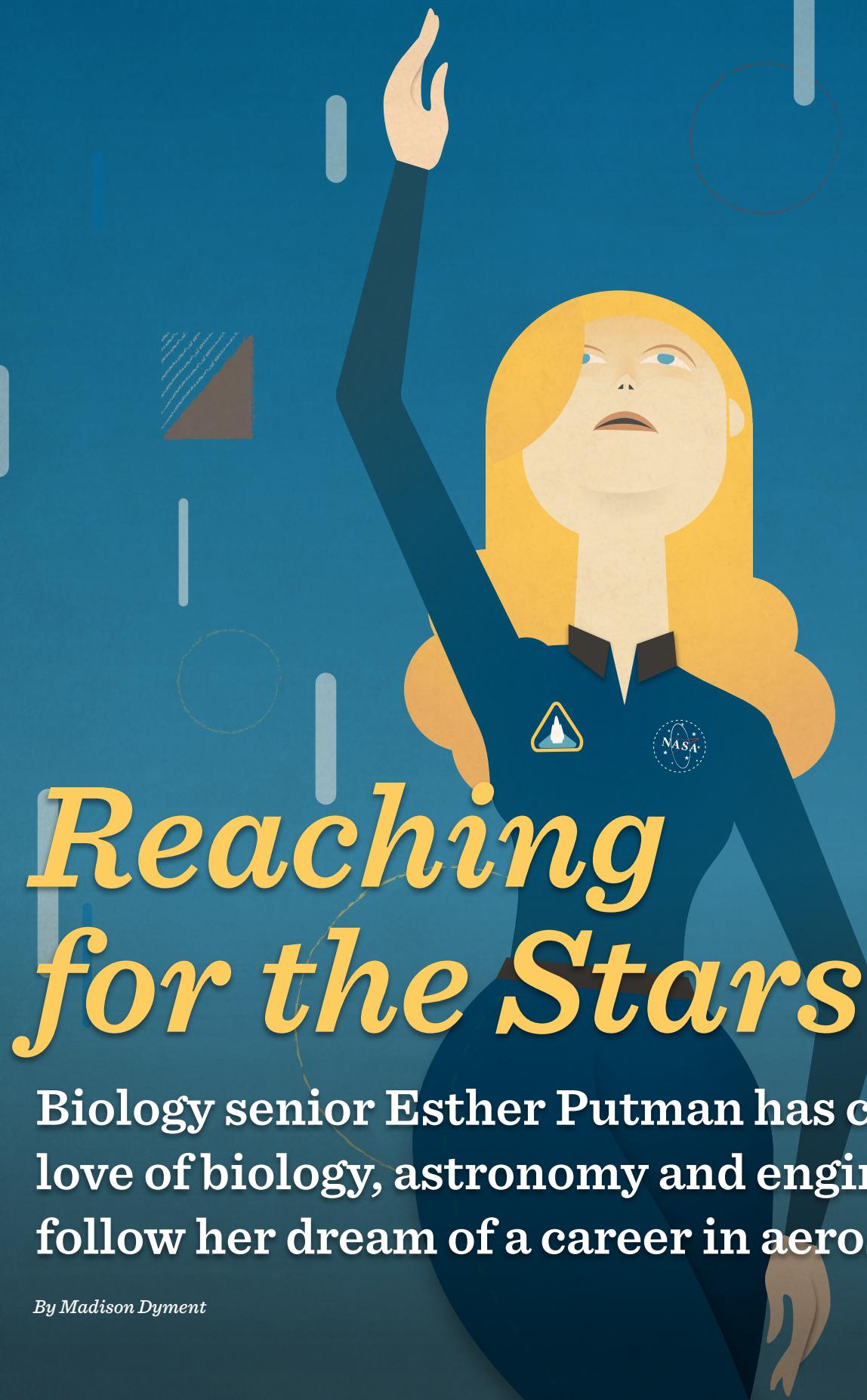


PHOTO BY CALLAWAY STIVERS



Reaching for the Stars

Biology senior Esther Putman has combined her love of biology, astronomy and engineering to follow her dream of a career in aerospace medicine.

By Madison Dymert

When we're young, we are often told that "the sky's the limit" for our future. There are a certain few, however, who dare to reach beyond the sky and to the stars, and UK biology senior Esther Putman is among this group.

Originally on a pre-med track, Putman, a Lexington native, had a plan set for her future, but she was never fully convinced it was the right path for her.

"When I was growing up, I was always good at math and science, so everyone around me pushed me towards medicine," said Putman. "But my dad is an engineer and I grew up doing little engineering projects with him. I always wanted to combine the two, but didn't really know how."

In 2014, a combination of an experience at the Kentucky Governor's Scholars Program and a little bit of fate lent itself to Putman's aid.

"In the program, I was assigned the major of astronomy kind of by chance. I absolutely fell in love with everything about space," said Putman. "Don't get me wrong, I always loved the stars and especially the mythology behind them, but I didn't grow up dreaming of being an astronaut like some kids. However, that summer really showed me how amazing space is."

From there, Putman had no questions about where her future lay.

"I started looking for ways to combine all that I loved—medicine, engineering and space—and stumbled on aerospace medicine," she said. "It was like that was what I wanted to do with my life all along, I just hadn't realized it before. I definitely know that this is my passion."

Although a major in biology is not a typical route that comes to mind for a student set on studying outer space, Putman's goals align perfectly with her major choice.

"Biology is the foundation of all of it!" she claims.

"Understanding the physiology of a human on Earth is essential to start thinking about what changes in space. I know that we can learn a lot about biological systems by studying them in the unique environment of space."



PHOTO BY R. WAYNE CROSS

Esther Putman, biology senior, working in a lab during her internship at Space Tango in Lexington, Ky.

The connections between the specialties extend further than just practical application. Putman began to piece together connections between health professionals and engineers concerning topics of human space travel. "I knew that if I could equip myself with knowledge from both fields, I could help to bridge that gap and create a common language. It's going to take strong collaboration between a myriad of industries to send people to Mars," explained Putman.

From there, Putman threw herself into every possible experience that could get her closer to her goal. Her passion for aerospace medicine and desire to learn and explore this field shone through and set her apart from her peers.

» CONTINUED FROM PAGE 23

"Quite simply, Esther is exceptional," said Jennifer Osterhage, assistant professor and Director of Undergraduate Studies for the Department of Biology. "Her interest in and dedication to her future career is among the top 1 percent of students I've known, which is over 4,000."

Faculty are not the only individuals to notice Putman's incredible potential. She has received numerous honors while at UK, including being selected as an Otis A. Singletary Scholar, taking part in the BS/MD accelerated pre-med program through the UK College of Medicine, and becoming a Chellgren Fellow in her sophomore year.

Externally, her achievements are even more impressive. Putman has worked with Space Tango in Lexington since February 2016, a service helping to facilitate research projects in microgravity aboard the International Space Station.

"I assist in planning and designing biological experiments, making sure NASA gets the right toxicology and hazards information, and conducting validation experiments to ensure system success on orbit," explained Putman. "My favorite thing about Space Tango is how much they focus on using what we learn in space for applications here on Earth."



Putman at the California Science Center in Los Angeles, Calif., during her internship at NASA Ames during the summer of 2017.

In the summer of 2017, she was selected to be part of a group of 10 students from across the country to participate in the prestigious NASA Space Life Sciences Training Program, working at the Ames Research Center near San Francisco, Calif.

"One of the biggest health problems that astronauts face in spaceflight is bone density loss, losing as much as 1 to 2 percent of their total bone density each month they spend in space. I was working in a lab studying the mechanism behind why this bone loss occurs, and how we might be able to prevent it," said Putman. "It was an amazing program, and of course an absolute dream to work at NASA. I presented a poster of my research at the American Society for Gravitational and Space Research (ASGSR) conference in Seattle, Wash., in October 2017, and was selected for a lecture presentation as well."

One of the most formative experiences for Putman came this past summer, when she was selected as a Brooke Owens Fellow, a nationally competitive fellowship designed for women with passion for aerospace and/or aviation. Through this opportunity, she was connected to work for Vulcan, a company in Seattle founded by Paul Allen, co-founder of Microsoft. The experience had her tackling problems to provide sustainable solutions to issues like conservation, climate change and equity.



Putman in front of the Endeavor Shuttle at the California Science Center in Los Angeles, Calif., while interning at NASA Ames.

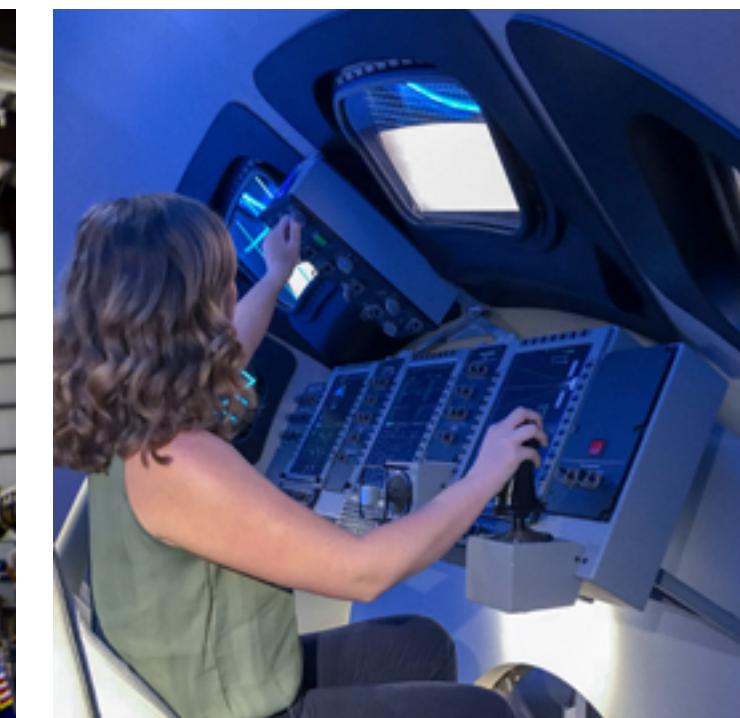
Putman worked under the mentorship of Dr. Kris Lehnhardt, an aerospace medicine physician, in the space systems team, utilizing satellite Earth observations to monitor topics including illegal fishing, poaching and coral reef health.

"This fellowship has been one of the best experiences of my life, giving me a network of supportive women in the industry that I had never had before," said Putman. "It can be hard to feel like you're the only one passionate about what you love. This fellowship completely changed that for me."

Her work with Lehnhardt impacted Putman on many levels besides simply providing her with a learning experience.

"Before I met Kris, I had never met anyone with an aerospace medicine career. With his mentorship, I've realized that my career is more than just a crazy dream—it can become my reality," said Putman.

This process was not easy. There are very few women in the aerospace industry and Putman struggled with moments where combining her two majors seemed impossible, but her past experiences have helped her gain confidence to forge on with her passions.



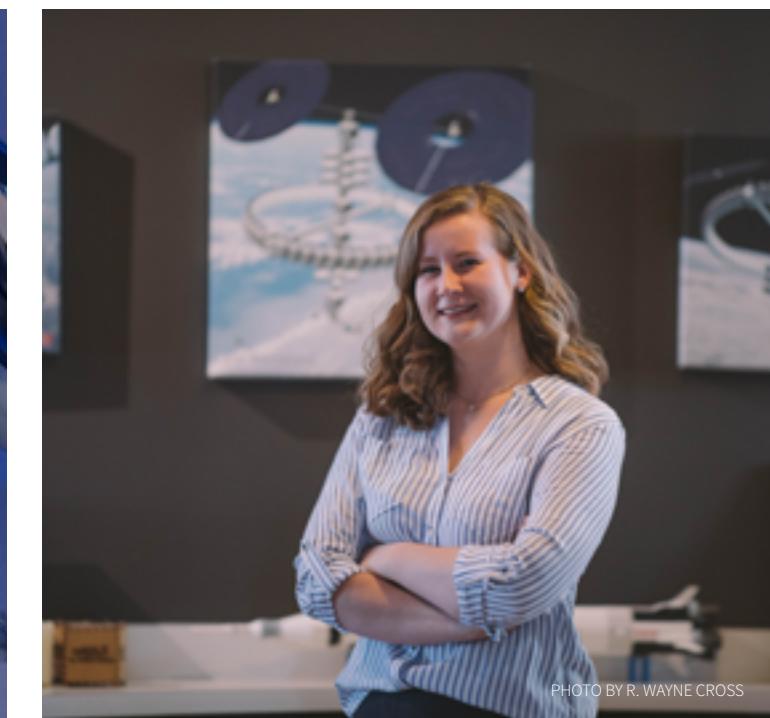
Putman in a shuttle flight simulator at the California Science Center in Los Angeles, Calif.

Another passion for Putman is her desire to encourage others from Kentucky to become more involved in the aerospace industry. She feels that her roots are a strength, not a hindrance, and that more should embrace their Kentucky heritage.

"Every internship I have and every conference or awards dinner I travel to, I get to show people what an aerospace professional from Kentucky looks like," said Putman. "I get to help set the standard for what our state is capable of and help show people a perspective of Kentucky that is often times very different from what they believed before."

With a past as illustrious as this, it's easy to dwell on previous accomplishments, but Putman is diving full-force into her future. She plans to design life support and human health protection systems that allow for long-duration spaceflight, but she is not content with only helping behind-the-scenes.

"Before, I would never tell people I wanted to be an astronaut. I assumed they would think I was crazy or childish," said Putman. "Through my experiences, I've met astronauts who have told me I've got what it takes, and because of their investments in me, I can now say it loud and proud: I want to be an astronaut." &



Putman at Space Tango during her internship in Lexington, Ky.



The Chemistry of Cancer

Two A&S researchers are working toward redefining cancer treatments

By Jennifer T. Allen

Photos by Sydney Janda and R. Wayne Cross

Phoebe Glazer's decision to come to the University of Kentucky Department of Chemistry weighed many factors, but two words in the job description solidified the deal: "surprise us."

"I really liked the idea that the department was open to new nontraditional, unorthodox approaches," Glazer said. "It showed they were interested in people that might be doing things that were unexpected."

With a background as a synthetic chemist and photophysicist, Glazer decided to switch to cancer research when she arrived on UK's campus in 2009. Moving into biological chemistry on a campus that also houses a medical school, College of Pharmacy and the Markey Cancer Center made the transition relatively smooth. "There are not many universities that have all of these research facilities and research groups on one campus," Glazer said.

For the last 10 years, Glazer has focused on creating new cancer therapies. As an inorganic chemist, she knows there is both a good and bad history of inorganic chemistry in cancer therapies. Drugs made from platinum are effective and successful. Cisplatin remains one of the most commonly used chemotherapy drugs, but there hasn't been a significantly better inorganic drug produced in the cancer field in the last 30 years, Glazer said. Glazer is working hard to remedy that and develop a research platform where inorganic chemistry and the features of inorganic compounds can be used to make better, more selective anticancer agents.

"There have been a number of new inorganic compounds from research groups at other institutions that have gone into clinical trials," she said. "I think we might be right at the inflection point where we're seeing a renaissance in medicinal inorganic chemistry. It's an exciting time."

To dive a little deeper into Glazer's research, we have to look smaller. Current cancer drugs can damage important, healthy cells, causing neurological damage, immunosuppression and many other side effects for cancer patients. This happens because the molecules of the platinum agents react with DNA.

"You would normally think this is terrible because it damages the DNA and eventually kills the cell. But, if you are trying to kill cancer cells, it's a good thing," Glazer explains. "The problem with platinum and any other agent that damages DNA is that you get a lot of side effects. You kill the cancer cells, but you can kill nerve cells and cells in the bone marrow that become white blood cells." This suppresses the immune system, putting cancer patients at risk of dangerous infections.

Glazer's lab is building inorganic molecules that are optimized at absorbing photons and transferring electrons, and can also perform other types of photochemistry. One arm of Glazer's research focuses on light-activated cisplatin-like molecules.

"The idea was that we could make a ruthenium complex that initially is inert and nontoxic. It doesn't do anything to DNA and doesn't kill cells, but then you can shine light on it and when it absorbs a photon, it becomes active and kicks out a molecule it's bound to," Glazer said. "Then it finds biological molecules like DNA and forms a new bond. That DNA becomes damaged and causes a cascade process which results in cell death."

The lab has expanded its program and is building different shaped molecules utilizing metals. Including a metal produces different geometries and shapes than you can get with organic molecules. "We are taking advantage of metal organic bonds because they are relatively easy to make, so we can build complex molecules like putting together Lego pieces," Glazer said.

That expansion now includes molecules that are not light activated, but that are built to have a certain shape and certain

function. These molecules can do completely different chemistry or have different inhibitory effects on cells. One of the more recent projects is building protein translation inhibitors that inhibit the cell's ability to make new proteins. Along with needing to replicate DNA, cancer cells need to synthesize protein at a much higher rate than healthy cells. Cancer cells can also be "addicted" to specific proteins—they require them for growth and survival. Blocking synthesis of proteins could be another way to kill cancer cells.

"The ultimate goal is to make molecules that will be as effective or more effective than current chemotherapeutics, but eliminate so many of these adverse side effects that patients experience," Glazer said. "As a research community, we don't always think about the impact of these side effects. We focus on efficacy rather than quality of life. It's understandable, but I think we need to try to reduce the toxic effect most patients suffer with standard chemotherapy."

How do inorganic compounds play into this goal?

With inorganic compounds, you have the opportunity to switch things on or off, which means you could potentially spatially localize the toxicity. "If you're trying to treat a tumor in the lung, you wouldn't want to activate the compound in other parts of the body," Glazer explains. "So you could possibly avoid peripheral neuropathy or neutropenia. That is the goal."

Once the molecules and compounds are created, the next step is testing. That's where David Heidary comes in. Heidary came to UK in 2010 with a background in protein structure and function, assay* development and drug discovery. Heidary's lab brings the biological aspect to the project.

"The synthetic chemists make molecules they hope have a certain function, and our job is to test and make sure that the function they're looking for actually occurs," Heidary said.

"Then we think about it in the broader context: If this works on a purified enzyme, will it work in a cell? If it works in a cell, will it work in a larger organism? Just because you make a molecule that inhibits something in a test tube, it still has a very, very long way to go to become a drug."

After graduate school and before coming to UK, Heidary went to work for Aurora Biosciences, which was founded by Roger Tsien, the 2008 Nobel Prize winner in Chemistry for the optimization and application of Green Fluorescent Protein (GFP). Tsien developed many fluorescent tools to monitor biological process and Aurora applied these fluorescent reporter systems in drug discovery.

"I have an unusual background from being at the company at a stage where there was a lot of development going on around constructing assays to report on cell function," Heidary said. He leverages that expertise to develop new assays to investigate

* An assay is a way to test something in a small scale and get a lot of information rapidly.

CONTINUED ON PAGE 28 »

» CONTINUED FROM PAGE 27

the biological function of chemical compounds, adding insights "that were not possible with the experimental systems that are currently available. That makes a big difference for our research," Glazer said.

Where is the research now?

"In 2009, we had a hypothesis. In 2010, we made our first molecules that showed this theory could work," Glazer said.

"Since then we've been working to build up the complexity of the biological systems that we are investigating the molecules in, but are also trying to understand better how the molecules are working and possible ways they could fail."

The team led by Glazer and Heidary is also currently focusing on structure-based drug design to try to target a specific enzyme that is involved in cancer initiation, malignant progression and, most important, resistance to chemotherapy.

And they have had some recent success.

"We are really interested in inhibiting a particular enzyme, which is a Cytochrome P450, to try to address issues of chemotherapy resistance," Glazer said. "The hypothesis is if we can inhibit this enzyme, normal therapeutics could be effective again, and potentially be effective at lower doses, which would reduce side effects."

After making many new molecules, tweaking and making more, the lab ended up creating molecules that are so selective for the desired target Cytochrome P450, they don't need a light-activated strategy.

This breakthrough wouldn't have been possible without Heidary's work in mammalian cells. The assays Heidary has designed show how compounds behave in the living, functioning cellular environment. This helps to understand if the compounds are selective for their target and taken up well in cells.

"We are getting richer information than we ever would have if we just stayed with simple *in vitro* assays," Glazer said. "This success would not have been possible without the close relationship and interplay between the biology and chemistry because we didn't know what to change until we got the biological results. We would have no idea if these molecules were even practical to use without having assays in cells."

Bumps in the road—the challenge of science funding

Soon after Glazer came to UK, her research was in jeopardy of being set back a year or more. While applying for grants and waiting to hear, she found herself in a position where there was a gap in funding. That's when the College of Arts & Sciences Academic Excellence Fund was able to help. "It was a really frightening time," Glazer said. The University and College were quick to provide bridge funding to keep Glazer's lab running.

"It made all the difference," she said. "Within a couple of months, I was able to get funded and about nine months later received another grant."

With science funding becoming more and more challenging, the importance of donor funding for higher education becomes even more important. Glazer has also received support from charitable organizations including the American Cancer Society and the Elsa U. Pardee Foundation, as well as receiving grants from the National Science Foundation and National Institutes of Health.

"At some point I think you've got to trust people to be good scientists. I don't think we can work effectively or keep our team of scientists together with so much uncertainty in our support," Glazer said. "The bar for funding has gotten higher and higher and reaches a point where you have to demonstrate that every aspect of what you're proposing you're going to do has already been demonstrated to succeed."

A special environment at the University of Kentucky

The collaborative work between Glazer and Heidary has resulted in many surprises and successes, and has a promising vision for more effective cancer drugs in the future. Glazer is quick to point out that this research wouldn't be possible without collaborations within the A&S Department of Chemistry and across campus.

"We have amazing colleagues and those colleagues make our science possible," Glazer said. "There are aspects of this research that have been profoundly enriched by these collaborations."

Both Glazer and Heidary collaborate with Chris Richards (Department of Chemistry, director of the UK Light Microscopy Core), Mark Leggas (College of Pharmacy, co-director of the Center for Pharmaceutical Research and Innovation Translational Core) and David Rodgers (College of Medicine, director of the UK Center for Structural Biology). "UK has great core facilities," Heidary said. "We can do nearly any experiment we want, and this is only possible since there are expert scientists in each facility to ensure the different aspects of experiments and equipment work properly."

What first began as a postdoc looking to take on more challenging questions has turned into Glazer's life's work and passion.

"It started partly as the intellectual challenge," she said. "This was the hardest medical application I could imagine. I figured there would be a really long path in front of me and that anything I did, as long as it took the next step down that path, would be helpful. It's become increasingly personal over time, but it's still a damn good intellectual challenge." &

Inside the Glazer and Heidary Labs

The majority of Phoebe Glazer and David Heidary's research takes place in three labs housed in the Chemistry-Physics Building. Inside those labs, undergraduate and graduate students, and postdoctoral scientists are hard at work.

"We want students and scientists in the labs to take ownership of the project," Glazer said. "We want them to be intellectually and emotionally invested so that they really want what we do here to succeed. We want them to help take the research to the next level."

"I really want to see that they are excited by discovery," Heidary said. "The best students are the ones who do the hard work to learn the techniques, read journal articles around their research area and develop their critical thinking skills to understand what their results mean so they can come up with the next hypothesis and experiment. For students, this can be a real challenge, since they have to rely on themselves to learn, and find the strength to push past experimental failures to find solutions."

DMYTRO HAVRYLYUK

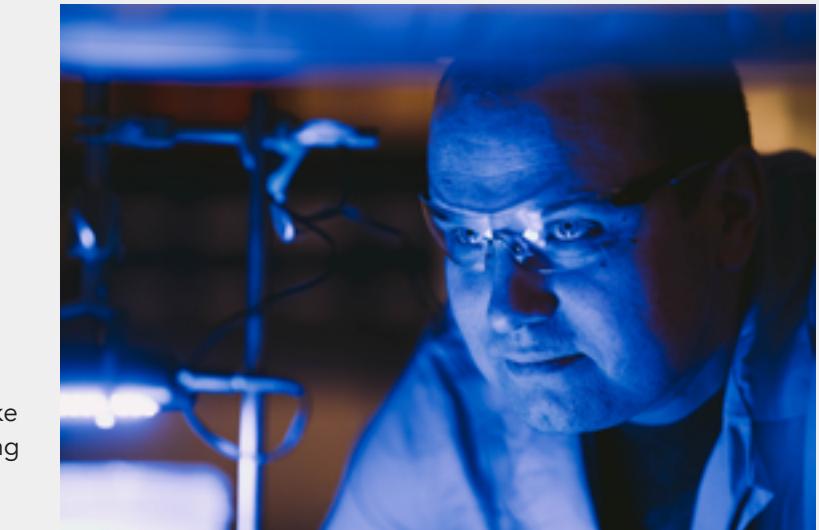
Postdoctoral scientist

Bogorodchany, Ukraine

Ph.D. in Pharmaceutical Chemistry and Pharmacognosy,

Lviv National Medical University

"Based on my experience in medicinal chemistry, which I received working in the laboratory of Prof. Lesyk in the Ukraine, I came here to discover biologically active metal complexes using synthetic inorganic chemistry. Working in this lab, I have the opportunity to combine metal scaffolds with different pharmacologically active small organic molecules. This can make prodrugs that have a dual action and can be useful for improving anti-cancer potency and aiming for different mechanisms of action."



It's the first time I've had the opportunity to work in an environment where the chemists and biologists discuss our data and plan the next step in the project every day. It has improved the quality of our experiments. It is great to work with an organized team to help reach our final goal of creating a small molecule that can affect cancer research positively. I feel we can do that in this small research group."



ALYSIA KOHLBRAND

Chemistry and Neuroscience senior

Fort Mitchell, Ky.

"I was interested in biochemistry and just starting out in research as a sophomore when I joined the lab. I now not only have a lot of different tools in my biochemistry arsenal, I have a lot of experience problem solving, working on my own and figuring out my own experiments. I feel that when I go to graduate school, it won't be as much of a shock."

It is such a great opportunity to be mentored by both Dr. Glazer and Dr. Heidary. Not only have I learned so much and been able to be part of such an accomplished research team, I always know they are the first people ready and willing to help me. Even if they have a million grants to work on, they always have time to help us if we need it."

Materials Chemistry at UK Has Never Been So "Fab"

*By Madison Dymert
Photos by R. Wayne Cross*

The "fab" in UK's new "Fab Lab" may stand for fabrication, but a quick trip inside reveals technology and work that is nothing short of fabulous.

Now in its second semester of operation, the Fab Lab is a hands-on laboratory extending from the materials chemistry track. The lab is offered as a course for UK chemistry students looking to experience hands-on training in materials chemistry and is one of the only labs of its kind.

Students enrolled in this course can make the jump from simply learning how to make the materials to putting this knowledge into action and creating functioning devices.

"This course is really how to connect material structures and properties to how they actually function in the devices we use today," said Kenneth Graham, assistant professor in the College of Arts & Sciences' Chemistry Department and contributing teacher and designer of the Fab Lab course. "It helps students see the actual application of the materials they learn about in their classes."



The Fab Lab consists of progressive technology for digital fabrication, allowing students to gain practical experience creating materials and models used in modern devices.

"It's cool being able to see the electronic changes rather than just knowing what's happening," said David Harris, a chemistry senior enrolled in the Fab Lab. "Actually being able to see the electronic changes right in front of you, from the electrochromic where you can watch it change its color and the OLED where you're actually able to make the light, is just a really awesome aspect of this lab."

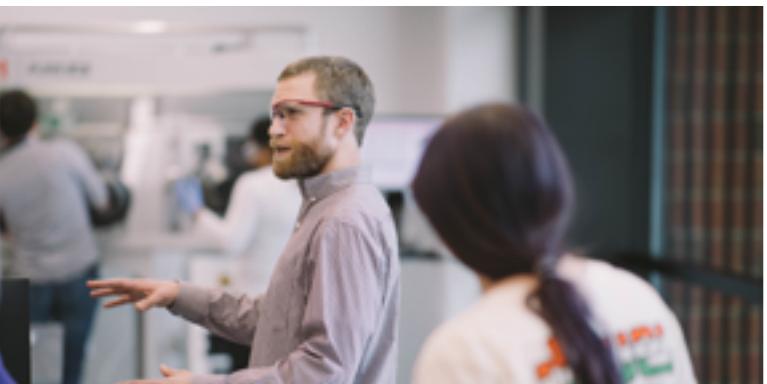
As far as creations are concerned, the Fab Lab creates small-scale models of applicable objects. An example of this is electrochromic devices used in the Boeing 787 Dreamliner and car mirrors that self-dim to deflect bright lights.



we knew that we could easily use that space to make the Fab Lab."

Beyond being a hands-on and practical option for materials chemistry students, one of the largest benefits of the lab is the relevancy of its course materials. Materials chemistry, like that of the Fab Lab, makes up almost every valued object in our world, from cell phones to aluminum foil, and topics taught in the Fab Lab are a basis for almost all of our material belongings.

"If you look around you, almost everything that you see is made by a materials chemist. You've got countertops and paints, or signage and plastics," Graham said. "It's just everywhere. I think the development of technologies is going to make it more relevant because you're going to need better materials and you're going to need mechanically flexible materials."



(Above): Kenneth Graham, assistant professor in the Chemistry Department and contributing teacher and designer of the Fab Lab course, spoke to students in the lab as they began work on projects.

(Left): Caroline Thornbury and David Harris, both chemistry seniors, test an electrochromic device in the Fab Lab.

"I think the thing that makes this course the most unique is that the students are actually working with materials that are still state-of-the-art. They're not working with materials that people were interested in 20 years ago," Graham said. "They're working with research grade equipment to make functioning devices and to characterize those devices the same way they would be doing if they were working in an industrial or academic research lab."

The creation of the Fab Lab was no small feat for UK. The rarity of a program and lab like this made its inception particularly special. In the end, a combination of an idea from numerous faculty and fortunate timing of the creation of the new Don & Cathy Jacobs Science Building lent itself to the installation of the Fab Lab.

"We were lucky that we were thinking of the lab as the Jacobs Science Building was being designed," said Graham. "We had a space that we knew was going to be an instrumental room and

With all of these practical applications being offered in the Fab Lab, this course offers immense long-term benefits for students enrolled. Graduate school, job opportunities, research positions and more are all within grasp for students with this added training.

"Our students will have a leg up for their future goals. They'll have been through a program where they've already made all these standard devices, so they could easily get into a graduate program and hit the ground running," Graham said.

Although it is in its second semester, Graham is confident that the lab will only continue to grow and evolve as long as materials chemistry stays pertinent.

"I don't think it's going anywhere," Graham said. "Materials chemistry has been around for a while and it's going to stay a very relevant area." &



Straight from the Students

A&S UNDERGRADUATES TALK ABOUT CAMPUS LIFE, LEARNING AND THE VALUE OF CONNECTIONS

Photos by Sydney Janda

In a newly launched video series, "Insights," College of Arts & Sciences Dean Mark Kornbluh explores the many facets of A&S with the faculty and students immersed in research and study on campus. Recently, Kornbluh sat down with four students representing a diverse range of majors in the College to discuss their experiences at UK. It became clear each student placed immense value in the outside-the-classroom connections that UK and A&S have helped them build in order to form a well-rounded education. Here is an excerpt from their discussion.



SARA RASTODER

Junior

International Studies and Arabic and Islamic Studies
Bowling Green, Ky.



BEAR BROWN

Senior

Political Science
Atlanta, Ga.

"I joined EMPOWER: Women's Leadership Program as a freshman. This year, I was lucky enough to be director of the program, and that's been a major source of my success during my college career. It's helped me put things in perspective and know how to be a leader. It's been an incredibly important part of my experience."



LINDSAY TUCKER

Sophomore

English

Bremen, Ky.



LILLY DO

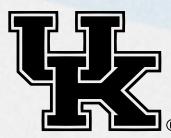
Senior

Chemistry
Middlesboro, Ky.

"The Jacobs Science Building has definitely helped facilitate student relationships. One of my concerns coming to UK was, it's such a big university, am I going to get lost in the crowd? But that has not been my experience at all and the ability of the University to facilitate those relationships, not only among students, but with professors has been really great."

"As a first-generation student I was very scared coming to UK because it's just so large. I was scared I wouldn't be able to find the right classes to take to graduate in four years. My advisor, Phyllis Nally, sat down with me and planned out all four years up to my senior year. She introduced me to a lot of summer pre-medical programs. Even though she's not my direct advisor now, she still helps me as I'm preparing to apply to medical school. Being able to get her insight has been so helpful and encouraging for me."

View the full discussion online at as.uky.edu/insights-students



University of Kentucky
College of Arts & Sciences
202 Patterson Office Tower | Lexington, KY 40506

