

University of Kentucky Alumni Association

# KENTUCKY

## Alumni

SUMMER 2017



# UK RESEARCH

*Engaging students for success*



**When we think of research universities, it's easy to fall into the trap of assuming they are all alike — educational facilities mainly interested in offering a place for professors and graduate students to participate in research projects in a wide variety of disciplines. The ultimate goal of all that research is to add to a knowledge base and develop new products and treatments that can benefit society.**

# UK RESEARCH

## *Engaging students for success*

Focusing on graduate research may have been the case years ago, but the University of Kentucky moved beyond that model to encourage undergraduate students, as well as high school students, to pursue research projects as a way of broadening their education, furthering science and ultimately making them more marketable in their chosen professions.

“I don't think I've ever turned away an undergraduate that wanted to do a research project. For undergrads, they have a lot of curiosity, are eager to learn the very basics, and I think it's a lot of fun for them and for us as faculty,” said Lisa Cassis, vice president for research and professor in pharmacology and nutritional sciences in the UK College of Medicine. “Research is really important for students, not only because it helps them be marketable in their chosen profession, but it also helps them learn problem solving and critical thinking outside of the classroom.”

UK professors are reaching out to Kentucky high school students to get them excited about science. For example, high school freshmen in Lewis County are integrating physics, health, communication and technology subjects and skills through a collaborative, web-based project with scientists and students at UK.

The project is a joint venture of Robin Cooper '12 NUR, associate professor of biology at UK since 1966, and Sara Poeppelman, a 16-year science teacher and department chairwoman at Lewis County High School. The two educators met through their work with the Partnership Initiative for Math and Science Education Reform. Cooper, who has a nursing degree and a passion for public health, is demonstrably committed to engaging young people in science, including helping to establish the Kentucky Science and Engineering Fair.

Cooper and Poeppelman devised a web-based collaboration that gets students to use social media, smart phones

and iPads — all while learning the physics and consequences of obesity and cardiovascular disease. The project was supported by a community grant from the UK Center for Clinical and Translational Science, which aims to accelerate discoveries for human health and focuses specifically on health disparities in Appalachia.

The project involves two freshman physics classes at Lewis County High School. Led by Poeppelman and another teacher, Summer Hampton Behrendt, students are divided into groups and work through a “case study” about a fictional patient named Cindy, who is middle-aged, overweight and has high blood pressure.

Each group must build a visual model — using tubes, water and pumps — to demonstrate to Cindy the physics of what is happening within her blood vessels and why hypertension is dangerous for her health. The students then make videos to demonstrate their models and

**Lisa Cassis, standing, vice president for research and professor of pharmacology and nutritional sciences in the College of Medicine, leads a team that is investigating angiotensin (a hormone that raises blood pressure) as a link between obesity and hypertension. Pictured in the foreground, left to right, are members of her lab team Yasin Al-Siraj and Erin Jackson.**

*Photo: UK Research Communications*



address with Cindy a holistic approach to her health, including lifestyle changes, available medications, and possible outcomes like cardiovascular disease. The videos are uploaded to a secure online platform called Acclaim, and UK science faculty and students then provide feedback and engage the Lewis County students in conversation about the case.

“I thought it was interesting to do something hands-on like that in class,” said Caleb Voiers, a Lewis County freshman who’s interested in nursing. “It was fun — it was wet and messy and out of

the ordinary and stuff that you wouldn’t normally do in a physics class.”

This out-reaching health-based initiative has now spread with faculty in the UK College of Education through the Department of STEM (Rebecca Krall) and with the UK College of Health Sciences (Gilson J. Capilouto). UK undergraduates in the STEMCats program and graduates are also now participating as mentors for the distant learning experiences which is growing to other counties in Kentucky.

From Cooper’s perspective, “If we

don’t get these younger kids interested in science, we’re going to end up with a public sector that doesn’t appreciate science. The only way to reverse that is to get kids to realize that we need to be science literate to advance our state as a whole.”

### **BY THE NUMBERS**

Research at the University of Kentucky is growing. In FY 2016, UK was awarded \$316.5 million in external grants

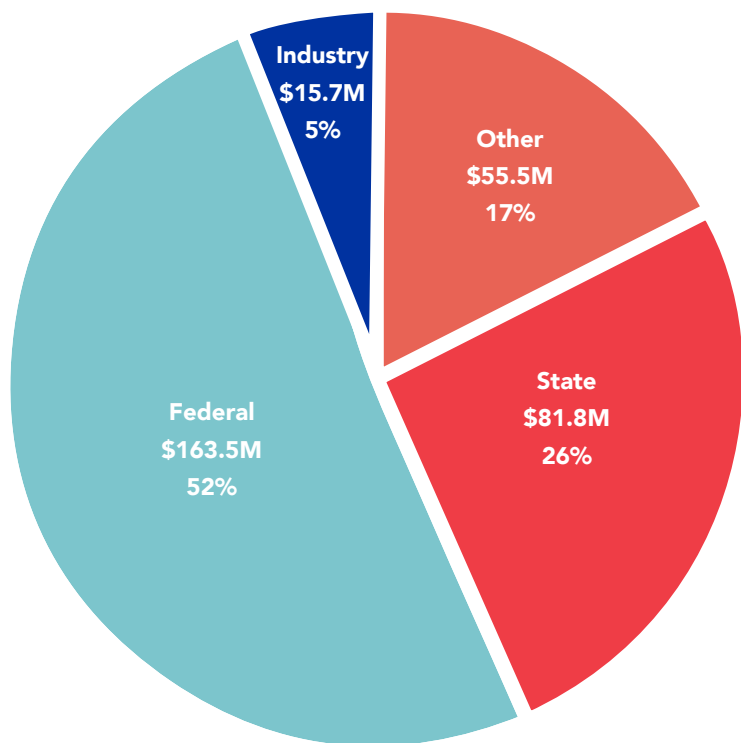
**“If we don’t get these younger kids interested in science, we’re going to end up with a public sector that doesn’t appreciate science. The only way to reverse that is to get kids to realize that we need to be science literate to advance our state as a whole.” — Robin Cooper**



*Photo: Ben Corwin, UK Research Communications*

**Robin Cooper '12  
NUR, University of  
Kentucky Associate  
Professor of Biology**





**University of Kentucky**  
**SPONSORED PROJECT FUNDING SOURCES**  
 FY 16 Grant & Contract Awards = \$316.5 Million



and contracts. This was an increase of \$31.4 million — 11 percent — from FY 2015.

In the past three years (FY 2014 to FY 2016), all external grants and contracts to UK increased by 22 percent, and federal grants and contracts increased by 7.2 percent.

In FY 2016, federal agencies awarded UK \$163.5 million. Grants from the National Institutes of Health (NIH) were \$92.4 million — 57 percent of all federal awards received by the university. Since 2011, the NIH has awarded UK more than \$543.9 million in grants and contracts.

The university has seen significant gains in funding from federal sources, including the National Institute on Drug Abuse (NIDA) and Department of Energy (DOE). Between FY 2011 and FY 2016, NIDA funding increased 53.1 percent, and DOE funding increased by 96.5 percent.

## UK'S COLLABORATIVE RESEARCH ENVIRONMENT

UK is one of only eight universities across the country with the full range of undergraduate, graduate, professional and medical programs on one campus.

That proximity leads to ground-breaking discoveries and unique cross-disciplinary research and scholarship.

In addition, UK is currently one of only 22 public institutions in the country with a “trifecta” of federal designations of excellence in research: for aging, in cancer and in translational science.

**On Aging:** In July 2016, the UK Alzheimer’s Disease Center at the Sanders-Brown Center on Aging was awarded an \$8.25 million, five-year grant from the NIH to continue research and clinical initiatives geared toward treating Alzheimer’s disease. Currently, only 30 designated Alzheimer’s Disease Centers (ADCs) exist in the United States. In 1985, Sanders-Brown was among the first 10 ADCs funded by the NIH and has been continuously funded since the designation was launched. Over the past 30 years, the UK center has developed a vigorous program in the clinical, neuropathological, educational and research aspects of Alzheimer’s disease that serves as a critical resource for the university, community, state and nation.

**On Cancer:** The UK Markey Cancer Center is the only National Cancer Institute (NCI) designated center in Kentucky. As a result of this designation, patients have access to new drugs, treatment options and clinical trials

offered only at NCI centers. The UK Markey Cancer Center is able to apply for federal research grants available only to NCI-designated cancer centers, and Markey clinicians and researchers can communicate and collaborate on new advances in cancer care with other NCI-designated cancer centers across the country. Locally, Markey has increased community engagement, including volunteers, patient advisory groups, and education and intervention programs. As the major referral center for Central and Eastern Kentucky, the designation also strengthens UK Health-Care’s overall mission of ensuring no Kentuckian will have to leave the state to get access to top-of-the-line health care.

**Translational Science:** In October 2016, the UK Center for Clinical and Translational Science (CCTS) received its second four-year, \$19.8 million Clinical and Translational Science Award (CTSA) from NIH. The mission of CCTS is to accelerate the translation of basic science discoveries into tangible improvements in public health. Through funding, training, infrastructure, and community engagement, the center facilitates and supports innovative team science. The center also supports a two-year career development program, called KL2, that provides funding, research training,

Construction is continuing on the new 300,000 square-foot research building that adjoins the Lee T. Todd Jr. Building (formerly the Biological-Pharmaceutical Building) and the Biomedical Biological Sciences Research Building.



Photo: UK Research Communications



The building will bring together researchers across numerous fields: health care (both basic and clinical), public health, behavioral sciences, agriculture outreach and extension, economics and engineering. It's expected to open in 2018.

conference travel support and mentorship designed to help junior investigators obtain grant funding. As the CTSA hub for Central Appalachia, CCTS focuses on addressing health disparities in the region and collaborates with universities and hospitals in Kentucky, Ohio, West Virginia and Tennessee. Through the Community Leadership Institute of Kentucky, CCTS has provided grants and research training to 14 community-based health partners.

## A TEAM APPROACH TO RESEARCH

As vice president for research, Cassis said she is frequently asked what it's like to be a researcher at UK. "Well, to be honest, I have only known one research environment as a faculty member performing academic research for the past 29 years, and that environment is UK. While this might be construed as making me shortsighted, I believe that one of the primary reasons I have remained at UK throughout my academic career is the col-

laborative nature of research," she said.

"Nowhere that I have visited, or been recruited to, has the team-based approach to research that I have experienced at UK," Cassis added. "I even like to think that I have contributed to that collaborative research environment, through interaction with programs including the National Institutes of Health Center for Biomedical Research Excellence, NIH Superfund Basic Science Research Program, and by serving as director of a multidisciplinary graduate and research center focused on nutritional sciences for 10 years."

She said each of these programs includes students, postdoctoral fellows, staff and faculty across department and college boundaries that come together to target an area of research. "The power of their interdisciplinary approach is evident in grants and contracts, honors and awards, scholarly publications and translational outcomes that arise from collaborative teams," Cassis said.

Research is conducted in all 16 UK colleges — with varying number of

projects each year — and in 60-plus campus research centers, such as the Kentucky Transportation Center, the Institute for Biomedical Informatics, the Institute for Rural Journalism & Community Issues, and the John Jacob Niles Center for American Music.

## NEW RESEARCH BUILDING WILL BRIDGE HEALTH GAPS

A new multidisciplinary research building — scheduled to open in 2018 — is a \$265 million project, funded half from the state of Kentucky and half from university resources, including private gifts. Located on the west side of campus near Virginia Avenue, the building will bring together researchers across numerous fields: health care (both basic and clinical), public health, behavioral sciences, agriculture outreach and extension, economics and engineering. The goal is to bridge health gaps in areas such as a cancer, cardiovascular disease and stroke, drug abuse, obesity and diabetes. Kentucky leads the nation in incidence rates in these complex health conditions.



The University Research Professors Program recognizes excellence in scholarship, creative endeavors and research across the full range of disciplines and in every college at UK. Each college sets their own nomination criteria for the one-year, \$10,000 award, to be used to further the research, scholarship and creative endeavors of the awardee. Seventeen faculty were named University Research Professors for 2016-2017. Those include, left to right: Chang-Guo Zhan (Pharmacy), Edward Hall (Medicine), Thomas Zentall (Arts & Sciences), Brent Seales (Engineering), Terry Bunn (Public Health), Esther Dupont-Versteegden (Health Sciences), Mary Davis (Law), Ellen Hahn (Nursing), Jeffrey Ebersole (Dentistry), Eugenia Toma (Martin School of Public Policy and Administration), Arthur Hunt (Agriculture, Food and Environment), Sherali Zeadally (Communication and Information), Gary Rohrbacher (Design) and Bret Smith (Medicine).

Not pictured are Stephen Borgatti (Gatton Business & Economics), Diana Hallman (Fine Arts) and Qiang Ye (Arts & Sciences).

## JOIN UK IN RESEARCH AND DISCOVERY

UK alumni and friends of UK can make a difference in research that advances health care and in other disciplines, for example, the humanities and social sciences.

Researchers are working hard to identify new treatments and strategies to improve health and to understand the diseases that make us sick, but to succeed they need healthy research participants and participants with medical conditions. Participating is an opportunity to learn more about your own health.

There are many ways to get involved, as health research ranges from simple questionnaires and screenings to clinical trials of investigational drugs and devices.

For more information about participating in research, including participant and research stories, visit [UKClinicalResearch.com](http://UKClinicalResearch.com). There you'll find a list of current studies at UK.

To connect with studies nationwide, join [ResearchMatch.org](http://ResearchMatch.org), which helps match willing volunteers with research opportunities that might be of interest. It promotes participation on UK research projects that UK is collaborating on with other universities across the country. This means UK alums don't have to be living in Kentucky to help with UK research.

You CAN make a difference!

**"Making a difference can be from improving cardiovascular health or from writing a poem that elevates someone's soul. All types of research and activity we do can make people's lives better." — Lisa Cassis**

"To solve complex problems, you have to use a multi-pronged approach," Cassis said. "Some of my colleagues tell me that obesity is about economics. I am approaching the problem from a very basic, biomedical research perspective. This building will allow us to put people like me in close proximity to someone that is studying obesity from an economic perspective. The real power of research is realized in bringing different groups of experts together. This building will give us a vehicle, and my job is to promote that culture here at UK.

"It gives us the space and resources that we need, and it's a great time right now to do that, when we're competing for very tight funding

across the nation," said Cassis. "We're engaging the best and brightest here, and we hope to also use this as a recruitment tool to bring even more people here who can add dimensions to what we're currently able to do. In my experience that is really how you do the best work."

In addition to building and optimizing infrastructure to support all types of research and creative work, Cassis said a critical part of the UK 2015-2020 Strategic Plan is community impact and engagement.

"Making a difference can be from improving cardiovascular health or from writing a poem that elevates someone's soul," she said. "All types of research and activity we do can make people's lives better." ■

# RECENT NEWS IN UK RESEARCH

Photos: UK Research Communications



Jon Thorson, left, and Madan Kharel, at that time a research associate in Thorson's College of Pharmacy lab, collected soil samples from the Truman Shepherd coal fire site.

## Researchers look in Appalachia for exotic microorganisms that could yield blockbuster drugs

This collaborative project between the College of Pharmacy, Center for Applied Energy Research and Kentucky Geologic Survey at UK and Rice University and the University of Oklahoma made new — and in some cases more effective — versions of the antibiotic daptomycin using an enzyme from a soil bacterium found in smoke vents of the Ruth Mullins coal fire. This project uses the unique geologic environment of Kentucky to look for new drugs.

> > Watch a video at [reveal.uky.edu/natural\\_products](https://reveal.uky.edu/natural_products).

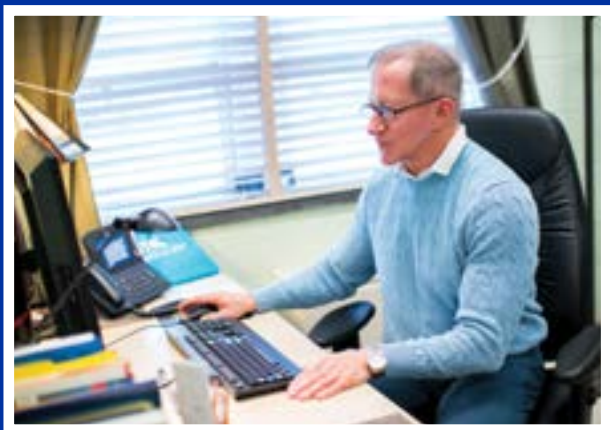
## Pioneering research to create new organic compounds for applications in electrochemical energy storage systems

Susan Odom '03 AS began her career in research at UK as an undergrad researcher. Her pioneering work in electrochemical energy storage includes applications for lithium-ion batteries, which are utilized in portable consumer electronic devices. Her additives have been demonstrated to protect these batteries from overcharging conditions longer than any other electrolyte additive reported to date.

> > Watch a video at [reveal.uky.edu/odom\\_susan](https://reveal.uky.edu/odom_susan).



Susan Odom, an assistant professor of chemistry in the UK College of Arts and Sciences, creates new organic compounds for applications in electrochemical energy storage systems.



Thomas Guskey is a professor of education psychology in the UK College of Education and studies teachers grading practices.

## Helping educators help students

Grading practices used in most schools aren't based on proven effectiveness from research, but rather on tradition, simply because it's always been done that way. Thomas Guskey's research shows that basing a student's grade on their relative standing among classmates, otherwise known as grading on the curve or norm-based grading, can have negative consequences. These include detrimental effects on students' relationships with their teachers and peers. Standards-based grading is one method he is helping teachers implement. It measures a student's proficiency on specific course objectives, breaking subject areas down into various components.

> > Watch a video at [reveal.uky.edu/guskey\\_thomas](https://reveal.uky.edu/guskey_thomas).