

MOSAICS

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A & S

and the



What it is and
why it matters.

Office of the Dean
317 Lowry Hall
Columbia, MO 65211
Phone: 573-882-4421

Production Manager and Writer
Laura Lindsey

Editor and Writer
Melody Galen

Art Director and Designer
Dory Colbert

Photography
Cover photos by Rachel Coward; other photos by Nic Benner, Mikala Compton, Rachel Coward, Melody Galen, Rob Hill, Lawrence Jackson, and Laura Lindsey

On the cover
From left: Bina Gupta, Curators' Professor of Philosophy and director of the South Asian Studies Program; Dongchu Sun, professor and chair of the Department of Statistics; Justin Dyer, associate professor of political science.

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PHOTO BY LAURA LINDSEY



PHOTO BY NIC BENNER



Clockwise from top left: Artist's rendering of new School of Music building; Sarah Gunn and Isabella Jacobs at one of the hanging monasteries of Meteora, near Kalambaka, Greece; MRI technologist Lee Lasiter prepares the 3-Tesla Siemens Trio Scanner.

From the Dean



There are a lot of things to be proud of when we talk about the University of Missouri, just as there are when we talk about the College of Arts and Science or, say, MU's English department. I'm beginning my 34th year at MU—a tenure that would have seemed inconceivable to me when I started my teaching-and-research career in 1980—and I remain just as proud of the university today as I ever was.

To tick off just one pride point, this year MU—and by extension A&S—welcomed the second largest student body in history, down a little bit from last year's record enrollment but still well above what it was two years ago. The message out there is loud and clear: not only is MU a world-class university, but it's still a great educational bargain. We have an excellent reputation as being not only a great teaching institution at the undergraduate level but also a world-class institution that trains doctoral and postdoctoral students who will be tomorrow's research leaders.

One sign of a university's status in the arena of teaching and research is membership in the Association of American Universities (AAU), a group of 62 universities—60 in the United States and two in Canada—that are highly regarded for the breadth of the programs they offer in undergraduate education and for their research and graduate education. A university must be invited to join the AAU, as MU was in 1908. On the negative side, an institution can also be asked to leave.

I know that not everyone is familiar with the AAU and why it is vital that we maintain our membership, so we decided to do this special issue of *Mosaics*. Throughout the pages, you will have the chance to learn about the AAU, the value it provides the University of Missouri, and how it is that we may be falling behind with regard to the indicators the AAU uses to evaluate current and potential new members.

As our pal Truman knows—he insisted on helping us out with this issue—membership in the AAU is much more than just being able to say that MU is part of an elite group. It means that the university holds itself to a very high standard, and when we see that our rankings are falling in some areas, it should be taken as a clear warning that we need to begin working on a plan to improve our programs across the board.

For example, one indicator of excellence the AAU uses is the amount of money brought in through federal grants to conduct research. MU's funding level has stayed fairly constant for the past several years, but just maintaining our position won't ensure that we remain among the best in the nation. We need to keep firmly in mind that other universities are working to increase their ratings, too, and a good number of them have passed Mizzou.

I realize this could sound like a scramble for position, and it is. And it's an important scramble. MU is one of the best universities in the nation, and we must do everything we can to continue improving the education available to our students by hiring the best scholars in their fields and by supporting them in their research and creative endeavors. We are constantly looking for new ideas or programs that can give the university a competitive advantage. My goal is for every decision we make to be one that will elevate the college, and hence MU, in the AAU rankings.

In order to do those things, though, we need the support of our alumni and friends—that is one thing that will never change. One other thing that will never change is my confidence that you'll be there to help us. You always have been, which makes my job so much more enjoyable.

A handwritten signature in black ink that reads "Michael J. O'Brien". The signature is written in a cursive, flowing style.

Michael J. O'Brien
Dean, College of Arts and Science

A&S and the A

BY LAURA LINDSEY

Some of the most memorable features of the University of Missouri campus are the columns, Truman, and Memorial Union, but one of the things that truly sets the university apart is something far less obvious. MU is one of only 60 universities in the United States plus two in Canada that are members of the Association of American Universities (AAU). Institutions in this group, which includes such universities as Virginia, Stanford, Michigan, Princeton, and Caltech, have large numbers of doctoral programs that are on the leading edge of innovation, scholarship, and solutions that contribute to the nation's economy.

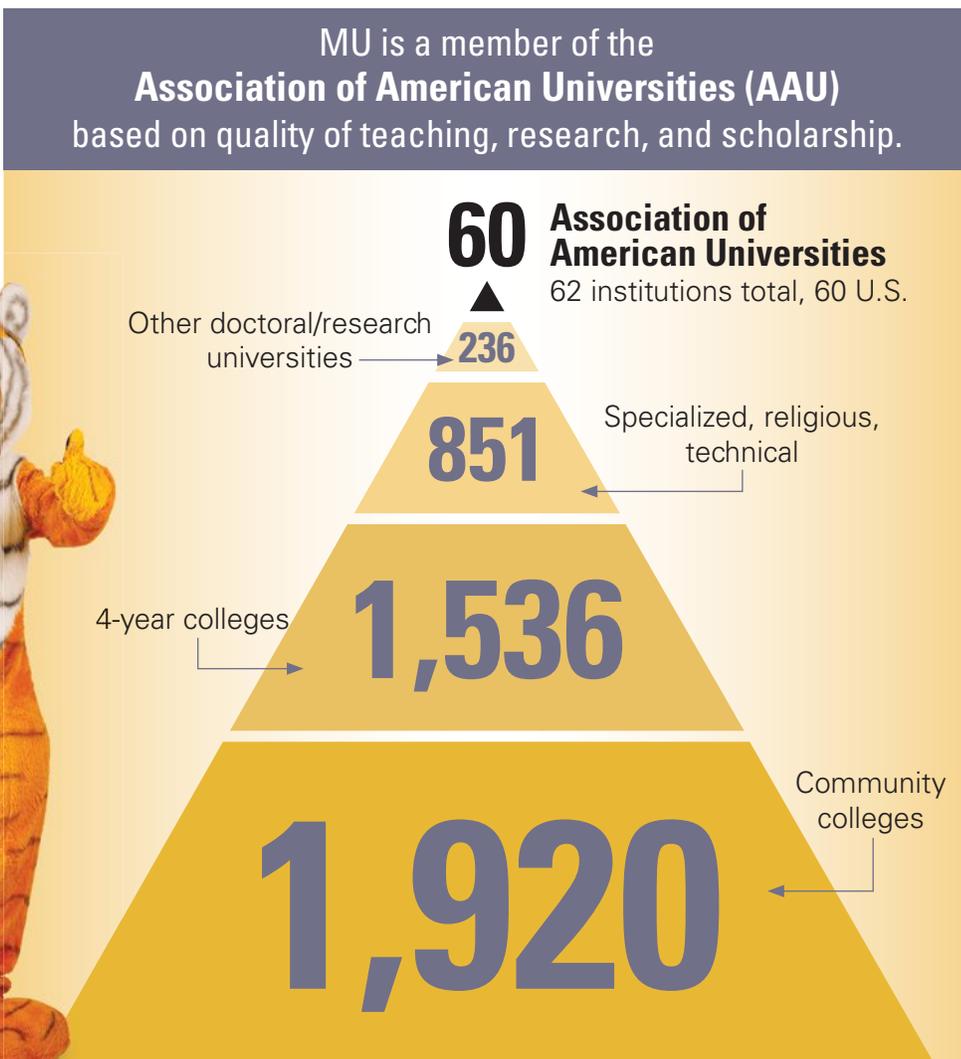
What is the AAU?

The AAU was founded in 1900 to advance the international standing of America's research universities. At the time, American graduate education was regarded with disdain by European universities, and the nine Ivy League universities, together with the University of Chicago, the University of Wisconsin, and the University of California (Berkeley), decided to join forces and do something to change that view. One of their first goals was to establish common

standards for doctoral education. As it began to grow, the association's function evolved from first serving solely as an accrediting body, then becoming a powerhouse that was able to affect government policy, especially the distribution of federal funding through such agencies as the National Science Foundation and the National Institutes of Health.

Membership in the AAU is by invitation only. MU was asked to join in 1908,

in the first expansion of the AAU's members, the same year as the University of Illinois and the University of Minnesota. The AAU uses two sets of indicators to assess how well its current members—and potential new members—are doing their jobs. Phase 1 indicators are used as primary metrics of institutional breadth and quality in research and education, and Phase 2 indicators are used to provide important calibrations of an institu-





AU What is it and why is it important?

tion's research and educational programs.

The association has a standing membership committee that periodically evaluates both nonmember universities for possible membership and current members for continued membership. Current members whose research and education fall significantly below that of other members will be subject to further review and possible discontinuation of membership. Thus, MU is always looking for ways to strengthen its standing relative to its peers.

"MU is part of a select group of schools as a member of the AAU," says Mike O'Brien, dean of the College of Arts and Science (A&S). "We aspire to be ranked closer to the top of the AAU standings, but we aren't there yet. We can begin to close the gap, though, by hiring and retaining the best faculty, offering competitive stipends for doctoral students, and having the best facilities in which students and faculty can operate. We know that having a great faculty and modern facilities is a tremendous lure for the brightest undergraduate students."

Advantages of Membership

Being a part of the top 2 percent of American universities has its advantages. AAU universities are key players that set the higher-education and research agendas for the nation. MU's membership enables the state of Missouri to compete at high and impactful levels, with a strong voice in Washington. In addition, membership encourages faculty and administrative interaction among peers worldwide that will further the university's teaching and research mission.

The AAU status attracts accomplished faculty, postdoctoral fellows, and graduate students to MU, and it adds value to

all MU degrees. When an MU graduate applies for admission or for a job at another university, that school understands that the student has had a rigorous course load taught by the best professors.

"We want the best graduate students to come here," says O'Brien. "They are the ones who are going to carry on the tradition of scholarship and research, and hopefully graduate education."

Although American universities lead the world today, other countries are catching up fast, so it is more important than ever to support educational institutions. A recent study that tracked output by research institutions as measured by the number of articles published in *Nature* and 17 affiliated journals by the Nature Publishing Group found that the U.S. is home to five of the top 10 research institutions: Harvard, Stanford, MIT, the National Institutes of Health, and the University of Washington. Germany, France, the United Kingdom, Japan, and Switzerland have one each. Fifty AAU universities made the top 200 worldwide, and 15 of the top 25 were AAU schools. Unfortunately, MU was not among the top 200, which shows that we have a way to go to secure a place at the high table.

Individual, State, and Federal Support

MU celebrated 100 years of AAU membership in 2008. In a speech, Robert Berdahl, who was then president of the AAU, reiterated how important state government support is to flagship public universities. He said that for America to maintain its lead in the world's education, the partnership between our research universities and the federal and state governments must be renewed and enhanced.

Providing a strong liberal-arts education

AAU Phase 1 indicators are:

- the amount of competitively funded federal research dollars spent annually
- the number of faculty in the National Academies
- the number of faculty awards, fellowships, and elected memberships in learned societies
- the number of scholarly citations earned by faculty

AAU Phase 2 indicators are:

- the amount of competitive research funding from the U.S. Department of Agriculture, state departments, and industry
- the number of doctorates awarded annually
- the number of postdoctoral students
- the strength of undergraduate education

by some of the world's best minds in a first-class setting benefits Missouri and the country. When MU graduates enter the work force, they will contribute to the state and national economies, and MU faculty continue to make discoveries that will enhance our lives, our environment, and our thinking. But to remain competitive, the university needs support from all levels.

AAU Membership encourages faculty and administrative interaction among peers worldwide

What You Can Do

If you are in a position to do so, please think about making a donation to A&S. Every gift helps recruit and retain the world's top students and faculty.

One goal of the college is to increase its number of postdoctoral scholars. To recruit the best, we need funds to make MU an attractive designation. If you fund one of these scholars, you will be directly responsible for creating opportunities for groundbreaking research and increasing MU's visibility through published research.

"It is my job as dean of the largest college on the MU campus, and the largest in Missouri, to protect your degree," says O'Brien. "I want to make sure that it means something. The stories in this issue will show you the things that we do to make us elite, and the areas where we could improve. I hope it raises the awareness of our alumni of the importance of AAU membership."

When you give to the university, you aren't just assisting today's students and faculty; you are helping to uphold the status of your degree. ♦

Printers Have

Professor discovered way to print human tissue

Sometimes the college is lucky and finds a professor who does it all. Gabor Forgacs, George H. Vineyard Professor in the Department of Physics and Astronomy, is one of those few. His 160 peer-reviewed journal articles have been cited thousands of times, he has received millions of dollars in federally funded research grant money, he has won awards, and he has mentored graduate students

and postdoctoral fellows for years. One thing that the Association of American Universities doesn't measure is the number of patents a university is assigned, but that is something that will have an impact on MU for decades. Mizzou has 77 patents assigned—Forgacs is responsible for eight of them.

He began his career as a theoretical physicist, but his interest in life sciences motivated him to get another degree, this time, in biology. His focus on early embryonic phenomena and the interplay between physics and genetics led him to make complex structures with living cells. To do this research in a life-sciences-friendly environment, he came to MU from

Clarkson University in Potsdam, N.Y. While continuing his research on complex biological structures, the idea came to him that he could put the cells in a printing cartridge and print them with a 3-D printer.

His research findings have paved the way for him to create two start-up companies. Organovo was founded in 2007 and specializes in regenerative medicine. It was one of the first com-

panies to build a 3-D tissue printer based on the prototype that Forgacs developed. This printer works similarly to your desktop printer, just with a third dimension and with cells instead of ink. When small clusters of cells are deposited by the printer next

The benefits of developing cultured leather and meat products are that no animals will be killed and production will require less water, energy, and chemicals.

to each other, they fuse and self-assemble. Forgacs says the possibility of printing tissues, and eventually organs, is not science fiction anymore and has the potential to save lives for those who need transplants.

Founded in 2011, Modern Meadow uses similar technology, but for a different purpose. Instead of printing human tissue, Modern Meadow concentrates on the biofabrication of specific animal products such as leather and edible meat. In both cases, the process starts with harvesting

Recent droughts in the U.S. have shrunk cattle herds to 60-year lows. *Source: USDA 2012*

Livestock travel more than 1,000 miles from farm to refrigerator. *Source: USDA 2010*



Come a Long Way

and make meat and leather in his lab

BY LAURA LINDSEY

cells through a simple biopsy from the animal. Subsequently, cells are grown to sufficiently large numbers to build pieces of meat or entice them to produce massive amounts of collagen to be turned into leather. For leather, collagen is organized into sheets, which are layered together like phyllo pastry, and finally tanned. If the cultured leather works, then the company will try to create meat with the appropriate modification of the technology.

The benefits of developing cultured leather and meat products are that no animals will be killed and production will require less water, energy, and chemicals than today's method of making these products. Forgacs says that with the growth in the global population and rising consumption levels, resources are being strained.

"For materials as fundamental as meat and leather, our planet's capacity is being stretched to the limit, so this will be a solution that will preserve our environment," says Forgacs.

Because Forgacs is a professor at MU, all the patents he has received so far name Mizzou as the assignee, which means the university holds the exclusive license. Forgacs' companies pay annual licensing fees to the university and once they begin to generate revenue through sales, the university will benefit, too, through royalties.

Forgacs has also generously given back to the university through the sale of shares of stock, which the College of Arts and Science has used for numerous purposes, including production of this issue of *Mosaics*.

In addition to his research, Forgacs is also the scientific director of the Shipley Center for Innovation at Clarkson, where he works with students to help them translate their ideas to the marketplace.

"I enjoy working with students because they are the ones with the boldest ideas," says Forgacs. ♦

What does it take to make a ¼-pound burger?

- 6.7 pounds of grain and forage
- 52.8 gallons of water for drinking and irrigating feed crops
- 74.5 square feet of land for grazing and growing crops
- 1,036 BTUs for feed production and transport
- 13.4 pounds of CO₂ equivalent released

Source: *Journal of American Science*

ILLUSTRATION BY DORY COLBERT



Federal Dollars Support Diverse



PHOTO BY RACHEL COWARD

J. Brian Houston

Communication Professor Receives Department's Largest Grant

J. Brian Houston, assistant professor in the communication department, was awarded a \$2.4-million grant from the Substance Abuse and Mental Health Services Administration (SAMHSA) to establish the Terrorism and Disaster Center (TDC) at MU (tdc.missouri.edu). The center focuses on enhancing mental- and behavioral-health preparedness, recovery, and resilience in children, families, and communities affected by disaster, and on increasing public awareness of these issues.

The funding, which began on Oct. 1, 2012, and will continue until Sept. 30, 2016, designates TDC as a Category II center in the National Child Traumatic Stress Network. Houston is principal investigator of the SAMHSA grant, which is the largest ever received in the

communication department, and serves as co-director of TDC.

TDC will work with community and school partners in Joplin, Kansas City, St. Louis, and New Orleans to develop, implement, and evaluate interventions and resources that can help communities prepare for unthinkable disasters.

Houston has hired several graduate students and a clinical social worker to help with intervention development, training, implementation, and evaluation, and a part-time instructional technologist to help with online-content development. TDC is working closely with the Missouri Department of Mental Health, the Department of Health & Senior Services, and the Ozark Center, a Joplin mental-health facility. Houston hopes to also work with schools in St. Louis and Kansas City. ♦

English Professor Receives NEH Grant to Edit Poems of Jonathan Swift

Stephen Karian, associate professor of English, received a three-year National Endowment for the Humanities (NEH) grant to edit the poems of 18th-century Irish writer Jonathan Swift. One of the greatest and best-known satirists in world literature, Swift wrote *Gulliver's Travels*, *A Modest Proposal*, and several hundred mainly satiric poems.

The NEH Scholarly Editions Grant is for \$225,000 and will support two complementary projects: a printed edition of Swift's complete poems and a freely accessible online archive. The printed edition will appear as four of

the 18-volume *Cambridge Works of Jonathan Swift*, now being published by Cambridge University Press. The online archive is expected to be even more voluminous and is intended to enable the user to search and compare the important early manuscript and printed versions of every poem. The archive will also make available illustrative resources beyond the printed edition.

Together, the edition and archive will provide unprecedented access to both Swift's creative process and the complex ways in which his poems engage with their social, political, literary, and intellectual contexts. ♦



Stephen Karian

PHOTO BY RACHEL COWARD

Research Projects

MU Researchers Develop New Data-analysis Method for U.S. Census Bureau

Two researchers in the statistics department are in the middle of a five-year \$3.65-million grant from the National Science Foundation (NSF) to form a research node at MU as part of a new joint effort between NSF and the U.S. Census Bureau. The grant is the largest ever awarded to the statistics department. Associate Professor Scott Holan and Professor Chris Wikle are developing new data analysis and modeling methods for the American Community Survey, an ongoing project that provides communities with information needed to plan the distribution of resources and services of more than \$400

billion in federal and state funds.

The MU statistics node is instrumental in analyzing and combining information with hierarchical spatial and temporal statistical models to predict the changing nature of population demographics. Holan says that budget constraints can sometimes limit the ability to gather data, but with reliable forecasts, communities can make an estimation of their needs without a disruption in services. Holan and Wikle's previous interdisciplinary experiences modeling environmental and epidemiological processes such as weather, ocean dynamics, and invasive species are applicable to the project. ◆



PHOTO BY RACHEL COWARD

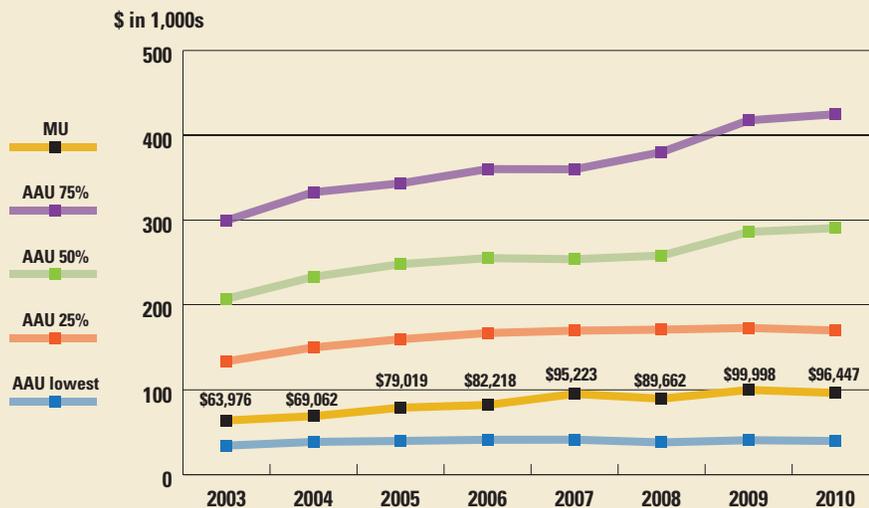
Chris Wikle



PHOTO BY RACHEL COWARD

Scott Holan

How Do We Compare? Federal Research Expenditures



Source: National Science Foundation Survey of Research and Development (R&D) Expenditures at University and Colleges/Higher Education Survey of Research and Development. 2003–2010.

All data are normalized by dividing by the U.S. institution's three-year average faculty numbers; for institutions with medical schools, medical school faculty are included in faculty averages for 2008–2010.

State-of-the-art Technology Provides Clues to Neurological Diseases



Since May 2008, the Brain Imaging Center (BIC) has been MU's melting pot. Although the center is housed in the Department of Psychological Sciences, researchers from communication, veterinary medicine, the medical school, and the nutrition and exercise physiology department have all benefited from the magnetic resonance imaging (MRI) and the functional magnetic resonance imaging (fMRI) technology housed in this unique facility.

"Users of the center have conducted research on healthy brain functions as well as on a wide range of conditions such as Parkinson's disease, autism, and schizophrenia," says Scott Frey, Miller Family Endowed Chair in Cognitive Science and director of the BIC.

Frey came to MU in 2011 from the University of Oregon, bringing research grants and six members of his research team with him.

"Scott is one of the best researchers in his field, and the university is lucky to have him," says Moshe Naveh-Benjamin, chair of the psychology department. "The contributions we have received from the Miller family have enabled us to do the most important things for our college—recruit and support our faculty."

The MRI technology at BIC enables researchers to collect behavioral data by producing pictures of the brain images that provide insight into how the brain functions during different activities and under various conditions. The accessibility of this technology solely for research sets MU apart from many other universities, which have to share equipment used primarily in patient care. The BIC enhances the university's ability to recruit faculty, secure grant funding, and conduct breakthrough research on human beings noninvasively.

BY LAURA LINDSEY

Research for Improved Rehabilitation

Frey recently received a five-year grant from the National Institutes of Health (NIH) totaling over \$1 million and another from the Department of Defense for three years for his research on understanding how the loss of a limb affects brain organization and reorganization. He and his team have been working in collaboration with colleagues at the University of Louisville who pioneered hand-transplantation surgery. Together, they have been working to understand how amputees' brains adapt to the challenges of feeling with and controlling their new hands.

"We believe that these insights will have relevance to understanding the potential for the mature brain to reorganize in response to training or rehabilitation following brain, spinal cord, or bodily injuries," says Frey.

He uses the advanced imaging technology at the BIC and the tools in his Rehabilitation Neuroscience Laboratory for stimulating the brain magnetically and measuring detailed hand movements and forces.

"Our interests are really in understanding the relationship between the brain and behavior and how this is shaped by genetics and our unique experiences," says Frey.

In addition, Frey's team collaborates with researchers from the MU School of Medicine, Rusk Rehabilitation Center, and the School of Health Professions to look at brain adaptation in stroke patients. And he also works on the development of assistive technologies with a colleague in the School of Engineering and an MU hand surgeon. The ultimate goal is to guide the development of more-effective rehabilitation techniques. ♦

Other Brain Imaging Center-supported Research

The center has allowed researchers in the university community to remain at the forefront of research and to have access to the best equipment to help them learn more about diseases that affect millions of people. Below are a few examples.

David Beversdorf, associate professor in the departments of radiology, neurology, psychology, and the Thompson Center for Autism and Neurodevelopmental Disorders, focuses on autism, drug abuse, dementia, cognitive effects of stress, cognitive neuroscience of problem-solving ability, functional neuroimaging, and pharmacological modulation of cognition. He uses the BIC to better understand the effects of the beta blocker propranolol on how people with autism spectrum disorders (ASD) think. Participants attend three sessions where they are placed in the BIC's MRI to measure the effects of the drug on their language, memory, problem solving, and connectivity in the brain.

In 2011, the work of Curators' Professor of Psychological Sciences Nelson Cowan was published in the *Journal of Cognitive Neuroscience*. He used fMRI to show the brain's function during different mental tasks involving working memory—the small amount of information an individual can remember at a time. His research was funded by the NIH and could lead to learning how the brain functions in cognitive-disability cases.

Jeff Johnson, assistant professor of psychological sciences, uses fMRI to understand the neural processes that underlie one's ability to encode and later remember unique events in his or her life. Johnson is particularly interested in finding out how retrieving a memory involves re-engaging the thoughts, emotions, and perceptions that were associated with an event, and why we sometimes vividly remember the details surrounding an event but other times experience only a vague recollection. His research examines how different regions of the medial temporal lobe contribute to the various aspects of episodic memory.

Shawn Christ, associate professor of psychological sciences, uses the BIC to understand how injury affects people's behavior. Much of his work focuses on the development of cognitive abilities in children with neurodevelopmental disorders such as ASD. Christ's long-term goal is to facilitate the design and implementation of more-effective rehabilitation strategies to improve cognition, daily function, and the quality of life for children and adults with brain injuries.

Heather Leidy, assistant professor of nutrition, exercise, and physiology, uses fMRI to identify neural activations in key cortico-limbic brain regions in response to food stimuli before and after a protein meal is consumed. Using this technology, she is the first to show that eating a high-protein breakfast blunts dinnertime brain activation in specific regions, which controls food cravings and food reward and motivation.

Great Minds

Appreciating the abilities of the truly gifted

BY MELODY GALEN

The College of Arts and Science is blessed with a staggering amount of raw brain power. Obviously, considering the breadth of departments and programs the college represents, its faculty members would be versed in an impressively high number of subjects. Math, physics, English, music, religious studies, romance languages, biology, anthropology, and economics—those are just a sample of the disciplines taught in the college and the fields in which research and creative performance are conducted on a daily basis.

As the largest college within a major research university, A&S recognizes the importance of providing meaningful opportunities for research to students in as many areas as possible. Not only do the hard sciences and math meet this need, but the humanities and arts departments also present myriad avenues of research and creative expression to undergraduate and graduate students.

The Association of American Universities ranks its member institutions according to several criteria, one of which is membership in the National Academies: the National Academy of Sciences (NAS), the Institute of Medicine (IOM), and the National Academy of Engineering. Of the six living NAS members at the University of Missouri, four are A&S faculty. MU can also boast one fellow

of the Royal Society of Canada (RSC) and three members of the IOM. Not small numbers, but it would be beneficial to the university as a whole if those numbers grew. The only way for that to happen is to continually hire the most brilliant scholars in their fields. Seems simple enough. The only problem is, all the other research universities out there are pursuing those same professors.

In these kinds of situations, the smart money is on the university that can offer the most-competitive recruitment packages. Salary, benefits, the number of postdoctoral researchers, facilities, even spousal accommodation can all be tipping points when a candidate is deciding whether or not to accept a job offer. Fall below average in just one of those categories, and a university probably doesn't stand a chance in attracting or retaining outstanding faculty. Truth be told, even "average" doesn't mean much anymore in the war that's raging among elite institutions for the best and brightest faculty members.

Meet some of the big fish who are currently swimming in the A&S pond.

James Birchler, Biological Sciences Elected to the NAS in 2011

Birchler is a geneticist who works on a variety of topics in corn and fruit flies. The thread that links the two is under-

standing the consequences of changing the number of chromosomes in an organism. You can't ethically do that in a human being, but it is easily done in corn and fruit flies. What Birchler's lab learns from studying those changes has implications for mammals as he points out, "because we know that the general principles that we see in fruit flies, plants, and mammals are all the same."

In another area of investigation, his lab has learned that the piece of DNA that is repeated over and over again and makes up the centromere—the bit that moves the chromosome in cell division—can actually turn itself off and hitch a ride on another centromere. Inactive cen-



James Birchler

PHOTO BY MELODY GALEN

tromeres can be turned back on, but they don't work very well, and Birchler is studying why that is and what ramifications it holds.

Birchler is a popular and successful teacher, especially in his large undergraduate genetics class. One reason for his popularity is his annual impersonation, complete with costume, of Gregor Mendel, the Austrian monk often referred to as the founder of genetics. Birchler took a lot of photographs when he visited the village where Mendel worked, and he uses the photos and costumed lightheartedness to convey information in a relatable way.

Birchler realizes the potential impact he can have on students, and he appreciates that helping them in his course can assist them to ultimately reach their goals. He recently was struck by the selflessness of some of his students. Late in office hours, the conversation had turned from genetics to what the students were doing. "One woman's brother had died of cancer at 13, and she was going to volunteer at a pediatrics cancer facility. Another guy was taking sign language as his foreign language, and then he was going to Fulton to the deaf school there to help out," Birchler remembers. "Somebody else was planning a trip over break to Nicaragua, to be on a medical corps there. After they left, I had to pause. You know, these students are just really involved; they are helping society and their fellow man, and they're just a great bunch."

Napoleon A. Chagnon, Anthropology Elected to the NAS in 2012

An evolutionary anthropologist known for studying aggression in human behavior, Chagnon came to MU in January 2013. He brought with him decades of research on the Yanomamö, a tribe in the Amazon Basin of Venezuela that is one of the last warring groups in the contemporary primitive world.

Noble Savages: My Life Among Two Dangerous Tribes—The Yanomamö and the Anthropologists, Chagnon's first book for a general audience, was published in

February 2013, and he was featured three times in *The New York Times*. As his career has had both vocal supporters and detractors, the book has had the same, at least in the anthropology community.

Chagnon praises MU anthropology for hiring people who are, in his estimation, scientific, and who specialize in evolutionary approaches to the study of human behavior. In particular, he names Mark Flinn, chair of the department, and one of his former students.

Chagnon has also been impressed with the interdisciplinary research he sees going on around him. He predicts that the department will ascend the ranks to one of the top five evolutionary anthropology departments in the world in the next couple years. "I think more students will apply to MU for the graduate program knowing that you have people like Martin Daly [anthropology], Flinn, Dave Geary [psychological sciences], and other people at the university," Chagnon says.

He hopes that as he and others begin mining the data that resulted from 25 trips to Venezuela, where he lived in more than 30 different villages, in every season of the year, he will be a catalyst to colleagues in his department and others. "Maybe we'll have increasing amounts of contact between departments," he says, "and that will be good for everyone."

Martin Daly, Anthropology Elected to the RSC in 1998

Daly came to MU from McMaster University in 2012. Perhaps best known for the textbook he wrote with his late wife, Margo Wilson, *Sex, Evolution, and Behavior*, Daly says many researchers have told him that the textbook was the reason they chose to go into animal behavior.

He is recognized as the discoverer of the "Cinderella Effect," which refers to the substantially elevated risk of violence from stepparents as compared to genetic parents. Daly is currently a couple chapters into a book he is writing on inequality in homicide. He recently taught a graduate seminar on income inequality and homicide, assigning presentations to the students with the intent of "using them to further my own education." Learning from archaeology students, for example, about archaeological signatures of inequality in ancient societies fits right in with his research.

Daly, like Chagnon, believes in the benefits of interdisciplinary work and says, "I think I'm functioning a little bit as a bridge between biological sciences and this department." He knows that he is likely to be aware of things in biology that anthropologists wouldn't be, especially in the animal behavior field, and he is happy to share his thoughts and experiences with those who are delving into the subject.



Martin Daly and Napoleon Chagnon

PHOTO BY MELODY GALEN

William A. “Buz” Brock, Economics Elected to the NAS in 1998

Brock, who received his undergraduate degree in mathematics from MU, retired from the University of Wisconsin, Madison, only to be snapped up by the MU economics department in 2012 to teach a course on dynamic modeling—a particular strength on the campus. Brock is well known for his work in ecology that looks at tipping points, or points of bifurcation, which are early-warning signals that might indicate when change, say, in an ecological system could be about to take place.

Although he is an economist by training, it is a misnomer to call Brock simply an “economist” because his interests are almost limitless. He has an innate ability to work with almost anyone, regardless of discipline. That includes Mike O’Brien, the dean of arts and science, who has written three papers with Brock, including one on risk and decision making that recently appeared in *Behavioral and Brain Sciences*.

Brock crosses disciplinary boundaries for one reason: “It’s all about science,” says Brock. “Wherever science takes

me, I go. For me, science isn’t just part of life, it’s all I do.” Perhaps Brock didn’t stick with mathematics because it can be a very solitary discipline, and he enjoys the stimulation that comes from partnerships. He has said of himself that he “latches onto” collaborators—and it would seem that being paired with this very productive interdisciplinary researcher is a benefit for all involved.

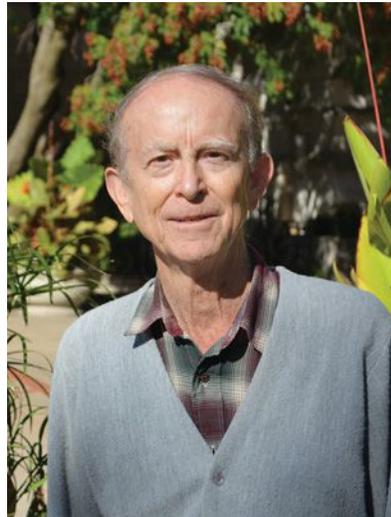


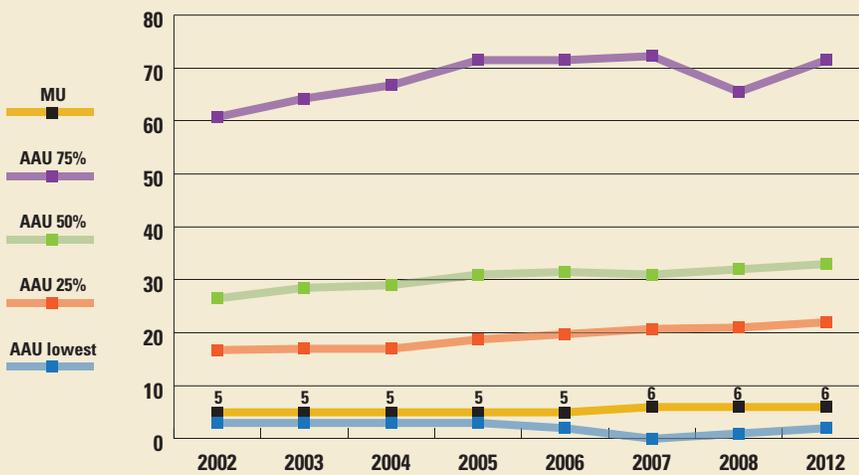
PHOTO BY MELODY GALLEN

William A. Brock

The National Academy of Sciences (NAS) is a private, nonprofit society of distinguished scholars. Established by an Act of Congress and signed by President Abraham Lincoln on March 3, 1863, the NAS is charged with providing independent, objective advice to the nation on matters related to science and technology. Scientists are elected by their peers to membership in the NAS for outstanding contributions to research. The NAS is committed to furthering science in America, and its members are active contributors to the international scientific community. Nearly 500 members of the NAS have won Nobel Prizes.

From the NAS Web site

How Do We Compare? National Academies Membership



Source: 2002–2008 data were collected by The Center; 2012 data were collected by the AAU

All data are normalized by dividing by the U.S. institution’s three-year average faculty numbers; for institutions with medical schools, medical school faculty are included in faculty averages for 2008–2010.

Normalized data for the National Academies and honors and awards are multiplied by 1,000 for ease of reference.

**M. Frederick Hawthorne, Chemist
Elected to the NAS in 1974**

Awarded the National Medal of Science by President Barack Obama in February 2013, Hawthorne has devoted most of his career to the study of boron chemistry. He has most recently been in the news for his work on a new cancer therapy that, so far, has been extremely successful at curing cancer but carries no debilitating side effects.

Boron neutron capture therapy (BNCT) was created with more common cancers in mind. A mixture of compounds, in which boron figures heavily, is injected into a patient and circulates through the blood to attach to tumor

cells. The patient is irradiated with slow neutrons, and the boron-10 atom that just attached itself to the cancer cells reacts with a neutron and essentially undergoes a nuclear reaction. That may sound alarming, but that kinetic energy travels only about one cell diameter and then “runs out of gas,” as Hawthorne puts it.

“All the energy released in that event stays put in that cancer cell and kills it,” explains Hawthorne. “It doesn’t go to the neighborhood, doesn’t wander around and bother the neighbors.”

Hawthorne knows of what he speaks—on a professional level and a personal one. In 2007 he was treated

with radiation therapy for squamous cell carcinoma. Having endured the rigors of radiation and several surgeries that resulted as complications of his disease, he would like nothing more than to be able to bring BNCT to fruition at MU.

There is still an enormous amount of work to be done, but Hawthorne is optimistic. “We’ve got stuff coming in the pipeline that may be even cheaper and more effective than what we’ve got now,” he says. “But if we never went any further, the efficacy of the compound and how it works now, we’d be there already. I’m really happy with what we’ve got.” ◆



M. Frederick Hawthorne receives the National Medal of Science from President Barack Obama, Feb. 1, 2013.

OFFICIAL WHITE HOUSE PHOTO BY LAWRENCE JACKSON

Prestigious Faculty Awards Enhance

Great faculty members are known to be passionate about their research. Professors share their enthusiasm in the classroom, in published articles and books, papers presented at conferences, and through service on state, national, and international committees. Highly successful professors are often recognized by being nominated for significant awards and by being named fellows of prestigious organizations.

The membership committee of the Association of American Universities (AAU) periodically reviews data on faculty awards, fellowships, and memberships as an assessment of the distinction of an institution's faculty. The AAU has compiled a list of "highly prestigious" and "prestigious" awards in four categories: arts and humanities, life sciences, physical sciences and engineering, and social and behavioral sciences. If a professor at MU receives one of these awards, it helps to secure the university's standing in the AAU.

From 2006 to 2010, the university increased its number of awards recognized by the AAU from 67 to 78. We're proud to share this small sampling of outstanding A&S professors here.

M. Frederick Hawthorne, National Medal of Science and Priestley Medal

Hawthorne, Curators' Professor of Radiology and Physics, and director of the International Institute of Nano and Molecular Medicine, received the highest honor bestowed by the nation on a scientist—the National Medal of Science. President



M. Frederick Hawthorne

Highly successful professors are often recognized by being nominated for significant awards and by being named fellows of prestigious organizations.

Barack Obama presented the medal to Hawthorne in a White House ceremony on Feb. 1, 2013.

The National Medal of Science, awarded by the National Science Foundation, is an honor bestowed on individuals who have made important contributions to the advancement of knowledge in the fields of behavioral and social sciences, biology, chemistry, engineering, mathematics, or physics.

In 2009, Hawthorne received the Priestley Medal, the highest honor conferred by the American Chemical Society. Established in 1922, the award commemorates lifetime achievement and is given to scientists who have made highly significant discoveries in their particular fields of chemistry.

Read more about Hawthorne's accomplishments on page 13.

Stefani Engelstein, Humboldt Research Fellowship

Engelstein, associate professor of German studies and director of the Life Sciences & Society Program, is spending the 2013–14 academic year in Berlin on a Humboldt Research Fellowship to complete her next book, *Sibling Logic: Incest, Collective Identities, and the Subject*.



Stefanie Engelstein

The Alexander von Humboldt Fellowship was created by the German government to promote cooperation between German scholars and scholars from around the world. While in Germany, Engelstein will be hosted by the Center for Literary and Culture Research, a humanities think tank, which has particular interests in the history of knowledge acquisition and its division into disciplines such as the sciences, the social sciences, and the humanities.

Robert Baum, Woodrow Wilson Center Fellowship

Baum, an associate professor in the Department of Religious Studies, was a member of the 2011–12 fellowship class at the Woodrow Wilson International Center for Scholars. He spent the year pursuing the project, "From Many Paths: A History of African Religions." His research focuses on African religious and social history, especially the history of the Diola religion in Senegal, Gambia, and Guinea-Bissau.

Quality of A&S

BY LAURA LINDSEY

The American Association for the Advancement of Science (AAAS) is the world's largest general scientific society dedicated to advancing science. Election as an AAAS fellow is an honor bestowed on members by their peers. Numerous members of the College of Arts and Science's faculty have been elected AAAS fellows, four of whom were named in 2013:

Stephen Alexander, professor of biological sciences

Alexander was elected for his distinguished contributions to understanding the molecular basis of drug resistance using model organisms and for major contributions to the study of glycosylation, an enzymatic process in the body.

Nelson Cowan, Curators' Professor of Psychological Sciences

Cowan was elected for his research in the field of human cognitive and developmental psychology and neuroscience, particularly short-term working memory.

Mark Flinn, professor of anthropology

Flinn was elected for his theoretical contributions in the area of the evolution of human behavior and for pioneering field research on stress response, family environment, and child health.

Kattesh Katti, Curators' Professor of Radiology and Physics and senior research scientist at the MU Research Reactor

Katti has made significant contributions in the field of nanoscale chemistry, particularly in groundbreaking discoveries enabling application of chemical concepts to biomedical applications.

Guggenheim Fellowships are given to scholars based on their past distinguished achievement and exceptional promise for future accomplishments. Awarded by the John Simon Guggenheim Memorial Foundation, the Guggenheim Fellowship program considers applications from scholars in 78 different fields, from the natural sciences to the creative arts.

Scott Cairns, professor of English

Cairns was among 187 artists, scholars, and scientists selected from almost 3,000 applicants in 2006 for this honor. He is a distinguished poet whose work has appeared in such venues as *The New Republic*, *The Paris Review*, and *The Atlantic Monthly*.

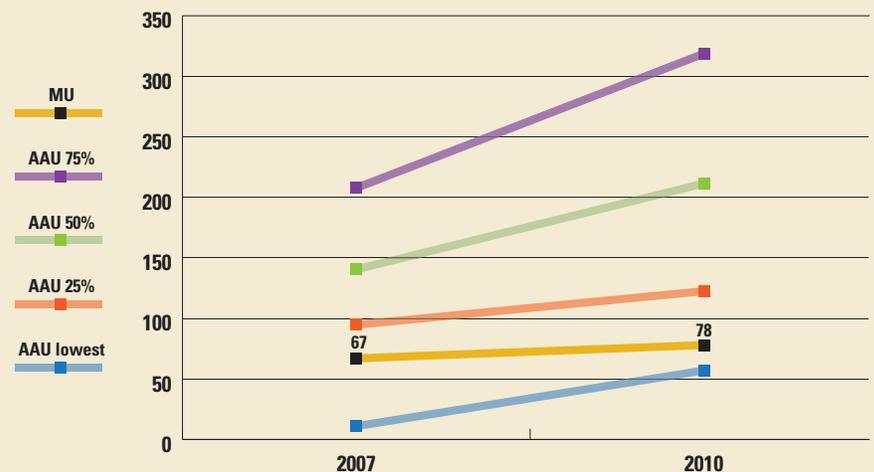
A. Mark Smith, Curators' Professor of History

Smith was awarded the fellowship in 2007 for his work on the three-volume translation of *Alhacen on Refraction*. He teaches a variety of courses in medieval history as well as the history of science from antiquity to the late Enlightenment. ◆



A. Mark Smith

How Do We Compare? Faculty Awards



Source: 2007 data are collected from The Center and the AAU. 2010 data are collected from Academic Analytics based on the list of the National Research Council's highly prestigious awards.

All data are normalized by dividing by the U.S. institution's three-year average faculty numbers; for institutions with medical schools, medical school faculty are included in faculty averages for 2008–2010.

Normalized data for the National Academies and honors and awards are multiplied by 1,000 for ease of reference.

Why Citations Matter

BY LAURA LINDSEY

Imitation is said to be the sincerest form of flattery, but the best way to praise an academic might be to cite his or her research.

Two things happen when a researcher is attributed with a high number of citations. First, it shows the impact that researcher has on his or her field, and, second, it influences the national perception of the university where the research took place.

Citations begin with a scholarly article, book, or monograph. The first step is to get the work published, either in a journal if it's an article, or by a major commercial or university press if it's a book or monograph. Then, another researcher has to cite the work as a source.

The more times MU research is cited—not in newspapers or trade magazines but in peer-reviewed journals and books—the stronger the university's reputation becomes.

"The best way to increase the number of citations is to recruit and support professors who are actively involved in cutting-edge research and discoveries," says John Walker, director of the Division of Biological Sciences. "To do that, we have to do a better job of offering competitive hiring and retention packages."

Citations are such an important measure of the effectiveness of a univer-

sity that the Association of American Universities (AAU) includes them as an indicator of the strength of its member institutions. The AAU uses the Thomson Reuters Incites Citations Database to provide an annually updated assessment of both research volume and quality.

Although MU researchers have doubled their citations in the past decade, the university still has fewer than most AAU universities. MU's lower ranking is not surprising, considering the AAU

The more times MU research is cited, the stronger the university's reputation becomes.

includes powerhouse universities such as Duke, Rice, MIT, and Stanford, but there is no reason that MU cannot compete effectively with those universities.

"We have some brilliant professors right now who can boast many citations," says Walker. "But, we need to provide them with the most up-to-date technology and support to make them even more successful."

Curators' Professor of Chemistry Jerry Atwood is one researcher who is known for his prodigious rate of publication. In

fact, he is one of the top 50 chemists in the world in terms of citations. Atwood is the author of more than 680 research publications, and his work has been cited over 29,000 times.

In 2012, Atwood received the Supramolecular Chemistry Award from the Royal Society of Chemistry, which recognized him for his pioneering work on the design and manipulation of supramolecular complexes containing intermolecular noncovalent interactions. Some of his groundbreaking research is capable of changing the way medications are delivered. His ultimate goal is to develop nanocapsules that can be used as chemotherapy treatment for cancer patients. Current cancer drugs are delivered to the blood stream and cause extreme side effects. The goal of Atwood's research on nanocapsules is to deliver the drug directly to a tumor, eliminating the side effects.

Today, Jonathan Steed is a professor of inorganic chemistry at Durham University in the U.K. and has been cited over 10,000 times, but in the early '90s, he was a young scientist looking for a postdoctoral fellowship. Steed was familiar with Atwood's research on organometallic chemistry. The two met at a conference, and Atwood told Steed he was going to change his area of focus to supramolecular chemistry. After that meeting, Steed knew that he wanted to learn and work with Atwood.

"It was a defining moment in my career, and I have been involved with supramolecular chemistry ever since," says Steed.

Steed moved to Columbia in 1994, and he and Atwood began a highly successful collaboration. Steed and Atwood co-wrote *Supramolecular Chemistry*, which was published in 2000 and re-

Rachel Winograd chose to attend MU as a graduate student because she wanted to study with Ken Sher—one of the best in the field.



PHOTO BY MIKALA COMPTON

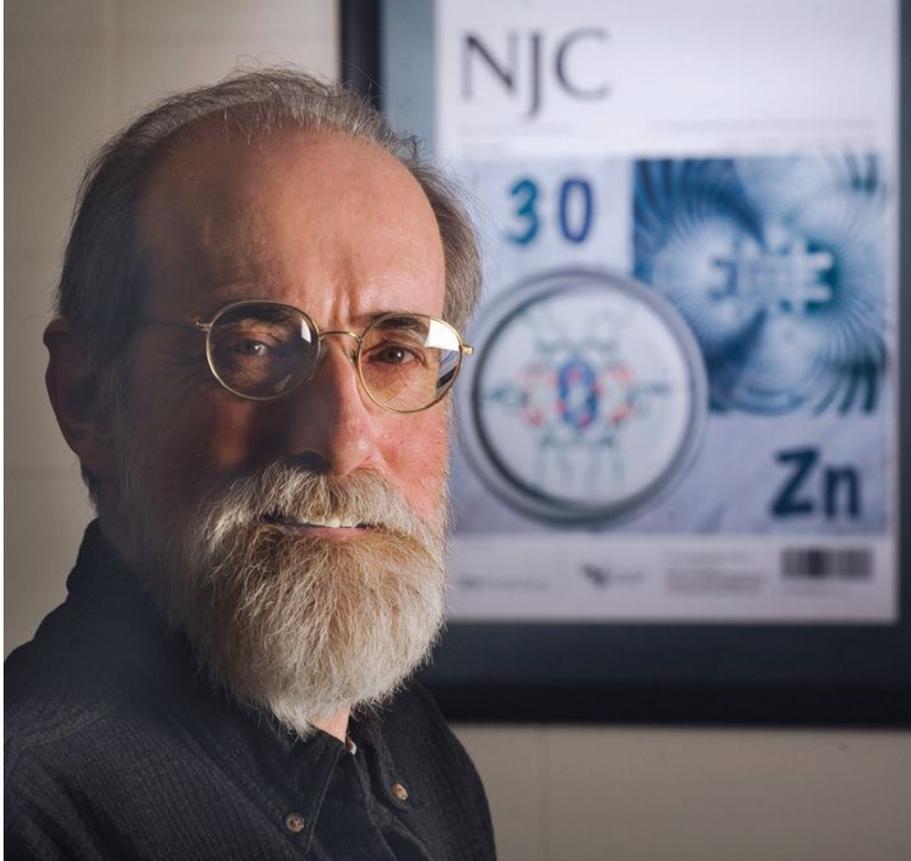


PHOTO BY ROB HILL

Jerry Atwood

printed in 2009. It has also been translated into Russian and Chinese. Steed said that the chance to ride on Atwood’s reputational coattails with that book and Atwood’s guidance throughout his early years have brought his own career to prominence.

Another researcher who has had extraordinary success with citations is Curators’ Professor of Psychological Sciences Kenneth Sher. He has been cited over 13,000 times in over 54 publications during his 32 years at MU. His research interests are focused on the

cause and progression of substance-use disorders, particularly alcohol dependence.

Sher and his research team are analyzing a large, nationally representative data set with the goal of characterizing developmental aspects of alcohol-abuse disorders and related comorbidities. He also collaborates with departmental colleagues in studying the behavioral effects of alcohol consumption in laboratory studies and the effects of extreme drinking events on neurological functioning.

Rachel Winograd was in the process of applying to graduate schools when one of her undergraduate professors suggested that she look at Sher’s research.

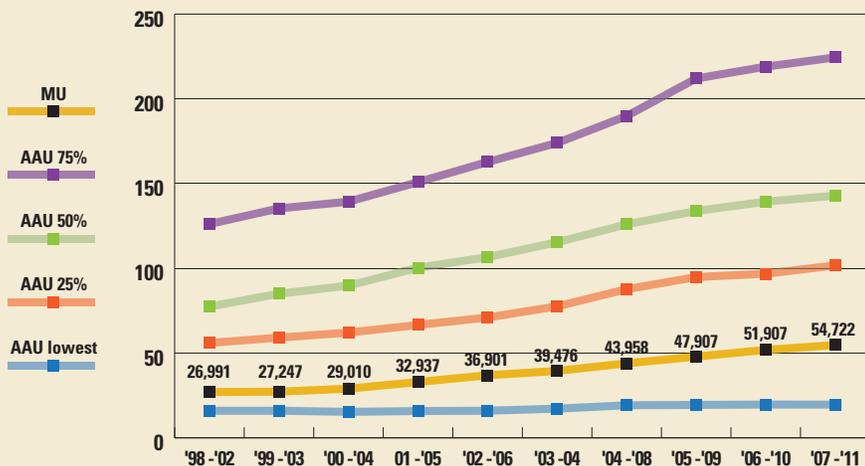
“I had heard that he was well known for his research on alcohol use and dependence,” says Winograd. “Once I began looking into his publications and funding history, I soon realized that he is prominent in the field, and I knew that if I could work with him, I would have the largest variety of career options available to me.”

Winograd began her fifth year on Sher’s research team this fall. Eventually she wants to work for a research hospital prominent in the field of alcohol dependence and treatment research. Her goal is to continue to be a part of a research team while still maintaining contact with a clinical population.

Atwood and Sher are just two examples of A&S professors who excel in postdoctoral training. By employing great professors, the university is able to recruit students, postdoctoral fellows, and new faculty with outstanding minds. Our job is to continue to create an environment where scientists have the tools available to conduct research that is worthy of being cited in future publications.

“People in other colleges on campus may have never heard of Jerry Atwood or Ken Sher,” Dean Michael O’Brien says, “but I guarantee you they are better off because Jerry and Ken are on this campus. Everyone benefits from the attention and prestige they bring to the university.”◆

How Do We Compare? Citations



Source: Data are from InCites, Thomson Reuters

Average of the institution’s citations for three five-year increments: 2004–2008, 2005–2009, 2006–2010.

All data are normalized by dividing by the U.S. institution’s three-year average faculty numbers; for institutions with medical schools, medical school faculty are included in faculty averages for 2008–2010.

MU Doctoral Students Get Unique

MU awarded \$3 million for research and training in neutron-scattering

Haskell Taub, professor of physics, came to MU in 1975 largely as a result of the university's research reactor (MURR)—the nation's highest-powered university reactor.

"Thirty-eight years later, MURR remains a unique facility on a university campus, and it gives us a fantastic opportunity for training scientists to use current neutron-scattering techniques," says Taub.

Scientists use neutron scattering to discover the molecular properties of materials. The technologies that have been developed include new drugs, electronic devices, and hydrogen-storage materials. However, the United States is experiencing a shortage of scientists trained in those techniques, and Taub hopes to do his part to change that.

One way is through the Integrative Graduate Education and Research Traineeship (IGERT) program funded by the National Science Foundation. Of more than 410 proposals submitted in 2011, MU's was one of 18 that were funded. MU contributed \$1.3 million toward the project.

MU's IGERT program, directed by Taub, implements a new

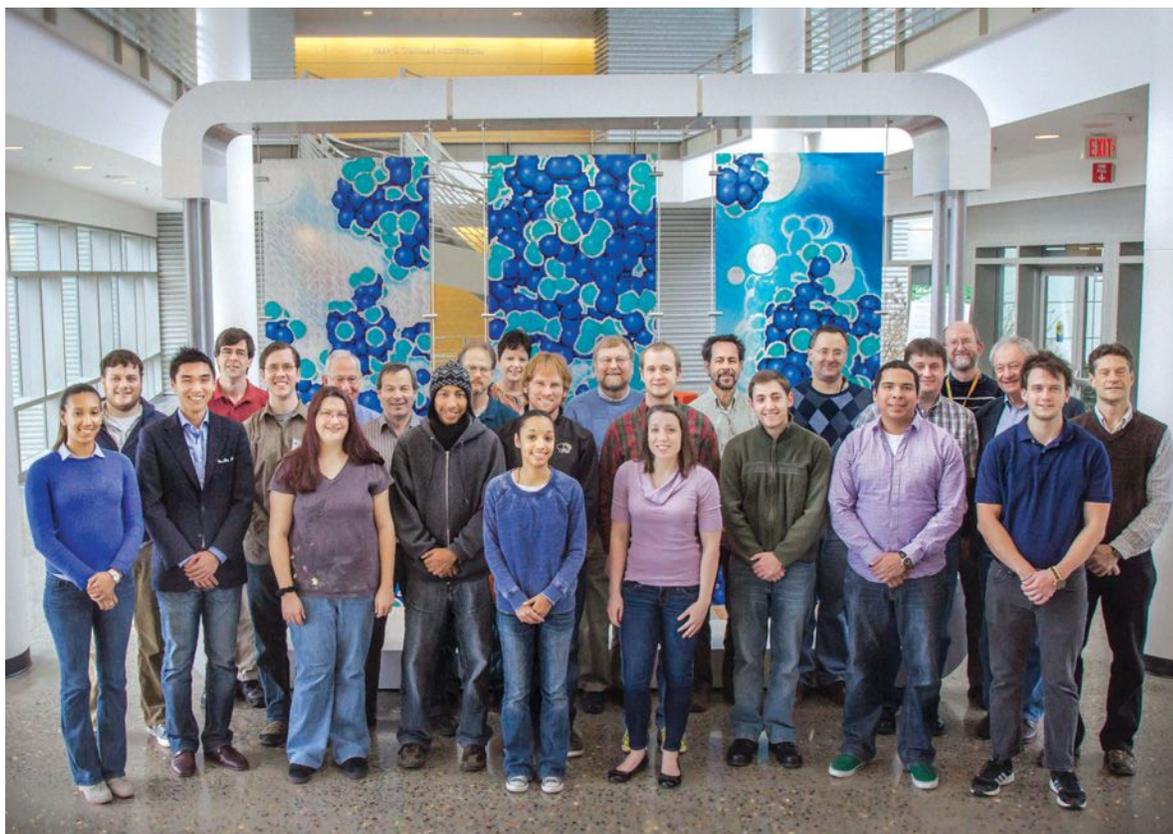
paradigm for interdisciplinary training in neutron-scattering research in three major areas: the molecular structure and dynamics of biological materials; the characterization of materials used for electronic devices, such as lasers and computers; and the structure of nanoscale materials, such as gold nanoparticles that have many uses including cancer treatments.

The curriculum uses problem-based learning and writing, combining hands-on training at MURR with innovative theoretical courses encompassing the three major research themes. On-campus research and training are paired with research experiences at the Spallation Neutron Source at Oak Ridge National Laboratory and the Center for Neutron Research at the National Institute of Standard and Technology.

Doctoral students have the opportunity to apply for the IGERT training program. Taub's goal is to train up to 20 students during the five-year program, which will provide \$30,000 annual stipends plus tuition and fees.

"This is a fantastic achievement, putting neutron scattering, our department, MURR, and MU on the national map like never before," says Peter Pfeifer, chair of the department. ♦

Students and professors combine on-campus research and training at MU with research experiments at the Oak Ridge National Laboratory, Oak Ridge, Tenn. This interdisciplinary training in neutron-scattering research is made possible by a federal grant.



Opportunity

BY LAURA LINDSEY

experiments

“MU’s research reactor remains a unique facility on a university campus, and it gives us a fantastic opportunity for training scientists to use current neutron-scattering techniques,” says Haskell Taub.



Haskell Taub

IGERT

Integrative Graduate
Education and
Research Traineeship



MU Research Reactor

A Growing Trend

BY MELODY GALEN

Postdoctoral positions are becoming more popular as departments

Arielle Deutsch, a postdoctoral fellow in psychological sciences, is enthusiastic. “I love this! I get to just do research all day.” For the next year, her job is to continue learning how to do her job better. Postdoctoral fellows devote themselves to research while at the same time learning more about the ins and outs of the research world—how to write proposals for funding, how to publish in top-rated journals, how to interview for faculty positions, and so on.

Postdoctoral research is an important stepping stone in many academic careers. The Association of American Universities (AAU) uses the number of postdoctoral fellows—“postdocs” for short—at an institution as one measure of its members’ and potential members’ academic success. Why? Because the presence of postdocs signifies there is significant intellectual capital available to entice researchers. In other words, professors at MU are engaged in research in which others want to participate.

Advantages for the Postdoc

Several faculty members in the psychology department run a large lab that studies addiction, and each of the five postdocs working there is paired with a faculty member for a research project.

For instance, Deutsch works with Professor Wendy Slutske investigating the underlying mechanisms that shape alcohol use during adolescence. Deutsch has been the primary author on two papers that have come out of Slutske’s lab, and she says that they are working on more.

“What I’m hoping, first and foremost, to get out of this postdoc is training in the areas we’re working in so I can be a more effective researcher and expand what I’m able to research,” says Deutsch. “But I also hope to establish a long-standing program of research that involves a behavioral genetic component.”

“I think that in psychology, a postdoc

is becoming almost required to get any sort of good position down the line,” she continues. “What I really like about it is that I’ve been able to do research I’ve never done before and I didn’t even have training in. When you get out of grad school, the work you are able to do is limited to one particular area. The advantage of a postdoc is that you get to expand yourself as a researcher. Also, you learn how to collaborate with other people and become part of potentially a brand new research network with all the contacts that you can make.”

Slutske agrees. “Right now funding is so competitive, and the tenure track at top research schools is so competitive, that to get a job or to get tenured,” she says, “you really need to have an established program of research and a fair amount of visibility.”

Advantages for the Department

The jobs a postdoc performs, from training graduate students to designing and implementing studies or analyzing data, frees up a faculty member’s time to be able to attend to higher-level issues.

Professor Thomas D. Sewell, of the chemistry department, appreciates the expertise that a postdoctoral fellow can bring to a department. “They come with a PhD in their pocket,” he says, “and with strong expertise in one or more areas that complements the ongoing needs of our own research interests and goals.”

The math department currently has nine postdocs, all on three-year terms, with half of their time spent teaching and the other half devoted to research. Glen Himmelberg, the department chair, says that his department couldn’t do without them. “In addition to their considerable research contributions, their teaching

mission is very, very important to us, because in math, we teach close to 40,000 student credit hours a year,” he says.

New Avenues

Maintaining a strong postdoctoral program is typical in the sciences, but other departments in A&S are looking to create them. For example, David Mandy, chair of the Department of Economics, has offered the department’s first postdoctoral fellowship to a recent doctoral graduate, Eric Parsons.

Parsons had the title of research analyst for the last couple years. “He didn’t hold a doctorate when we first hired him,

but now he does,” Mandy explains. “And, of course, that change means that we need to do something with his appointment to reflect the fact that he’s now more credentialed.” Parsons is in the midst of working on several projects, and the

department did not want to lose him. It made sense to offer him a fellowship in which he could continue his work and publish papers with known researchers.

Mandy says that the social sciences in general have not had a role for that in-between step of a postdoctoral appointment—PhDs went from receiving their doctorates straight into a faculty position if they were headed for academia. “But for us, with the intensity of data work that’s being done if you’re an empirical researcher, there is a role emerging for someone at that postdoctoral level to just help with the data work. And more of it is being grant funded than before, so a postdoc will likely be helping with grant management as well as writing them up,” says Mandy. “After three years of a postdoc, when they get a faculty position somewhere, they will hit the ground running.”

Another department is considering

“The advantage of a postdoc is that you get to expand yourself as a researcher.”

realize their value

the benefits of a postdoc—Robert Johnson, chair of philosophy, says it had never crossed his mind to hire a postdoc until Mike O'Brien, the dean of A&S, brought it up at a chair's retreat. It dawned on him then that he did indeed have some ideas for using postdocs. "We have a couple of younger faculty members who work in philosophy in a way in which philosophy traditionally has not been pursued," says Johnson.

"Philip Robbins, for example, works in the philosophy of psychology and philosophy of mind. He does what is now called experimental philosophy, which involves doing psychological research on some issues that are of interest to philosophers. He would definitely benefit from having a postdoc come to work on some of these projects with him."

Another faculty member in philosophy whom Johnson felt would immediately benefit is André Ariew, who collaborates with people across campus in studying evolution. He already works with graduate students as co-researchers and has written several papers with them, as has Robbins with his students.

Johnson believes that a postdoctoral program in philosophy could have a very positive effect on the graduate program. He says the department has struggled a bit with isolation as a result of being in mid-Missouri as opposed to someplace like New York, where a student would have the opportunity to rub elbows with many more professional philosophers than he or she ever would in Missouri. Each postdoc would be another person "for the graduate students to gauge themselves by to get a sense of *that's* what it is to be a professional philosopher."

The growth of postdoctoral programs provides benefits for everyone involved, from the postdocs and their mentors, right on up to individual departments and MU as a whole, where it will help the university increase its standings in the AAU. ♦



Professor Wendy Slutske and postdoctoral fellow Arielle Deutsch and her dog Chrome.

Learning Exp

Students can find their “classrooms” outside of MU’s walls

The Association of American Universities assesses its members’ undergraduate programs to determine if the institution is meeting its commitment to undergraduate education. The committee is flexible in its assessment of this category because it recognizes that universities have different ways of providing undergraduate education.

MU provides opportunities for undergraduate students to expand their knowledge through the undergraduate-research and the study-abroad programs.

Undergraduate Research

Undergraduate research at Mizzou allows students to explore the unknown through hands-on work with faculty mentors. Students develop their own questions, devise their own methods for finding answers, and discover new knowledge based on their findings. This program seeks to meld the two chief missions of MU—research and teaching. Students can participate either through the Office of Undergraduate Research or the Undergraduate Research Mentor Program (URM) in the College of Arts and Science.

The URM Program began in 1994 as a way to show the interconnection between research and teaching that would enrich undergraduate students’ programs of study. Any A&S student with 50–75 hours of coursework and at least a 3.25 grade point average is eligible to apply.

Jordan Bartlebaugh, BS ’13 bio sci, began her research the summer of her sophomore year. Her project studied the termination of transcription—the process of making RNA from DNA. By the end of the summer, she determined that her research would be a multiyear project, and future examination would include altering the termination signals to see how they affect the termination efficiency.

This past spring, Bartlebaugh, then a senior, earned a prestigious National Science Foundation Graduate Research Fellowship, which recognizes outstanding students in the science, technology, engineering, and mathematics disciplines who are pursuing research-based graduate and doctoral degrees.

She is using the funding from the fellowship to pursue a graduate degree in biological sciences at the Massachusetts Institute of Technology.

“Through research, material in class has been brought to

life,” Bartlebaugh says. “My communication and reasoning skills have been vastly improved, and I have been able to travel and learn about research being conducted across the country.”

Research doesn’t always happen in a lab. Take English major Grace McNamee who worked with Professor Devoney Looser on the project, “Culture Clash: An Exploration of Jane Austen’s Mr. Darcy in Her Time and Ours.” Since 2000, at least 182 novels have been published that modernize, rewrite, or provide sequels to the story of Mr. Darcy and Elizabeth, iconic characters from *Pride and Prejudice*. McNamee’s research

explores the factors that today’s authors present in Mr. Darcy’s character and how changes in culture have altered these traits from the original 1813 text.

McNamee said that this experience taught her to push herself and to ask more questions when she finds things she didn’t expect.

“You learn that in class, but if you aren’t researching and writing on a large scale, it’s harder to realize how important that process of continual questioning is,” she says.

McNamee wants to be a professor of 18th-century literature, and she says that knowing how to research, explain her findings, and help people understand their significance will be key for her success in the future.

Students who participate in undergraduate research go on to become leading researchers in their fields. Often, their projects translate into a presentation at a conference or the basis for applications to graduate schools.

Study-abroad Program

The International Center at MU promotes educational opportunities in more than 60 countries in all academic disciplines through the study-abroad program. Students can choose to do so for an academic year, a semester, or a summer.

Sophomore Isabella Jacobs and nine other students spent summer 2013 in Greece with Michael Barnes, associate teaching professor of classical studies, and she says that traveling to other countries is the only way to learn and gain a new perspective on the world.

“Every day we visited a new historical site and would learn about artifacts and their significance,” says Jacobs. “We went

Students who participate in undergraduate research go on to become leading researchers in their fields.

a n d e d

BY LAURA LINDSEY

places where tourists are usually not allowed to go, so we were able to see new excavations that are taking place.”

This is the fourth year that Barnes has taken a group of students to Greece. Over the span of four weeks, the group toured more than 20 cities and focused on sites, monuments, and museums that showcase Greece’s ancient and Byzantine heritage.

“I’ve designed the trip to be an immersive teaching and learning experience,” says Barnes. “It’s hard to beat watching students get their first glimpse of the Acropolis—the excitement on their faces and in their voices reminds me why I got into this profession in the first place.”

The benefits of the study-abroad program last well beyond the trip. Barnes says that traveling extensively throughout the country and meeting so many people along the way pushes students to question their own assumptions, both about antiquity and about their own lives.

“The students are exposed to different ways of living, and

they realize that there is nothing inevitable or natural about the culture in which they were raised,” says Barnes. “Experiencing the traditions of Mediterranean hospitality and food etiquette prompted them to question assumptions about their daily routines.”

Nick Brown participated in the program in 2012 and says he wanted to visit Greece with Barnes because it was a chance to take a journey back in time to see the world through a different lens.

“I inhaled my surroundings and learned from everything I did and saw,” says Brown. “Classroom lectures teach students about historic events, but by seeing places firsthand, I was able to understand it in a deeper context.”

So, whether conducting research in a lab or library, or traveling the world to observe other cultures, hands-on experiences create unique opportunities for students to enhance their learning. ◆



Nick Marin and Kaitlyn Kelly at Cape Sounion, Greece, looking out at the Aegean Sea. They are two of nine students who traveled to Greece in 2013 and came home with a new perspective on the world.

Facilitating Better

People often joke unkindly about committees and boards, and sometimes with good reason, but the College of Arts and Science can boast several successful alumni boards. Each one is dedicated to furthering the teaching and research mission of its respective department.

For example, geological sciences' alumni formed a board in 1981. One of its chief goals is maintaining and improving Camp Branson, which is the department's summer field school outside Lander, Wyo. Geology students from MU and universities around the country have been immersed in hands-on field experiences there for over 100 years, and such facilities require constant upkeep. With that in mind, the Geology Development Board recently raised over \$500,000 for Camp Branson. It has also raised money for endowed funds to bring in postdoctoral students, for scholarships, and for faculty enhancement.

Don Packwood, PhD '71 physics, tells in his own words how the alumni board in physics came to be and why he thinks it is a successful example of what alumni can help their departments achieve.

The Physics Leaders—A Success Story

In fall 1996, distinguished alumni from every department in the College of Arts and Science gathered in Columbia for the Third Annual A&S Leaders Conference and Banquet. David Cowan, who at the time was chair of the physics department, had invited a cross-section of alumni to become Physics Leaders and to have the opportunity to meet astronaut Linda Godwin, MS '76, PhD '80 physics, who was a scholar-in-residence at MU that year.

Cowan chose his Leaders well, selecting people who had shown an interest in the department and who had lent their support. He tried to find people who had roots and family in Missouri so they would have reason to return each year. Cowan created a terrific program for his Leaders, asking them to talk to students and emphasize the factors that led to their success. The Leaders came away acquainted with the state of the department, its faculty, and their research. They could see that the department had many needs, and they felt they could help.

Cowan had chosen as the Physics Leaders' first president Gerald Fishman, BS '65 physics, an eminent astrophysicist who was doing groundbreaking research on the cause of intense gamma-ray bursts originating throughout the universe. Each alum who was being recruited to join Leaders received a letter of invitation from Jerry. When I received mine, I decided to accept, and I called several others who were on the list of prospects and urged them to accept.

The crew of the space shuttle *Atlantis* in 1991: front, Jerry Ross, Professor Linda Godwin, and Jay Apt; back, Instructor Steve Nagel and Ken Cameron.



Education

BY DON PACKWOOD

Physics Leaders includes academic physicists, government lab physicists, industrial physicists, medical physicists, entrepreneurs, and even a lawyer, a retired Air Force general, and a retired NASA astronaut. The late Jim Ferguson, BS '56, ScD '01 physics, the inventor of the first commercially successful liquid crystal displays, which are still used today, and Bill Brinkman, BS '60, MS '62, PhD '65, ScD '87 physics, the director of the Office of Science at the Department of Energy—both are former MU physics students.

From the beginning, the focus of Physics Leaders was to help the students and faculty. Leaders gave career seminars, offered mentoring and advice to the students, and sponsored undergraduate and graduate student research presentations with cash prizes for the top papers in each category. They gave advice to the faculty on the curriculum and advice to the dean on the department's needs. The ability to give money has never been a factor in our recruitment of new members for the Physics Leaders, nor is a donation ever required for membership. Despite the lack of emphasis on monetary giving, the Leaders have been generous when they have seen departmental needs. Most recently, the Leaders mounted a campaign to establish a \$500,000 endowed fund for faculty-compensation enhancement. We are partway to our goal, and the fund is making a huge difference.

We found at our first meeting a department that produced good research but was small—far smaller than other physics departments at major research universities. We found a department that was focused mainly on producing future professors. The industrial physicists in the group pointed out that there were simply not enough professorships avail-

able for all the graduates being produced and that most would wind up in alternative careers, so the department needed also to prepare its graduates to be able to succeed in these other career paths. The Leaders as a group, and in some cases individually on their own initiative, began to lobby the dean about the department's need to expand. The dean at the time, Richard Schwartz, responded by approving the department's expansion into the field of biological physics, and the department began to grow. The

Physics is now a department that prepares its students broadly for whatever path their careers may take them

growth of the department has continued under the present dean, Mike O'Brien. The department is approximately twice the size that it was when the Leaders started—certainly more in keeping with that of a major research university. It has strengthened and broadened its program in many areas.

While the Leaders cannot take complete credit for all this, surely we have played an important role. Physics is now a department that prepares its students broadly for whatever path their careers may take them, even to the extent of establishing a joint physics/electrical engineering degree. The Leaders have been very gratified that so many of their recommendations have been acted upon. It gives us all a sense of accomplishment and satisfaction and keeps us coming back each year.

The Leaders found that one of the physics department's strengths was the unusually large percentage of students

who were women. This is not the case in most physics departments around the country. Most are unwelcoming, some even hostile to women. We felt it was a competitive advantage that our department is female friendly, and we encouraged even stronger outreach to women. At present, MU is a national leader among physics departments in terms of the percentage of the faculty and students who are women. One-third of the physics faculty are women, and over a quarter of the department's graduates are women.

One of Dean O'Brien's goals has been to encourage all of the departments in the college to create alumni boards that are similar in scope to the Physics Leaders. Helping in that effort is the main thing I can contribute as a member of his strategic development board. In the beginning, this was a hard sell for reasons I simply did not understand, considering the benefits the physics department received as a result of our collective efforts. Surely, I thought, all the departments would want to gain the support of their alumni and derive similar benefits. It took years of beating the drum, but I now am seeing real change on the horizon as department chairs and their faculty members are seeing the benefits.

I have written this article in the hope that some of the A&S alums who read it will decide that they, too, want to enjoy the satisfaction of helping students and faculty. I encourage you to contact the chair of your department to see if you can join such a group, or perhaps help get a group organized. You will have a rewarding experience.

My thanks to my wife, Lona, and to Linda Cunningham, wife of Physics Leader Robert Cunningham, MS '66, PhD '70 physics, for many helpful suggestions as I was writing this. ◆

Upgrade to Facilities Will Have Long-lasting Impact

Find out how you can support the arts at Mizzou

BY LAURA LINDSEY

You don't have to have a degree in art, music, or theater to enjoy the fine and performing arts. People from all educational backgrounds can appreciate an art show, a musical performance, or a play. That's why all Mizzou alumni can join in our efforts to renovate the Fine Arts Building and construct a much-needed School of Music building on the MU campus. Supporting these projects not only helps recruit and retain the best students and faculty but also creates excitement among members of the community, who can enjoy performances and exhibits in state-of-the-art facilities.

A first-class fine arts facility will attract top undergraduate and graduate students and contribute to the recruitment of outstanding faculty

Art, music, and theater students and faculty have been housed in the Fine Arts Building on the southwest corner of Hitt Street and University Avenue since 1960. The building was fine for the first decade or so—for example, theatre only had three professors when the building opened—but with increased enrollment and expansion of the programs, the space quickly became inadequate.

If you haven't stepped foot in the

building for 25 years, don't worry—it still looks just the same as it did back then. As the years have gone by, each of the three departments has been forced to move more and more studios to other buildings on campus. The goal of the construction-and-renovation project is to consolidate the departments in one location and to vastly improve studio and performance space.

Fine Arts Building

The two-story buff brick building is of a modernist design that was popular in the '60s. It consists of two blocks that are connected by a large space that serves as an art gallery. The southern block has two auditoriums—Whitmore Recital Hall and Rhynsburger Theatre—with floors of classrooms, offices, and studios in between.

“Having a first-class art facility will attract top undergraduate and graduate students to Mizzou and will contribute to the recruitment of outstanding faculty,” says Melvin Platt, chair of the art department.

The primary goals of the project are to create appropriate spaces for art and theater teaching programs, improve faculty- and student-support facilities, enhance exhibition spaces for art display, provide conveniently accessible venues for theater productions, and upgrade the overall infrastructure for ease of maintenance and operation.

“Our theater program continues to grow as new generations of our students

seek careers as artists and scholars,” says Heather Carver, chair of the theatre department. “The building renovations are vital as we create theatrical productions to showcase the talents of Mizzou students—the stars of our future.”

School of Music

When the School of Fine Arts—a designation no longer used—was established in 1921, the music department was housed in the original Lathrop Hall, a former dormitory on south Sixth Street that was built in 1894. It didn't take long for the realization to sink in that the building was insufficient for musical purposes, as the walls were not soundproof and the rooms were poorly arranged. When the new Fine Arts Building was completed in 1960, students and faculty finally had private space for individual instruction and a recital hall for concerts. However, increased enrollment soon forced the department to expand to other buildings on campus.

The new building, to be located on the northeast corner of Hitt Street and University Avenue, will consolidate music faculty and students and provide a 410-seat recital hall, 50 sound-proof practice rooms, a recording studio, and 31 faculty studios.

“For decades, the School of Music has needed proper facilities to match its outstanding faculty and students,” says Robert Shay, director of the School of Music. “The new facility will

continues on page 28



HIGHLIGHTS

Department of Art

Undergraduate students:	250 to 300
Graduate students:	27
Professors:	20
Adjunct professors:	15

- Since 2009, the art department has had four Fulbright Scholars
- In 2010, Associate Professor J. Brett Grill created a seven-foot bronze sculpture of former President Gerald R. Ford that is on display in the Capitol Rotunda in Washington, D.C.
- Professor Lampo Leong's works can be found in 16 museums, and his achievements have been discussed in over 900 reviews and publications including a PBS documentary.

School of Music

Undergraduate students:	201
Graduate students:	78
Professors:	41
Adjunct professors:	18

- In its 2013–14 season, the St. Louis Symphony will perform “Ravish and Mayhem,” an original piece composed by alumna Stephanie Berg.
- Jeanne and Rex Sinquefeld have given a \$1.4-million gift to continue and expand the Mizzou New Music Initiative and the Creating Original Music Project.
- Alicia Miles, BA '05, was the vocal soloist with the Brooklyn Tabernacle Choir at President Obama's inauguration in January 2013.

Department of Theatre

Undergraduate students:	73
Graduate students:	29
Professors:	12

- Tom Berenger, BA '71, took home an Emmy in 2012 for Outstanding Supporting Actor in a Mini-series or Movie for *Hatfields & McCoy*s.
- Professor Cheryl Black received a 2013 William T. Kemper Fellowship for Teaching Excellence—one of the highest teaching awards given by the university.
- Senior Amanda Newman's one-act play, *The Lost Slipper*, served as one of seven invited productions for the 2013 Region V Kennedy Center American College Theatre Festival out of several hundred entered. This is the second year in a row that MU has received this honor.

Above: Artist's rendering of the renovated Fine Arts Building.





undoubtedly help us attract more music students and the next generation of top music faculty to Mizzou.”

To make this dream possible, we’re going to need the generosity of our alumni and friends. Giving opportunities include naming opportunities and gift-in-kind contributions, such as building materials.

“Since I’ve been dean my goal has been to improve the facilities for the fine- and performing-arts departments,” says Mike O’Brien, dean of the College of Arts and Science. “It may seem overwhelming, but I’m confident with the dedication of our alumni and friends, we can accomplish something that will last. These buildings will impact future generations, and I can’t wait to get started.” ♦



Above: Artist’s rendering of the new School of Music building.

Left: The Fine Arts Building as it was when it was built in the 1960s.

COURTESY UMC ARCHIVES C:1/25/6

To learn more on the proposed buildings, see a video at

<http://coas.missouri.edu/development/som.shtml>

or contact us at **573-882-4421**.

Chemistry Alumnus Helps Retain Top Professors

BY LAURA LINDSEY

Although Chris Fuldner, BA '73, did not use his pre-med chemistry degree to become a doctor as he originally intended, his science education at MU helped him succeed in the family window-and-door manufacturing business. To show his appreciation, he has set up a fund to provide cash incentives for high-producing faculty in the chemistry department.

After spending some time in Denver following graduation, Fuldner moved back in 1977 to his childhood town of Monett, Mo., to learn the ropes at his

and chemistry classes all helped him in his career.

"Because of my extensive background in physics and chemistry, I actually knew more about the plant processes than the people who were supplying the chemicals to us," says Fuldner. "My education came in very handy for my career choice, and the science classes taught me to think in a logical manner."

Fuldner has always been grateful for the education he received at MU and has given back to the university in many ways. When Cornell Hall, the home of the Robert J. Trulaske College of Business, was built, he donated all the windows and doors, and he has been a guest lecturer in business classes. When Mike O'Brien, dean of the College of Arts and Science, visited him years ago and asked if he would be interested in giving back to A&S, Fuldner did not hesitate.

Originally, he wanted to create a scholarship endowment, but O'Brien mentioned that he sometimes has difficulty attracting and retaining professors in the college.

"He said that to have a great school, you need great faculty," says Fuldner. "He's right. If MU is going to be one of the best state universities, the best professors must be recruited to teach the students and conduct groundbreaking research."

In August 2012, Fuldner gave the chemistry department \$50,000 to do just that—support its faculty. Starting this year and recurring through 2017,

the chair of the department will identify three faculty members to serve as Fuldner Chemistry Fellows for the calendar year based on overall productivity in the areas of research, teaching, and service.

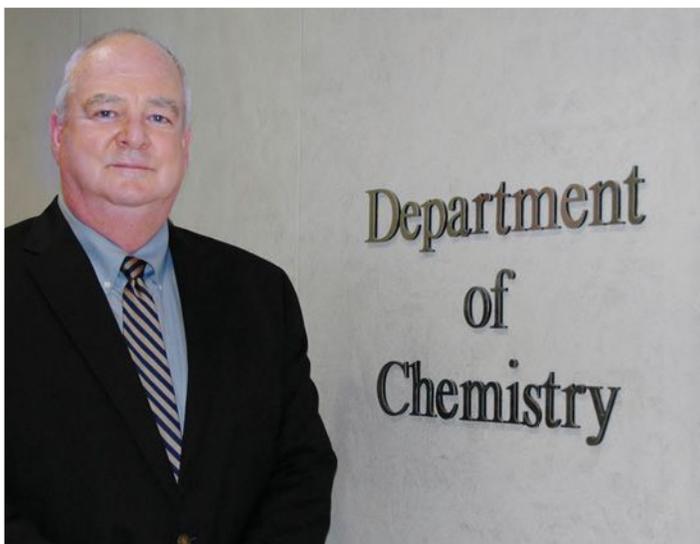
"Think of this as a scholarship for the faculty."

Individual faculty members are eligible to receive the award a maximum of two times in five years. The awards were given to Silvia Jurisson, Paul Sharp, and Kent Gates in 2013.

"My gift is just a start," says Fuldner. "My hope is that others will consider contributing to funds similar to this one as a way of saying thank you to the faculty. Hopefully, the recognition will go a long way in keeping the top performers at MU."

Members of the Geology Development Board did something similar when they set up a faculty-enhancement fund and a faculty retention fund. In fall 2012, six professors received financial recognition for their extraordinary contributions. Fuldner said that when he heard how well that recognition was received, it motivated him to make a difference in the chemistry department.

"Retaining the best and brightest faculty is an important part of making the university successful," says Fuldner. "Everyone always wants to give scholarships, but think of this as a scholarship for the faculty." ◆

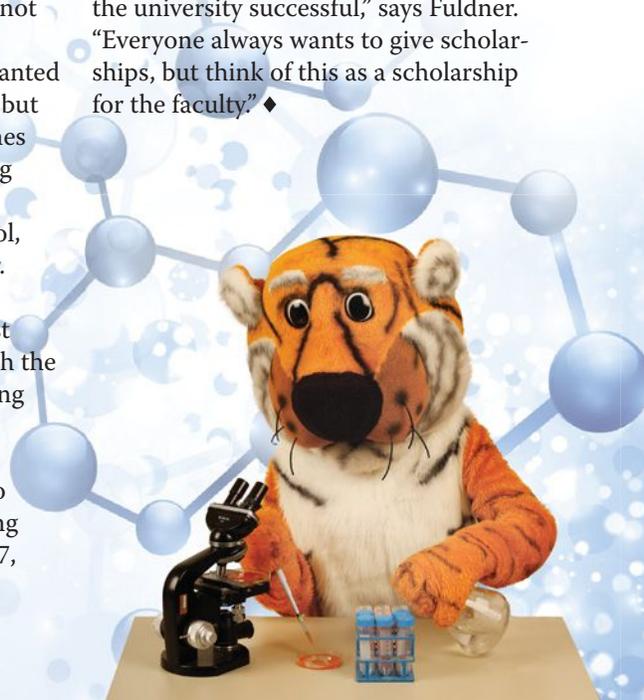


Chris Fuldner

PHOTO BY LAURA LINDSEY

father's business, EFCO. By the time he became CEO in 1985, he had expanded the company from a small, sleepy, regional manufacturer to a prominent player in the national market. When he joined the business, it had 60 employees. Thirty-three years later, it had grown to employ about 2,000. Founded in 1951, EFCO is still a leading manufacturer of architectural aluminum windows, curtain walls, storefronts, and entrance systems for commercial architectural applications. Fuldner sold the company to Pella Corporation in 2007.

Fuldner says the economics, business,



Alumni Support Great Faculty

Banker's Gift Used to Recruit Distinguished Professor

Sam Cook is chairman of Central Banc Company, a Missouri-based bank holding company that *Forbes* magazine consistently ranks among the nation's best 20 banks. Cook, former curator of the University of Missouri, says that macroeconomics was the most important course he took at MU, and he wanted to ensure that today's students have the opportunity to learn the subject from one of the nation's top economists. With the encouragement of former MU Chancellor Richard Wallace, Cook funded a chair in the economics department to help recruit such a person. Because of that gift, MU was able to lure Christopher Otrok from the University of Virginia—one of the top public universities in the country.

"The Sam B. Cook Chair provides financial resources to support my research that were unavailable to me at Virginia," says Otrok.

Otrok's research is in three distinct areas: how financial disturbances felt in one country impact other nations in today's integrated world economy; how asset prices can be used to extract information about the future macroeconomy; and why it is better to develop strategies to deal with crises when they begin to occur versus intervening needlessly when the economy is healthy.

The *Journal of Economic Dynamics and Control* is a major journal in economics and finance with an excellent reputation for publishing high-quality refereed research papers, and it is now headquartered at MU because of Otrok.

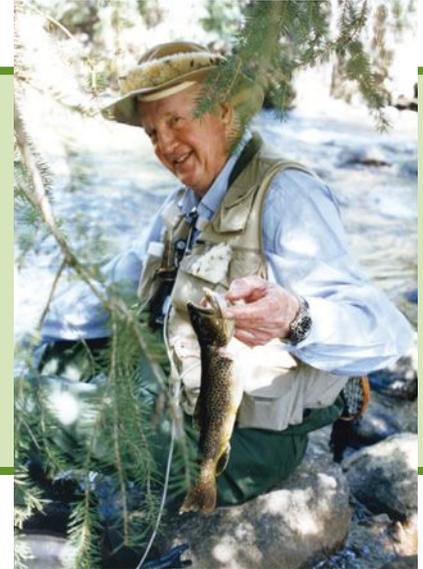
After moving to MU, he made the case that the journal should move with him, and he oversees the management of it as coordinating editor.

"The international journal will expose MU to a global audience," says Otrok. "Having such a journal sends a message that both the economics department and the university are worthy of being the gatekeepers of a quality journal."

By attracting and supporting a distinguished scholar such as Otrok, the university remains competitive on economic growth and business fluctuation issues, and it has made an investment in the future study of macroeconomics, which is exactly what Sam Cook had in mind when he funded the position. ♦

Macroeconomics examines economy-wide phenomena such as changes in unemployment, national income, rate of growth, gross domestic product, inflation, and price levels. It is focused on the movement and trends in the economy as a whole.

When he isn't running one of the nation's most successful banks, Sam Cook enjoys outdoor activities. His gift to A&S helped recruit one of the best economists to teach at Mizzou.



Winemiller Provides for the Faculty, Too

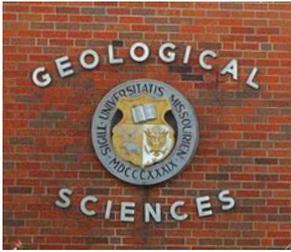
Albert Winemiller Jr., BA '64, MA '65 statistics, is a staunch supporter of the statistics department, and one of his ways of showing support is through cash donations. This past February, Winemiller gave \$50,000 to the department, with the stipulation that it be used over the coming two years, with \$15,000 each year going to student scholarships and \$10,000 each year earmarked for faculty

awards in whatever way the department chair and dean of the college deem appropriate. This gift is in addition to existing endowments he's set up for scholarships and faculty enhancement.

"My first goal is to foster student academic excellence and interest in statistics, but I also would like to see more collaboration between statistics and other departments," says Winemiller. He'd be especially happy to see faculty

development taking place in a market-driven statistics-based pricing course. He also hopes to someday see more faculty development of online courses. "It would be a big one-time effort that could free up faculty for higher-level tasks down the road," he says.

In honor of the ongoing support Winemiller has shown his alma mater, the department has named a recurring conference for him. ♦



Strong Faculty, Strong Students

BY MELODY GALEN

Geology alumni have historically been very active in support of their department, and that continues to this day. As soon as alums had finished a campaign to refurbish the summer field school facilities at Camp Branson in Wyoming and another one to augment graduate student funding, they turned their attention to faculty support.

The quality of training and education of the students begins with the faculty.

Higher education is a big target for cuts, and faculty salaries have stayed at a low level compared to those at other institutions that, like MU, are members of the Association of American Universities. Scott Raymond, BS '72, MA '74, began to be concerned that “with the economy what it is, and with business what it is, we may not have any faculty left to teach the students.” He started the Geology Faculty Enhancement Endowment with the goal of giving monetary rewards to top faculty performers.

Eddie Williamson, MA '73, started the Geology Faculty Retention Award, and it does what the title suggests. It provides funds with which the department chair and the dean may offer extra salary to keep a faculty member from being wooed away by another university. “What I want to achieve is the retention of the top-notch faculty that the department is able to bring on board,” says Williamson.

Simply having the endowments in

place is only the beginning. Next, you need people to actually donate to them, and at a university, student scholarships are some of the most popular ways to give back. It’s taken a bit of a nudge and some explanation, but people have begun to see that it is also important to augment faculty (and staff) salaries.

Tim McHargue, BS '71, MA '74, has contributed to the faculty enhancement funds in geology. “My real concern, of course, is about the quality of training and education of the students,” he says, “but that begins with the faculty, so retaining them is fundamental.” He realizes that no one likes to work in a place where he or she doesn’t feel valued, and he hopes that the extra funds will make a difference when a professor is being lured away.

Because faculty support is one of his top priorities for the college, Dean Mike O’Brien has offered to match a certain amount of what is given to the distribution accounts of these endowments. Raymond appreciates the boost in the money that’s available for his department’s faculty. “We’re kind of getting 200 pennies for each dollar I give because of the match coming from Mike,” he says.

The good news is that the faculty enhancement program is growing: last academic year, six faculty benefitted from the extra funds, and in 2013–14, the department anticipates making seven awards. As Raymond says, “If you’re going to go to the trouble of bringing in great students, you darn well better keep some great faculty!” ◆





Meet the Cover

We mean it when we say that the College of Arts and Science is the largest and most diverse college on the MU campus. With 28 academic departments ranging from art to chemistry, political science to history, and everything in between, the college boasts a wide array of people and interests.

The professors featured on this issue's cover are no exception—their research and teaching interests cover a broad spectrum. Not only do their subjects differ, but their experiences at MU are as diverse as they are. Here's just a brief view of our cover stars.

Bina Gupta

For over 40 years Bina Gupta, Curators' Professor of Philosophy and director of the South Asian Studies Program, has been on a mission to dispel the notions that philosophy is exclusively a Western phenomenon and that women can't be good philosophers. Her research and her success have done just that.

Gupta says it is a common misconception that Indian philosophy is spiritualistic, intuitive, and lacking in theoretical rigor. Instead, she says, Indian philosophy, like its Western counterpart, resides in the disinterested, systematic search for truth.

Gupta began her research on the Advaita Vedānta—the school of Indian philosophy best known to the Western world as spiritualistic and mystical. Her goal was to demonstrate that Indian philosophy is an intensely intellectual, complex, and relentlessly critical pursuit. Her initial efforts resulted in several short studies in the form of articles, essays, and book chapters, eventually leading to the publication of her first book on Vedānta.

Gupta's 13 books and over 80 published articles have received international attention. She has been asked to give more than 100 lectures around the world, and she served as president of the Society for Asian and Comparative Philosophy from 1998 to 2001—the only woman to have held that position.

For decades, Gupta has made serious efforts to bring to the forefront the critical issues related to the equal treatment of women and minorities. Her efforts were recognized in 1991 when she received the MU Alumnae Anniversary Award for her outstanding contribution to the education of the women of Mizzou. In 2003, she was honored at the first annual Tribute to MU Women, where she was recognized for helping to create an environment of equity, fairness, and justice.

Models

Dongchu Sun

Dongchu Sun has been a professor in MU's statistics department since 1992 and currently serves as department chair. His main research interest is Bayesian inference, a branch of statistics in which probabilities are continually updated as more information becomes available.

During the last five years, he has used the theoretical properties of Bayesian methods to solve complicated practical problems, including cancer incidence, mortality rates in epidemiological studies, signal detection, memory studies in psychology, microeconomics, and estimating yield curves for Chinese national bond funds. His research has been funded by the National Science Foundation and the National Institute of Public Health.

Sun believes in the natural connection among research, graduate teaching, and advising graduate students. In his career, he has advised 24 doctoral students and 16 master's students. Many articles based on his students' dissertations have been published in leading statistical journals.

In 2004, Sun was named a fellow of the American Statistical Association, and in 2005 he was named a fellow of the Institute of Mathematical Statistics.

Justin Dyer

As an undergraduate business student at the University of Oklahoma, Justin Dyer enjoyed his foundations of American politics class so much that he changed his major to political science.

Today, he is an associate professor in the MU political science department where he teaches courses in American government and the Constitution. His research interests are in American political development, political philosophy, and constitutional law with an emphasis on the Western tradition of natural-law philosophy and its influence on politics.

Dyer's articles and books have ranged from American antislavery constitutionalism, historic abortion politics, and most recently, Martin Luther King Jr. and his use of natural-law tradition in the civil-rights debate. His future project will focus on novelist C.S. Lewis, who was the foremost public defender of natural-law philosophy in England during World War II.

"He had interesting things to say about politics, although he didn't want to be associated with politics," says Dyer. "This is a departure on the type of research that I have previously done. I want to draw out Lewis' political thought."

Truman the Tiger

Truman has been working at MU since 1986, twirling his tail, passing out high fives to adults and children, and generally acting as the heart and soul of the campus. Although he can be found at all kinds of events—pep rallies, football games, and homecoming parades—it is little known that Truman's real love is academics, especially courses taught in the College of Arts and Science. He jumped at the chance, not only to appear alongside his friends on the cover of *Mosaics*, but also to help introduce several of our stories. ♦





The Art & Soul of Mizzou

From the establishment of MU in 1839, its liberal arts and sciences have been the foundation of higher education. Today, the College of Arts and Science is the largest college in the state, with more than 450 tenured and tenure-track faculty members and 9,000 undergraduate and graduate students.

By financially supporting the college, you help us recruit and retain highly sought-after faculty and students who will go on to make great discoveries that can change the world. As our reputation for academic excellence is enhanced, your degree becomes more valuable.

Every gift counts.

To make a donation, please visit

www.coas.missouri.edu/giving

or call 573-882-4421.