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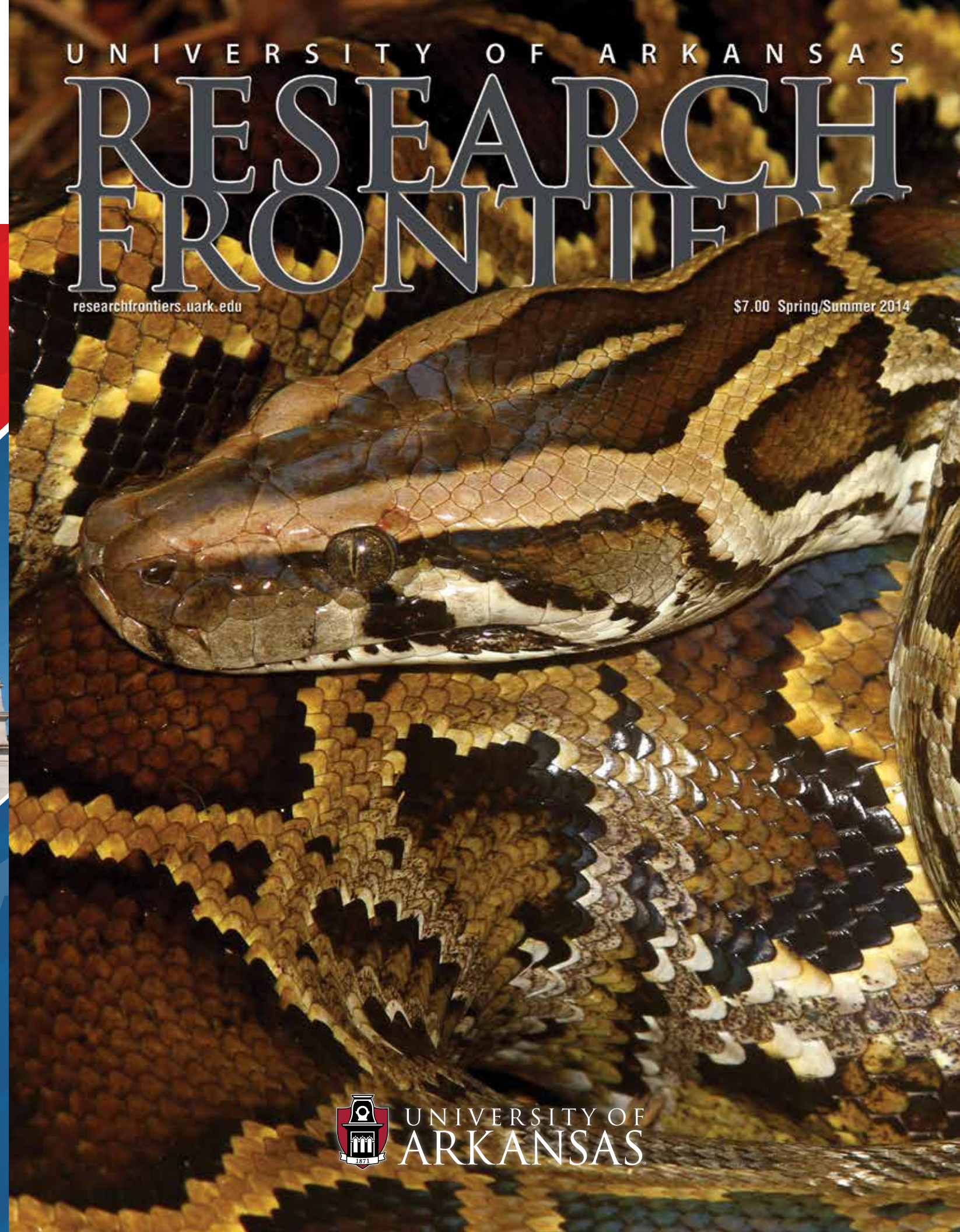
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A Tale of Two Whistlers: The Private Life of a Celebrity Artist



Nocturne in Black and Gold: The Falling Rocket, James McNeill Whistler, ca. 1875, oil on panel, Detroit Institute of Arts

By Chris Branam

"I first met James Whistler when I was twelve and he had been dead for fifty-five years," writes Daniel E. Sutherland in his new biography of the 19th century American artist. Sutherland was in grammar school, on a field trip with his classmates to the Detroit Institute of Arts, when he saw a self-portrait of Whistler hanging next to his most notorious painting, "Nocturne in Black and Gold: The Falling Rocket."

"The memory of that encounter has stayed with me, and now, with the passing of nearly another fifty-five years, it is my reason for telling his story."

And so Sutherland begins *Whistler: A Life for Art's Sake*, the exhaustively researched biography that ruminates on the nature of the two sides of Whistler.

"There were two different Whistlers," Sutherland said. "His public persona, which is something he encouraged and nourished himself, is of this carefree *bon vivant* who is more concerned with celebrity and entertaining people and making people laugh, as

opposed to a serious artist, which he really was. This was a man who was driven. He was insecure at heart, and the insecurity came from this drive for perfection."

There have been nearly 20 biographies of Whistler since he died in 1903. Sutherland's is the first to make extensive use of his private correspondence.

"I'm not an art historian, so I looked at his life holistically," Sutherland said. "I think others recognized there was a difference between his public and private lives, but because they never went into deeply his private correspondence, they never understood the way in which it really affected how he viewed art and the world."

In past biographies, Whistler has been remembered as a combative, eccentric, unrelenting publicity seeker. All of that was true, Sutherland said, but these qualities obscured what was underneath: a master who "was a very great artist, arguably the greatest of his generation, and a pivotal figure in the cultural history of the 19th century."

Whistler was born in Massachusetts in 1834, followed his father as a cadet at West Point and failed out of the academy at age 19. He moved to Paris and embarked on a career as an artist. In 1871, he finished *Arrangement in Grey and Black No. 1*, known colloquially as "Whistler's Mother," one of the most recognizable portraits in the Western world. Whistler produced 2,700 paintings, drawings, etchings and lithographs and became famous for producing inventive, non-traditional works of art.

"Whistler had a reputation as a 'painter's painter,' someone who only another painter really understood," Sutherland said. "Other artists understood him and sympathized. He would destroy paintings for which people would have paid him a lot of money, because they didn't match his image of what he was trying to do. In his 'painter's eye,' he had a vision. He would demand 50 or 60 sittings for portraits. He would start, and the sitter would come back the next day and see that the canvas was blank again."



Whistler: A Life for Art's Sake is published by Yale University Press.



Daniel E. Sutherland is a Distinguished Professor of history. He is the recipient of more than 50 awards, honors and grants and is best known for his series of books chronicling 19th century America.

For more about Sutherland:
<http://history.uark.edu/5654.php>.

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Photo by Russell Cothren

In Julian Fairey's Water Research Laboratory, improving the quality of drinking water is paramount. Here, lake water with added coagulants is being slowly stirred in one-liter jar testers to evaluate the extent to which undesirable chemicals can be removed by adhering to the particles, which are settled out in a subsequent treatment process.



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U N I V E R S I T Y O F A R K A N S A S

RESEARCH FRONTIERS

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On the Cover:

Curled at the top of the food chain, the Burmese python is decimating the mammal population of the Everglades.



PROMISE

pilot program for students with disabilities



\$32.4 million dollar grant

The PROMISE grant is the first national study to investigate the correlation between paid work as a teenager and later competitive employment.

1,000 arkansas teens with disabilities receiving SSI

largest research grant in UA history

GOALS

- increase education
- increase employment
- reduce reliance on SSI

Fewer than one in 10 adolescents receiving Social Security disability benefits ever achieves competitive employment. Typically, they do not have a first job or internship. They are cut off from the world of work. PROMISE research could go a long way toward facilitating independence and social inclusion for adolescents with disabilities.

Selection and funding of programs	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Recruitment and random assignment										
Delivery of program services										
Evaluation site surveys										
Youth and parent surveys										
Evaluation reports										

Revealing Shape and Ripples One Atom Deep

Physicists in the J. William Fulbright College of Arts & Sciences are using innovative methods to measure and map graphene, a one-atom-thick sheet of graphite, discovered in 2004.

Electrons moving through graphite have mass and encounter resistance, but electrons moving through graphene are mass-less and encounter much less resistance. Graphene could emerge as a replacement material for silicon and other materials in microprocessors and energy devices, but much remains unknown about its properties.

An international research group, led by Salvador Barraza-Lopez, is using a new mathematical framework to map the material's shape.

"The properties of two-dimensional materials depend on shape," Barraza-Lopez said. "And this mathematical framework allows you to make extremely accurate characterizations of shape. This framework is a novel tool to understand shape in materials that behave as atom-thin membranes."

The researchers are using discrete differential geometry, which is the geometry of two-dimensional interlaced structures called meshes. When the nodes of the structure, or mesh points, correspond with atomic positions, discrete differential geometry provides direct information on the potential chemistry and on the electronic properties of two-dimensional materials, Barraza-Lopez said.

Graphene was once thought of as existing on a continuum — think of a smooth, continuous "blanket" — but the new mathematical framework allows the consideration of the blanket's



Photo by Russell Cochran

"fibers," which provides an accurate understanding of the blanket's properties that complements the continuum perspective.

In another study, Peng Xu, a postdoctoral research associate in physics, led an international team of scientists in tracking the dynamic movement of ripples in freestanding graphene at the atomic level. Their work advances the fundamental understanding of graphene, one of the strongest, lightest and most conductive

materials, said physics professor Paul Thibado.

"Physicists have known that the ripples must be there and some experiments did find them," he said. "But they could only measure the ripples as static in time. The theory requires that they fluctuate, more like looking at an ocean with waves. The thermal energy needs to vibrate. Up until our experiment no one had successfully measured this dynamic property of the ripples."

The researchers' innovative scanning tunneling microscopy technique provides a much-needed atomic-scale probe for the time-dependent behaviors of intrinsic ripples, Thibado said. The ripple dynamics are important for understanding mechanical stability and the efficient thermal conductivity transport properties of graphene.

This study, funded by the Office of Naval Research and the National Science Foundation, was conducted through a partnership between the University of Arkansas and the University of Antwerp in Belgium.

Nanosensors Detect Signs of Concussion

Engineering researchers have developed a wireless system to continuously monitor each player on the football field for physiological signs that indicate concussion. The system includes a dry, textile-based nanosensor and accompanying network that detect early signs of traumatic brain injury.

"Wearable nanosensor systems can detect the severity of head injury by quantifying force of impact, be it light or violent," said Vijay Varadan, Distinguished Professor of electrical engineering. "In real time, our system continuously monitors neural activity and recognizes the signs and symptoms of traumatic brain injury, such as drowsiness, dizziness, fatigue, sensitivity to light and anxiety."

The system is a network of flexible sensors woven or printed into a skullcap worn under a helmet. The sensors are built with



carbon nanotubes and two- and three-dimensional, textile nanostructures grown at the University of Arkansas. Data is transmitted from the sensors to a receiver and on to a remote server or monitor, such as a computer or a smart phone.

Varadan and researchers in his laboratory have tested the system on a small scale for real-time application. They plan to test the system during a game in fall 2014.

Varadan holds the Twenty-First Century Endowed Chair in Nano- and Bio-Technologies and Medical Technology and is a professor of neurosurgery at the University of Arkansas for Medical Sciences. He directs the National Science Foundation-funded Center for Wireless Nano-, Bio- and Info-Tech Sensors and Systems.

How to Become an Energy-Burning Machine

For some women, a high-protein meal followed by 30 minutes of moderate exercise is an effective way to burn calories, especially when compared to exercising on an empty stomach.

Ashley Binns, a doctoral student in kinesiology and exercise science who led the study, said the goal was to determine the interaction between the thermic effect of food and exercise on the body's total energy expenditure. Thermic effect is the amount of energy that it takes to digest, store and utilize the food we eat.

"We looked at the effects of protein consumption alone on total energy expenditure and protein consumption combined with exercise," Binns said. "We found that with exercise, there is a trend for a continued increase in caloric expenditure with higher protein consumption. Additionally, the consumption of the high- or low-protein meals resulted in greater energy expenditure than the fasted state. That means that eating prior to exercise does provide fuel to burn, making us more like an energy-burning machine."

Binns co-authored the paper with Michelle Gray, an assistant professor of kinesiology, and Ro Di Brezzo, a University Professor of kinesiology.

"To my knowledge, this is the first study of its kind," Gray said.



University of Arkansas graduate student Ashley Binns (left) and Michelle Gray, an assistant professor of kinesiology, collaborated on a study that found for some women, a high-protein meal followed by moderate exercise is an effective way of burning calories.

Photo by Russell Cothren

"What Ashley found is important because of the growing problem of obesity in the United States. If simple changes can increase our energy expenditure, then they may have a large impact on weight loss or weight maintenance."

Zinc Oxide Boosts Solar Cell Efficiency

Engineering researchers, led by Omar Manasreh, have achieved the highest efficiency ever in a 9 millimeter-squared solar cell made of gallium arsenide. After coating the cufflink-sized cells with a thin layer of zinc oxide, the research team reached a conversion efficiency of 14 percent.

A small array of these cells – as few as nine to 12 – generate enough energy for small light-emitting diodes and other devices. But surface modification can be scaled up, and the cells can be packaged in large arrays of panels to power large devices such as homes, satellites, or even spacecraft.

An alternative to silicon, gallium arsenide is a semiconductor used to manufacture integrated circuits, light-

emitting diodes and solar cells. The surface modification, achieved through a chemical synthesis of thin films, nanostructures and nanoparticles, suppressed the sun's reflection so the cell could absorb more light. But even without the surface coating, the researchers were able to achieve 9-percent efficiency by manipulating the host material.

Manasreh focuses on experimental and theoretical optoelectronic properties of semiconductors, superlattices, nanostructures and related devices. Since joining the University of Arkansas in 2003, he has received more than \$8 million in public research funding from the National Aeronautics and Space Administration, the U.S. Air Force and the National Science Foundation.



Yahia Makableh demonstrates how a small array of 9-millimeter, gallium-arsenide solar cells can provide energy for small devices.

Photo submitted

Use of Tanzanian Beauty Pageants to Achieve Social Mobility

In *Language, Globalization and the Making of a Tanzanian Beauty Queen*, Sabrina Billings looks at Tanzanian beauty pageants as a place where women use verbal and non-verbal communication to struggle for mobility, access to education and a place in the global world.

Billings found that the pageants differ significantly from those in western cultures because they are socially progressive events that offer contestants an opportunity to access education and social mobility that would otherwise be impossible.

"The women who participated in my study typically want a life different from their mothers — they don't want to be beholden to a man whom they consider dishonest, controlling or abusive and they want to be able to have a career and make their own money," said Billings. "They seek independent, stylish and modern lives, away from paternal or conjugal authority, and



Photo submitted

English is often understood as a critical tool in fashioning their own, mobile futures."

Although Swahili is the national language of Tanzania, Billings said, "English is a cornerstone of pageant success."

Participants display cosmopolitan behavior to show their knowledge of Western norms. In addition to using English, they become globalized citizens

through their interpretation of western body image — including standards of weight, style and fashion, and use of make-up products like skin-lightening cream. They also demonstrate their concern with global issues such as HIV/AIDS, homelessness and child abuse.

Billings is an assistant professor of world languages, literatures, and cultures and the director of the Swahili language program in the J. William Fulbright College of Arts and Sciences.

Amborella: The Museum of Dead DNA

A new study has uncovered an unprecedented example of horizontal gene transfer — the acquisition of foreign DNA from unrelated species — in *Amborella trichopoda*, a South Pacific shrub that is considered to be the sole survivor of one of the two oldest lineages of flowering plants. It is the first description of a land plant acquiring genes from green algae.

Andrew J. Alverson, an assistant professor of biological sciences in the J. William Fulbright College of Arts and Sciences, performed the computational analyses that identified the many donors of this foreign DNA, which includes entire mitochondrial genomes from three green algae and one moss.

The study, led by scientists at Indiana University, included researchers from the U.S. Department of Energy, Pennsylvania State University and the Institute of Research for Development in New Caledonia.

"The *Amborella* mitochondrial genome is huge, and most of its DNA is foreign, acquired from the mitochondrial genomes of other plant species," Alverson said. "We've never seen horizontal gene transfer at this scale. It's not acquiring genes or bits of genes in a piecemeal way. It's been swallowing up whole genomes. One of our main tasks was to determine the ancestry of its several hundred 'extra' genes."

Most of the genes in *Amborella*'s extra DNA are degenerated and nonfunctional.

"*Amborella* is a hoarder, Alverson said. "Its genome is a museum of dead DNA."

This large amount of "junk DNA" is evidence that mitochondrial fusion in plants is incompatible with the way mitochondrial fusion occurs in animals or fungi, Alverson said.



Photo by Mike Bayly, Wikimedia Commons



HIDDEN KILLERS

Invade Florida Everglades

By Chris Branam



A Burmese python crosses the main road in Everglades National Park during a nighttime survey conducted by a team of scientists studying the secretive snake.

Since it was established in 1947, Everglades National Park has been a research haven for wildlife biologists, who are drawn to the diverse array of animals who call the 1-and-a-half-million-acre park home. The Everglades is one of the largest remaining wilderness areas in the eastern United States, and because of its subtropical ecosystem, scientists who study reptiles and amphibians visit frequently.

In the early 2000s, a team of herpetologists went to the Everglades to conduct research on the rise of the Burmese python as an invasive species in south Florida. One night, after driving the park's main road looking for snakes, one of the team's lead researchers compared observations with J.D. Willson, who was then a doctoral student at the University of Georgia and is now a University of Arkansas biologist.

"I remember commenting to J.D., 'We haven't seen a raccoon down here, dead or alive,'" recalls Mike Dorcas, a professor of biology at Davidson College, who was Willson's undergraduate mentor. "We realized we hadn't seen opossums, either. So consequently we developed the idea for a study to look at changes in relative abundance of mammals associated with the python invasion."

Photos courtesy of John D. Willson



Photo by Russell Cothren

J.D. Willson, an assistant professor of biological sciences at the University of Arkansas, holds a corn snake in his reptile laboratory. Willson helped lead a team that concluded that the invasion of Burmese pythons in Florida has resulted in dramatic declines in mammals in Everglades National Park. Because they are an invasive species, Willson does not have pythons in his lab.

From 2003 to 2011, the team led by Dorcas and Willson drove roads at night looking for mammals and compiled observations from other biologists. The scientists amassed more than 57,000 kilometers of surveys on the main road in Everglades National Park, recording observations of mammals that had historically been abundant in the park, including the two most commonly found during the 1990s, raccoons and opossums.

What they found shocked them. In all those miles, they accounted for only nine raccoons and five opossums, declines of more than 98 percent compared to pre-python surveys. They saw only four bobcats, and they didn't spot a single fox or a rabbit.

"It was an unbelievable reduction," Willson said. "It is now kind of eerie to drive roads at night in the southern parts of the Everglades. You go hundreds of miles and seldom see a single mammal. We have reports of park visitors who went to go fishing in the 1990s and they would frequently see rabbits scampering across the road.

"As far as we can tell, nobody has seen a wild marsh rabbit along the 40-mile main road in Everglades National Park in almost 10 years."

The team — which included scientists from the National Park Service, the U.S. Geological Survey, the University of Florida and Auburn University — came to a single conclusion.

"These findings suggest that predation by pythons has resulted in dramatic declines in mammals within Everglades National Park and that introduced apex predators, such as giant constrictors, can exert significant top-down pressure on prey populations," they wrote in a paper that appeared in the *Proceedings of the National Academy of Sciences* in 2012.

Burmese pythons are at the top of the food chain in south Florida.

"There's not much there that they can't eat," Willson said. "The largest pythons are capable of eating nearly every native bird or

mammal in the southeastern United States — including full-grown whitetail deer and even alligators. We were seeing enough pythons in the Everglades that we expected to see some effects, but we had no idea it would be that dramatic."

CASCADING EFFECT

Among the various threats to wildlife and native ecosystems across the United States, invasive species are not getting enough scientific attention, according to Willson. The Burmese python — one of the largest snakes in the world and native throughout much of southern and southeastern Asia — had been one of the most common animals in the pet trade for three decades. Burmese pythons started popping up with increasing frequency in the wild in Everglades National Park starting in the early 2000s.

"It started out as one or two a year, so people assumed that these were recently released animals or those who had escaped from their owners," Willson said. "But fairly quickly it became apparent that this was an established and reproducing population starting to expand in the region. The first animals were found in some of the most remote areas of Everglades National Park in the mangrove sections near Flamingo. Now, there are records of them showing up well north of Interstate 75 — Alligator Alley. In the last 10 years they have spread over a huge area."

Realizing this as a rich research opportunity, Dorcas, Willson and their research colleagues began making regular trips to Florida. They found out what the pythons were eating — and soon became concerned about how they could affect species that are endemic to Florida or are federally or locally protected.

For example, consider the Key Largo woodrat, which is only found in a small area on Key Largo in the upper Florida Keys archipelago. The U.S. Fish and Wildlife Service lists the rodent as an endangered species, and estimates suggest that there are only about 200 of the rodents left on the island.

The first python that was captured and euthanized on the island had two Key Largo woodrats in its stomach — perhaps 1 percent of the species' known population.

The National Park Service and the University of Florida have amassed a large prey list based on the examination of the stomach contents of captured and euthanized pythons.

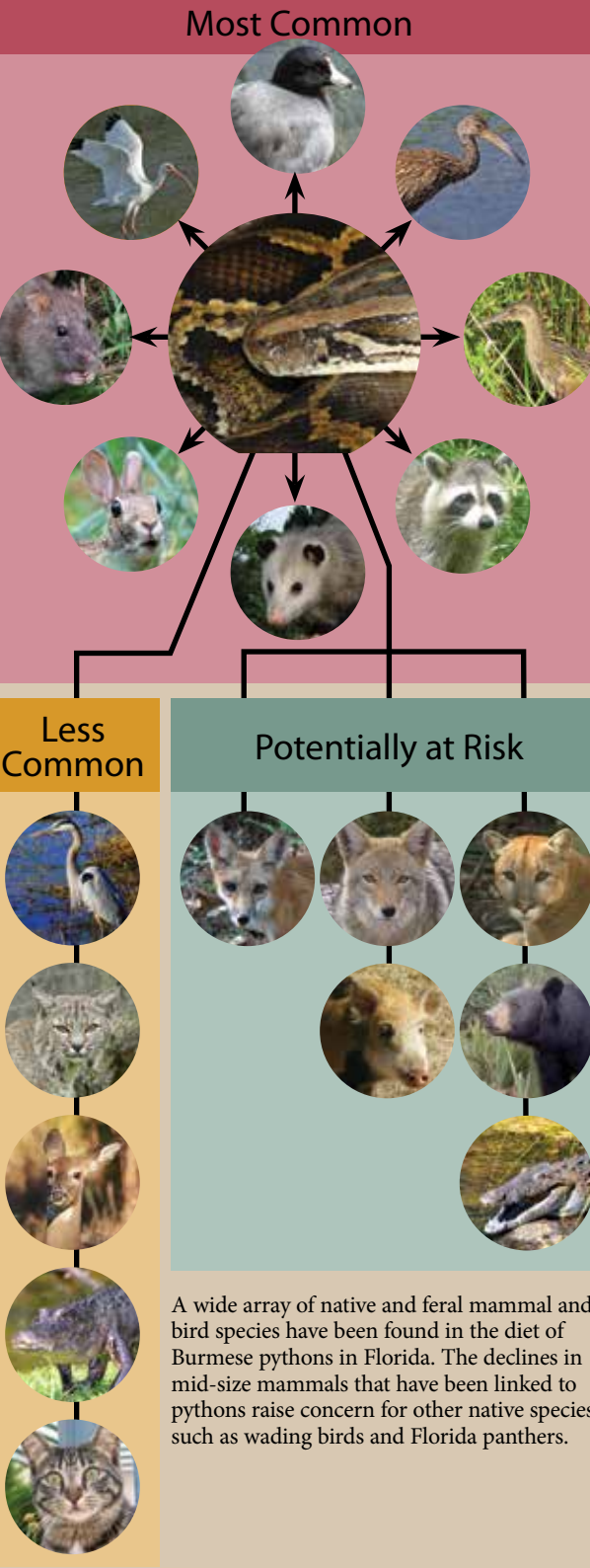
"They seem to be eating alligators with some regularity," Willson said. "We are also worried about the beautiful herons and egrets that draw tourists to the Everglades and are frequent prey for pythons."

Before pythons were common there, the Everglades had a standard medium-sized mammal community. There were high numbers of raccoons and opossums and smaller numbers of carnivores such as bobcats and foxes.

Not any longer.

"The mammal study was important in providing very convincing evidence of the apparent effects that pythons are having on native fauna," Dorcas said. "Our research has made people aware that these pythons can have major impacts on the prey species

PYTHON DIET and their Impact on the Everglades





Photos courtesy of John D. Willson

that they are feeding on. This is probably going to have major cascading effects on the ecosystem, as well. It's hard to imagine taking out most of the mammals and not seeing the impacts on plants and other species."

POPULATION DYNAMICS

Nobody has been able to come up with a solid estimate of how many Burmese pythons are slithering around south Florida — rough guesses range from several thousand to hundreds of thousands. Their date of origin in the Everglades hasn't been determined with any accuracy, either.

Research by Willson's group disproves the theory that Hurricane Andrew caused the problem. For years, a popular notion in the

media has been that the 1992 hurricane destroyed a warehouse or breeding operations that released the snakes into the wild.

"In order to get to what we would consider a plausible population size — more than 10,000 snakes out in the wild — you would have to start with several hundred 'founders' to start that population and get that population going quickly enough to get to where we are now," he said. "The area where pythons were first found and where reproduction was first confirmed is more than 30 miles away from the areas in western Miami that have reptile dealers.

"It makes much more sense that the problem started in the southern part of the Everglades and dates back well before Hurricane Andrew," he said. "Our research, based on population models and examination for the spread of the area of invasion, suggests that the most plausible explanation is that a few snakes were released either intentionally or unintentionally to the southern part of the Everglades in the 1980s or possibly even the 1970s.

"If we don't know how many are out there we have no ability to judge how well our control efforts are working, to know how much effort it would take to eliminate them even from a small area," he said. "They are so adept at hiding that there are very few circumstances where we know how many there are with any degree of certainty."

Willson's research team is currently working on new methods for estimating python density.

RANGE EXPANSION

So, will a Burmese python be coming to your neighborhood anytime soon?

Again, there is no good answer.

The technique that has been used most frequently to assess how far these snakes could spread is climate matching — a method that attempts to match the climate of areas where Burmese pythons are known to be found in their native range to similar conditions in areas at risk of invasion.

Most people think of Burmese pythons as tropical animals that won't be able to live in colder climates. That's not exactly true. The species does occur in tropical areas but it is also found in very arid areas in Pakistan and northern India and farther north into the foothills of the Himalayas, where it freezes in the winter. Some climate models predict suitable climate as far north as central Arkansas.

Four years ago, Willson helped lead a cold-tolerance test for pythons while working as a post-doctoral fellow at the Savannah River Ecology Lab in South Carolina. The group translocated 10 adult male pythons from the Everglades to a snake-proof enclosure at the lab that featured a large pond and a variety of habitats.

The researchers kept the snakes outside for almost a full year to monitor their behavior, physiology and body temperatures, but ostensibly it was an experiment to see if they would survive the



There is no solid estimate of how many Burmese pythons are in Florida, but studies conducted by J.D. Willson's research group have identified approximately where the "founder" population originated and how quickly the snakes have expanded in the last two decades.

South Carolina winter. It was one of the coldest winters on record in South Carolina and all of the snakes eventually died — but not before showing some adaptive behavior and resilience to the frigid temperatures.

"In the fall, the pythons stayed underground or in the water at night and they basked in the sun during the day," Willson said. "One snake made it through six or seven freeze events before he eventually died during an intensive cold spell in January. These results suggest that they may not be able to survive that far north, especially during extreme winters, but we definitely saw some behaviors that were appropriate for cold weather."

That means that the python's territory will probably extend beyond south Florida.

"This is probably not just a south Florida problem," Willson said. "It is probably at least a peninsular Florida problem and likely a Gulf Coast problem. The jury is still very much out on the central and Southern United States." ■



J.D. Willson is an assistant professor of biological sciences at the University of Arkansas. His lab focuses on understanding factors that drive population and community dynamics of reptiles and amphibians. Although much of the lab's work is applied, Willson and colleagues also shed light on basic questions in ecology. They are especially interested in understanding "unique aspects of reptile and amphibian population biology that differentiate them from other vertebrates."

For more information: <http://comp.uark.edu/~jwillson/>

Willson and Mike Dorcas are the co-authors of *Invasive Pythons in the United States: Ecology of an Introduced Predator*, published in 2011 by the University of Georgia Press.

Individual Development Accounts:

"Income feeds people's stomachs. Assets change their lives."

By Barbara Jaquish

Put three social work researchers around a table, ask a couple of questions and turn on the audio recorder. That was the plan, and it worked because the researchers are Kameri Christy, Yvette Murphy-Erby and Marcia Shobe, three professors with a commitment to improving the lives of women as well as years of experience together doing just that. In addition to discussing their research, the three emphasized the importance of their feminist perspective in designing and implementing projects.

In particular, Christy, Murphy-Erby and Shobe have studied programs that offer women Individual Development Accounts. IDAs are special savings accounts that make it possible for low-income individuals to save money, build their assets and enter the financial mainstream.

While women in IDA programs may have learned habits of saving from their parents, daily demands can derail saving for the future, despite the best intentions. IDA programs are designed to bridge the gap between planning for the future and carrying out those plans by supplementing the women's own savings with matching funds.

The funds are matched by government or private-sector organizations at the rate of one to one or two to one or sometimes more. The savings accounts are dedicated to purchasing an asset such as a home, a small business or a college education.



Photo by Logan Webster



Marcia Shobe is professor and direction of the University of Arkansas School of Social Work and is an affiliate faculty member in the university's Public Policy Ph.D. Program. Her research interests encompass the areas of health disparities, anti-poverty policy and practice, community development and child welfare. She is principal investigator on a 10-year grant for over \$1 million from the Ford

Foundation to study outcomes for low- and moderate-income savers in IDA programs in Arkansas and New Mexico. Also, she is principal investigator on a U.S. Department of Health and Human Services grant related to scholarships for disadvantaged students. She publishes frequently in peer-reviewed journals and presents at national and international professional conferences. At the university, she edits *Inquiry*, the undergraduate research journal.



Kameri Christy is a professor of social work and is an affiliate faculty member in the university's Public Policy PhD Program. Her research interests include economic development and security for abused women, decreasing violence against women, and anti-poverty policies and programs. She has been a co-primary investigator with Marcia Shobe on grants from the Ford Foundation and the Winthrop Rockefeller Foundation (on which

Yvette Murphy-Erby is also an investigator). She is a principal investigator on a grant from the Indiana Housing and Community Development Authority and a co-investigator on a grant from the Winthrop Rockefeller Foundation to evaluate Educational Development Account pilot programs. She publishes and speaks frequently at academic conferences, nationally and internationally, and has been an invited presenter at think-tank sessions hosted by the Ford Foundation, the U.S. Department of the Treasury, the Social Security Administration, U.S. Department of Health and Human Services, and the Urban Institute.



Yvette Murphy-Erby is a professor of social work and interim associate dean of the Fulbright College of Arts and Sciences at the University of Arkansas. In addition to her work with Marcia Shobe and Kameri Christy on IDA programs, she has studied African American grandmothers raising their grandchildren (funding from the Social Work Research Center, University of Arkansas), conducted various literacy projects in the Marshallese community in

Northwest Arkansas (funding from the Women's Giving Circle and the Office of Institutional Diversity, both at the University of Arkansas) and served as co-principal investigator on an adolescent pregnancy prevention program (funding from the U.S. Department of Health and Human Services). In addition to publishing and presenting nationally and internationally, she serves on the editorial boards for the *Race, Gender & Class Journal* and for *Intersectionalities: A Global Journal of Social Work Analysis, Research, Policy, and Practice*.

Marcia Shobe: I think what has excited us about the IDAs is that here is a program that provides a match for savings to low- and moderate-income individuals in order to buy a house or go to school or start or expand your own business. These are the same tax incentives that are offered to moderate- and upper-income Americans in the U.S. tax code. So IDAs offer the same things to the lower- and moderate-income. It will help level the playing field, and the primary participants in IDAs are women.

Kameri Christy: And people of color. For people to move up socioeconomically, some of the more successful programs have been asset-building programs, like the GI Bill where people who have served our country could come back and get an education or low-interest home loans.

Shobe: I remember when IDAs first started, our mentor was talking to folks in the community. She was explaining IDAs. A woman said, "So it is like a 401K only for us, for poor people." She said to her, yes, that is exactly what it is.

Murphy-Erby: There are still a lot of people who distrust 401Ks, but not to that same level, so they are willing to put money in and their employer will match it. But when you talk about that same concept and apply it to moderate- and low-income families, all of the sudden it becomes something else. It is looked at in a negative light. Not only are the participants not really valuing this whole notion, oftentimes you get people from the community who see it as welfare or a handout or something negative.

Shobe: Interestingly enough when IDAs first started they tried a 1:9 match that was with private funding, and it did not work as well as the 1:1 or the 1:2, because people did not feel that they were earning it. When people go to financial education or financial literacy classes, and they speak to legislatures, and they write letters, and they participate and save their money every month, they feel like okay, I am giving, too, and earning this match. I think some ownership comes of that, which I think is very feminist-based thinking and perspective as well. I am working for this as well – it is a give and take.

WHY FEMINIST RESEARCH?

Yvette Murphy-Erby: A reason I think feminist research is so important is to get those voices in the center of the conversation, to get those experience out there, but also to continue to challenge the status quo and policies that are oftentimes constructed around the dominate way of thinking and the dominate paradigm.

Christy: I think with feminism it is not an either/or, us-against-them, low-income versus middle-income versus upper-income. It is "both/and." When one group of people has their rights protected and when we have social justice in one area, it really does spread



Photos by Logan Webster



across and benefits everybody in lots of different ways. I think that is another part of the research agenda that we have as well. We focus on marginalized populations, but we realize that anybody could become marginalized. In a blink of an eye, it could happen.

Shobe: I think the relationship aspect of the feminist approach is so integral to the IDA program movement and to the research. Other places have tried to institute IDA programs where they do some marketing, and they go to the bank, and they really have no one-on-one contact. Those programs have died. They don't even get started and off the ground. It is word-of-mouth – it's personal relationships that work. That is feminist research, too; it is all about the relationship and the meaning behind it.

When Shobe observed that the number one reason for bankruptcy in the United States is health care costs, the conversation went from the Affordable Care Act to a discussion about the difference between income and assets.

Christy: We did an article looking at health insurance, health status and medical debt. And, of course, what we found was that people with health insurance can have large amounts of health debt. All it takes is a major illness for you or a dependent or a partner, and you are right there with no money whatsoever.

SO, WHAT DOES THIS TELL US ABOUT INCOME AND ASSETS?

Christy: Income is what people need every week or every month to pay their bills, buy their food, and make their rent payment or mortgage payment or whatever. But doing that doesn't change their economic status. For people to actually be able to move out of poverty usually means that there has to be some type of asset or wealth component to that, like getting a house where they can build up enough equity so they will have that in case there is a rainy day or to get some type of post secondary training or education.

Shobe: Income feeds people's stomachs; assets change their lives. They can start thinking about the future: ok, now that my debt is paid, what do I want for me? What do I want for my kids?

Murphy-Erby: One thing that I think is a really important component of the individual development asset account movement has been financial literacy education. Because again, you are talking about sometimes first generations and so first generation being banked – using a banking service. I think the IDA movement is not only looking at policy change it is also



Photos by Logan Webster

looking at some practical things and looking at some education. By this instruction at various levels, I think that it has been effective, and we have seen that in our research.

Christy: That is a really good point. When people don't have information, they don't know what their options are and they tend to not do things because it becomes too scary or intimidating for them. This goes back to being a woman, too, as far as financial literacy. I had none growing up. I think part of it was because of my gender, and also because my parents were very, very low income. When I first started in the IDA area, Marcia hired me to go to the classes to translate classes from English into Spanish for our Hispanic attendees there, and I learned so much stuff in those classes. I don't want to be dependent on having to go to a banker who I don't necessarily trust anyway to talk to me about points and cleaning up my credit. It is better for me to have that information and that is what financial literacy training does; it gives people handouts and booklets as well as having just having discussions about what different things mean and doing exercises to help them learn more about financial education.

WHAT ARE THE HURDLES IN INSTITUTING IDA PROGRAMS?

Murphy-Erby: Trust is a major issue, and we saw that even in recruiting participants for our study. When we offered the opportunity to participate in the IDA, we realized that one of the major factors in recruiting participants was having someone who could take it to the community and say, "I have tried this it has worked for me."

Shobe: That is true nationwide. When we started the program, we thought people would be waiting in line and knocking down the door. It took us a year, because all of our marketing was not going to work. It was word-of-mouth that worked. Our first meeting in the community, a man stood up and said, "What is in it for you?" I said that is a really good question. So we laid it out: We are doing a pilot program. We think we can change policy. We think we can level the playing field. We also want to conduct research and see what works and what does not.

I remember one community member, Regina, saying, so I told all my cousins about it, and they thought oh, yeah, another

person – another white person – coming into our community and saying you give us your money and we will match it or whatever. Yeah, we have heard that song and dance before.

So, we worked with the credit union. I used to joke and call it the Bank of Bob. There was one guy named Bob who ran that credit union, and he had a personal relationship with everybody in our program, and they trusted him. We had to meet with the community and say who do you trust, who do you want us to work with. Because we tried it with other banks, and they were awful to our participants.

HOW DOES THIS ALL RELATE TO FEMINIST RESEARCH?

Shobe: We can go in as researchers and say this is good this is the finding we need to do this but really it is the participants whose voices need to be heard. It is the people in the community that matter the most.

Murphy-Erby: I think giving light to their experience is really important. I think one of the things that feminism does it is not

just research for the sake of research but it really is a bout change, it is really is about social justice, it is really about what are the major implications from the standpoint of those who are most affected. I think that is really key in terms of thinking about policy and thinking about programming. I think that fits very well with social work, but it also fits very well with the feminist perspective. I think our team melds those two pieces together nicely. ■

For more from the interview, including stories about IDA programs and participants, go to the Research Frontiers website to hear short sound files.





MIMO

—— (Multiple Input/Multiple Output) ——

Dynamic Data Saves Bridges and Lives

By Matt McGowan

There are no sad songs about Silver Bridge. There should be. During rush hour on Dec. 15, 1967, 46 people died on the bridge when it collapsed into the Ohio River. That's 17 more than the entire crew of the SS Edmund Fitzgerald, the Great Lakes freighter eponymously immortalized in 1976 by Gordon Lightfoot.

But structural and civil engineers do not need an elegiac ballad to be reminded. For them, the Silver Bridge lives in infamy. In fact, the purpose of Kirk Grimmelsman's research can be traced back to the day it collapsed into the Ohio River.

"Prior to that event, there really weren't any national bridge inspection standards or requirements," says Grimmelsman, assistant professor in the College of Engineering. "The Silver Bridge collapse changed everything."



B&W Silver Bridge image courtesy of: West Virginia State Archives, Otis Adkins Collection; Color photo of Woolsey Bridge near Elkins Ark, by Brandonrush, Wikimedia Commons.



In reaction, Congress passed legislation creating the National Bridge Inventory, a database maintained by the Federal Highway Administration and containing safety and structural information on all U.S. bridges and tunnels that carry vehicles. Today there are approximately 600,000 bridges in the United States, most of which are 300 feet or shorter.

The database includes information on bridge types and specifications, operational conditions and other data, such as materials, loading, hydraulics and preservation. Engineers use the data to analyze and judge the condition of bridges. But they also provide the data as part of the biannual inspections required by law.

Grimmelsman is one of these engineers. In his office, on a wall next to his desk, there is a picture of him at the top of one of towers of the Throgs Neck Bridge in New York City. The Bronx is behind him. He is wearing all the appropriate safety gear, including a fluorescent vest, a hard hat and a headlamp, not to mention a harness and cable that tether him to the bridge. He isn't unhappy, but he looks focused and serious, the way you might expect someone working 300 feet above the East River to look.

GOOD VIBRATIONS

For 17 years, Grimmelsman has participated in scores of bridge evaluation studies, but he is one of many engineers nationwide who consider visual inspection data to be primarily qualitative and therefore less than optimal for cost-effective and reliable maintenance of the nation's inventory of aging and deteriorating bridges. In recent years there has been a greater effort to use modern technology to provide quantitative data for assessing the condition and safety of deteriorating bridges.

Grimmelsman is at the core of this effort. He has performed a variety of full-scale testing programs on several long-span bridges in New York City and elsewhere. One method he uses to evaluate

bridges is called dynamic testing, an experimental approach that quantitatively characterizes bridges. The two main approaches for dynamic testing are operational modal analysis, frequently referred to as ambient vibration testing, and experimental modal analysis, also called forced-vibration testing.

Ambient vibration testing is by far the most popular form of dynamic testing for bridges. It relies on the natural environment, sources such as wind, microtremors, waves and especially operating traffic on and near the structure, all of which make the bridge vibrate. Although it has the important advantages of being inexpensive and non-disruptive to traffic, ambient vibration testing is less exact because researchers cannot control or measure the forces that make the structure vibrate.

With forced vibration testing, engineers dynamically "excite" the bridge with controlled and measurable sources, such as shakers and impact hammers, which allow researchers to control the inputs used for testing. The relationship between the dynamic inputs and structural response provides a meaningful description of how the bridge is currently behaving – a behavior that can't necessarily be viewed.

But there's a downside. While it is a superior approach, the effectiveness of forced vibration testing depends on a single vibration-inducing device. These devices are large, heavy and expensive. Most weigh 100 pounds or more and cost a minimum of \$15,000. More importantly, deploying these bulky devices and their supporting equipment interferes with traffic on bridges, and they are not practical to use for long-term measurements that will continuously track the condition of bridges as they age and deteriorate.

The crux of Grimmelsman's work attempts to solve this problem.

FROM WOOFER TO BASS SHAKER

He spent several years chasing solutions to this problem, thinking about how he might develop a more reliable, practical and less expensive system to perform forced vibration testing of full-scale bridges. He was searching for something light and flexible, a system he could design as a distributed network, something that would vibrate a bridge from many input locations without interrupting traffic.

And then one day, he had an idea. What about speakers? Nearly everyone has experienced the shaking sensation caused by car stereo's low-frequency loudspeaker. In the '70s, they were called woofers or subwoofers. Today, most people call them bass speakers. Except engineers.

"I had been thinking about modifying voice-coil actuators for use in dynamic testing of bridges," Grimmelsman said. "You know, a bass speaker."

He knew he would have to modify speakers to make them suitable for use in testing bridges, but Grimmelsman thought he could build a distributed network of shakers with these off-the-shelf devices. As he prepared to start the project, another thing



Photos submitted

Grimmelsman and students developed a light and mobile bridge-vibration system using modified voice-coil actuators, otherwise known as bass shakers, which provide haptic feedback of audio signals at or below the audible range.

happened, the kind of synergetic experience that occurs when people share ideas, exactly the kind of thing that would not happen if scientists toiled in a vacuum.

"So that was the original idea," Grimmelsman says, "to go and get some speakers and put some mass on them and put them on our grid structure in the lab. I was telling my grad student at the time, Jason Herrman, what I was planning, and he said, 'Well, there's already something called a bass shaker that does the same thing.'"

Through low-frequency vibrations, tactile transducers, popularly called bass shakers, provide haptic feedback of audio signals at or below the audible range. In other words, they make sounds you can feel rather than hear.

Which isn't absolutely true. "You can hear them," Grimmelsman says.

"Depending on the tuning... If you allow the device to use the full lower band on the audio spectrum, you can hear the sounds produced by these devices. But the pitch is odd. You have to listen carefully and know what to listen for."

Normally integrated with audio speakers, tactile transducers enhance user experience by adding shaking, vibrating and jarring movements. They are used for flight simulation, computer games, home-entertainment systems and amusement park rides. These are the tools that make you "feel" like you are flying through turbulence when you're actually sitting in a theater chair.

It is true that transducers do the same thing – produce low-frequency vibrations – as his graduate student said, but for the purposes of Grimmelsman's research, they do it better.



Photos submitted

Kirk Grimmelsman, left, and students install tactile transducers on the underside of a rural highway bridge. The system produces significant vibrations over a broad range of frequencies. The bridge vibrations induced by the shakers allow researchers to evaluate the structural integrity of a bridge.

“Once I figured out what these things were, I did some market research,” he says. “I found some devices that might have worked for dynamic testing, maybe a little more expensive than the speakers I was originally going to use, but I quickly realized that we wouldn’t have to modify them the way we would have had to if we used a regular audio speaker.”

Grimmelsman and students Jessica Carreiro and Eric Fernstrom experimented with and evaluated the capabilities of a variety of available types of tactile transducers for dynamic testing purposes. All of the devices they studied were small and portable – weighing less than 10 pounds. After this vetting process, Grimmelsman designed and built a prototype bridge-testing system with a series of devices that cost less than \$500 per shaker.

The researchers later installed 12 tactile transducers on the underside of a rural highway bridge to evaluate how the shakers would operate in the field. As a network, the system produced vibrations with reasonable force over a broad range of frequencies. The bridge vibrations induced by the shakers were also much larger than those caused by wind and other natural sources. The testing was the first attempt by any researchers to dynamically excite a full-scale bridge in the field using a large number of controlled inputs at the same time.

“The bridge test demonstrated that this system could dynamically excite a full-scale structure in a controlled manner to produce vibration responses with less uncertainty and more uniformity than from natural sources and traffic,” Grimmelsman said.

DYNAMIC EXCITATION

Five students at three academic levels are currently working on various facets of Grimmelsman’s bridge-shaking research. These projects use the shaker system to investigate multiple dynamic testing methods and different characterization approaches.

Two undergraduate students are gathering field data from ambient-vibration testing on two bridges: a truss bridge with virtually no traffic and a girder bridge with a high volume of traffic and other environmental forces. A third undergraduate student is performing laboratory tests to determine the ideal number and location of shaker devices for optimal performance.

In another project, a master’s student is using a modified transducer to deliver and measure how a bridge response to impact dynamic loading. These tests are similar to those in which engineers drop heavy weights onto bridges. Essentially, with this project, Grimmelsman says, the shakers act as large hammers striking the bridge at multiple locations.

Fernstrom’s doctoral research project focuses on using the shaker system for forced vibration testing of typical highway girder bridges. His research represents the first attempt to perform what Grimmelsman calls “MIMO” – multiple input and multiple output – forced vibration testing of a bridge using more than two excitation devices simultaneously. With this type of vibration testing, engineers could “excite” a structure at many locations while simultaneously measuring the structure’s vibration responses at many different locations.

Taken together, all of these projects constitute the first efforts to characterize the structural integrity of a bridge using controlled and known dynamic excitation at many locations on the structure at once. The testing system could lead advance ambient and forced-vibration testing of bridges.

This inclusive approach is part of what Grimmelsman would like to see incorporated into new testing standards for the National Bridge Inspection Program. He knows that quantitative testing would not replace visual inspections, but the two approaches could be combined to improve the reliability and utility of the existing testing and evaluation programs.

“The beauty of quantitative assessments is that it can be done continuously, so you don’t have to wait for the end of the two-year inspection cycle,” Grimmelsman says. “And it gives you data about the performance of certain bridge details relative to others over time. This means you might not have to wait for a failure. With minor damage and deterioration over time, the quantitative assessment will change and may reveal things might not be visible in a regular inspection.”

The other major benefit of quantitative assessments is that they enable repairs and retrofits of existing bridges to be implemented cost-effectively. The dynamic testing results allow researchers



to calibrate analytical models developed by architects and engineers to better reflect the actual behavior of the structure. Incorporating measurements of actual structural behavior into the modeling process provides a more realistic and reliable representation of the structure, which helps engineers analyze important metrics such as loading, force, stress and hydraulics.

In short, Grimmelsman says, “It forces the model to reflect reality.” ■



Kirk Grimmelsman is an assistant professor in the department of civil engineering. He earned his bachelor’s and master’s degrees at the University of Cincinnati and his doctorate at Drexel University. At the University of Arkansas’ College of Engineering, he teaches courses and conducts research on structural analysis, structural mechanics and field instrumentation.

What do Women Want?

Party Favors & Sex Education, Too

By Heidi Stambuck

*F*ormal sex education, for most women, consisted of a video they watched in health class during middle school or junior high. Or, possibly, the health textbook devoted an entire chapter to the mechanics of human reproduction. Topics of special programs were usually limited to preventing pregnancy and sexually transmitted diseases. Or, maybe there was nothing at school.

Informal sex education ranged widely in content and accuracy. At home, typically, moms explained to their daughters what to do when their menstrual periods started. Later, some parents set down rules based on a moral code about sex that they wanted their girls to follow. Older siblings, cousins and friends passed along tidbits of information that sometimes were accurate and helpful, sometimes not, and youth learned social cues and expectations about sex by watching television and listening to music.

For Kristen Jozkowski, who studies sexual health, this raises some important questions. Where do mature women turn for facts about sex? Where do they learn what's normal for most people, what to do if something hurts, how to communicate with partners about what they want, and what products and techniques exist that would make sex more enjoyable?



iStock photo

Quality

The topic of sex is everywhere – on daytime talk shows and in movies, in the news, in popular women’s magazines, social media, advertising, casual conversations at the gym and the grocery store – but is the information reliable and accurate?

Jozkowski believes the quality of a person’s sex life is important. She teaches in the community health promotion program in the College of Education and Health Professions, and she’s a Research Fellow at the Kinsey Institute for Research in Sex, Gender and Reproduction at Indiana University.

Some people question the legitimacy of research about sexual health and sexual behavior. But, an estimated 99 percent of people have sex, Jozkowski counters. People are curious about sex, she says.

“This is an applied discipline,” Jozkowski says. “I study topics that will apply to nearly everyone.”

Jozkowski has published several articles about her research regarding how sex toys and other sexual enhancement products provide an opportunity for sex education for women. Her

Her research findings suggest that women at the parties feel comfortable asking questions about relatively private topics including sexual behavior, function and sex toys

research with colleagues at Indiana University, where she earned a doctorate in health behavior, has examined the questions women ask when attending sex toy parties.

Sex toy parties are hosted by a woman or a small group of women who invite their female friends to attend. A consultant from the sex toy company will be at the party; she will have products for women to see and learn about, much like Pampered Chef and Tupperware parties. But, instead of cake-servers and storage containers for leftovers, products sold at these home-based parties include vibrators and lubricants.

As a result of her work with sexual enhancement product companies, Jozkowski helped design an online training module for the party consultants to complete so they are better able to provide information and resources for their customers.

Information

Very little scientific research previously existed on the role these parties play in providing sex education. Jozkowski’s research, published in the *International Journal of Sexual Health* and the *Journal of Sex and Marital Therapy*, found that party consultants could answer questions about the products themselves, but the women attending the parties wanted information beyond how to use the products.

In one study conducted by Jozkowski and her colleagues, more than 2,500 party attendees were surveyed. Sex education efforts tend to focus on adolescents and risk-reduction strategies, the study authors wrote. Outside of clinical settings, there are few sex education opportunities focusing on enhancing sex lives – including such aspects as desire, arousal and orgasm – of adult women in long-term, monogamous relationships.

“The party consultants were telling the sexual enhancement product companies that women were asking questions they didn’t know how to answer,” Jozkowski says. “The women who give these parties are from all sorts of backgrounds. They don’t necessarily have a background in health.”

Nearly half of the women surveyed were over 30 years old and more than 75 percent reported that they were married or in a monogamous relationship. The majority of participants in the online survey reported relatively high levels of sexual functioning on the nine-item Female Sexual Function Index that measures the domains of desire, arousal, lubrication, pain, orgasm and satisfaction.

The researchers suggest that sex therapists could work with party consultants to improve the party experience while providing accurate sexual health information. This would give sex therapists an opportunity to reach a previously underserved population of women, promoting messages about sexual wellness and enhancing women’s sexual experience.

Another study of 677 women attending sex toy parties found that they asked 765 questions at the parties. Most commonly reported questions were about lubricants and vibrators. Women also frequently asked questions about men’s sex toys, G-spot, orgasm and vaginal dryness.

A Chance to Talk

Sexuality in general is a topic that people tend to be uncomfortable talking about in some settings, Jozkowski says, but her personal experience in gathering data is that finding subjects who will open up about their experiences and feelings is not

terribly hard. Her research findings suggest that women at the parties feel comfortable asking questions about relatively private topics including sexual behavior, function and sex toys.

“People really want to tell their stories,” she says. “It’s not unusual when I’m doing qualitative research for interviews to last more than an hour for each person.”

Jozkowski also conducts research, with her students, on topics related to women of all ages. They have studied how college students define and communicate consent to sex, the impact of hormonal contraceptive methods on women’s sexual pleasure, sexual function in menopausal women, how medical providers talk to their patients about sexuality and sexual health, beliefs about women’s vibrator use, association of lubricant use with women’s sexual satisfaction, and the influence of social media on communication of consent.

Sexual satisfaction contributes to general happiness, and quality of life is an important indicator of public health.

“Within research about sex there are safer topics,” she says. “There are research topics that are more likely to be funded. Sexual enhancement doesn’t fall into that category, although the use of lubricants decreases condom breakage and slippage, which helps reduce the risk of pregnancy and sexually transmitted diseases.

“Making sex feel better is an important part of sexual health,” Jozkowski continues. “Sexual satisfaction contributes to general happiness, and quality of life is an important indicator of public health.”

Societal taboos around such products may be lessening some based on the wide variety of products now available on discount store shelves, Jozkowski says.

“You go past the greeting cards or the snacks, turn the aisle and there they are,” she says. ■



Kristen Jozkowski is an assistant professor of community health promotion in the College of Education and Health Professions and an affiliate faculty member in gender studies in the J. William Fulbright College of Arts and Sciences. She was recently funded by the Foundation for the Scientific Study of Sexuality to examine conceptualizations of sexual consent that extend beyond the dyadic encounter.

She directs the Sexual Health Research Team at the University of Arkansas and is a Research Fellow at the Kinsey Institute for Research in Sex, Gender and Reproduction at Indiana University.

Three Feet High & Rising

Linking Sea-Level Rise to Migration Patterns

By Chris Branam



Donna Davis graduated in May with a doctorate in environmental dynamics. A Distinguished Doctoral Fellow, she holds two degrees from the university: Master of Arts in rural sociology (1998) and Bachelor of Arts in sociology (1996). Davis has presented her research at the annual conferences of the National Social Science Association and the National Council of Science and the Environment. Her dissertation co-advisers were Frank L. Farmer, professor of rural sociology, and Steve Boss, professor of geosciences.

Think about where you grew up. Then imagine your hometown disappearing from the face of the Earth.

For thousands of residents of the Republic of the Marshall Islands, that prospect is becoming more likely each day. The latest Climate Assessment Report issued by the International Panel on Climate Change projects that under the worst-case scenario increased ocean warming and mass loss from glaciers and ice

sheets could lead to a global sea-level rise of up to one meter by the year 2100.

The elevation of Majuro, the capital and home to more than half of the Marshall Islands' 58,000 residents, averages one meter. A meter is equal to a little longer than three feet.

Donna Davis, a doctoral student in environmental dynamics, has studied how sea-level rise in the Marshall Islands will affect the migration of its people to the United States, specifically Northwest Arkansas. Between 4,000 and 6,000 Marshallese have traveled 6,000 miles to relocate to the region since the 1980s in search of better education, employment and health care opportunities.

The Republic of the Marshall Islands is one of three Pacific Island nations that have agreements with the United States — known as Compacts of Free Association — that permit the islander citizens to migrate to the U.S. and its territories without visa and labor-certification requirements. Northwest Arkansas has the largest population of Marshallese in the continental United States.

"Most of the Marshallese who have come here had a choice, but the nearly 60,000 friends and family members who remain in the Marshall Islands may not have that choice," Davis said. "They may be forced to migrate, and we know enough about migration streams to know that because we already have this network here in



Marshall Islands Journal

The 58,000 residents of the Marshall Islands are already seeing the effects of global sea-level rise on their Pacific Island nation, as shown here in a 2008 "king tide" that flooded a cemetery.

our community, it will be a very attractive destination for people who will be forced to flee the rising sea. We could become one of the first host communities to refugees of sea-level rise.

"We will see the faces of climate change, right here," she said. "It's unprecedented."

There will be at least about a one-third of a meter rise in the global mean sea level by 2100, according to the best-case scenario under the Climate Assessment Report. Davis notes that the residents of the Marshall Islands are already seeing effects of sea-level rise, through annual high tides known as "king tides," and also storm surges. Global sea levels have already risen by 20 centimeters — about 7 inches — since 1900, according to the International Panel on Climate Change.

Using a geographic information system analysis of Majuro, Davis predicts that sea-level rise, in conjunction with more frequent and severe king tides, "will render the entire country uninhabitable."

"Their coasts are eroding away," she said. "Their environment is getting battered. These events will continue to deplete resources, and could prompt evacuation efforts long before 2100, potentially as soon as 2030."

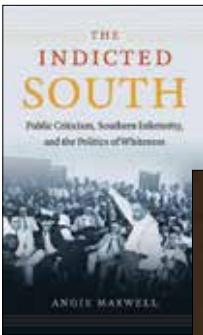
For her dissertation, which she completed this spring, Davis focused on how climate change in the Marshall Islands will

not only dictate the migration of the Marshallese to Northwest Arkansas, but what the effects of this growing population will have on the state.

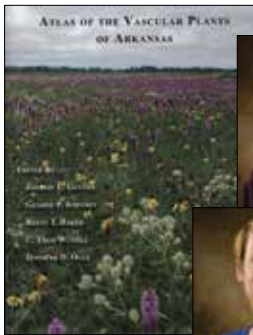
"I want us to prepare to be a shining example of a host community," she said. "The key thing that we need to do is understand their culture and where they come from. It's with that cultural respect and understanding that we can work to create an equitable community for everybody."

The Marshall Islands are located about halfway between Australia and Hawaii. The country is comprised of five islands and 29 coral atolls, and each of those atolls includes dozens of small islets strung together like a pearl necklace. The total land area of the Marshall Islands is 70 square miles spread over 822,000 square miles of ocean.

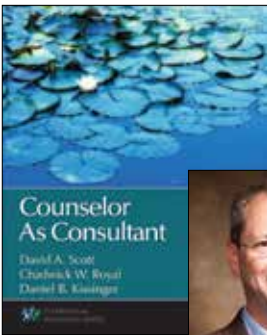
"For the first time in recorded history, we could see the loss of entire island countries due to sea-level rise that is being caused by global warming," Davis said. "For these countries and their cultures it is an existential threat born of a problem they didn't create. It is a serious case of environmental injustice in which the least responsible, most vulnerable countries are paying the most immediate price of a warming planet." ■



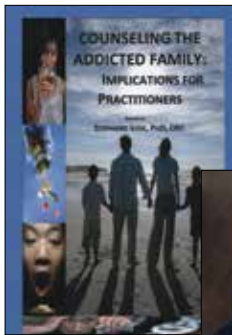
In **The Indicted South: Public Criticism, Southern Inferiority, and the Politics of Whiteness**, Angie Maxwell examines three moments in the 20th century in which the South was exposed to intense public criticism, identifying in white southerners' responses a pattern of defensiveness that shaped the region's political and cultural conservatism. It is published by University of North Carolina Press.



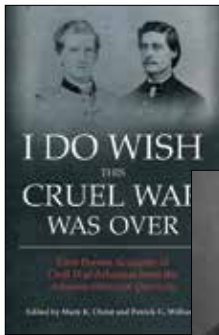
Atlas of the Vascular Plants of Arkansas, edited by Johnnie L. Gentry, George P. Johnson, Brent T. Baker, C. Theo Witsell and Jennifer D. Ogle, provides the most up-to-date knowledge of the geographic distribution of native and naturalized vascular plants in Arkansas. It includes county-level distribution maps of the 2,892 taxa known in the state.



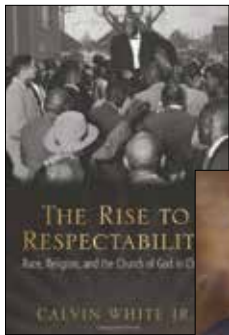
Counselor as Consultant by David A. Scott, Chadwick W. Royal and Daniel B. Kassing offers counseling professionals grounding in the primary theories, skills and models used by consultants. Published by Sage, it is the first text to address new professional standards issued by the Council for Accreditation of Counseling and Related Professional Programs.



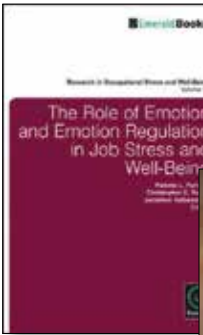
Counseling the Addicted Family: Implications for Practitioners was edited by Stephanie Lusk, who also was an author for six chapters of the book. The textbook, published by Aspen Professional Services, focuses on the interplay between people with substance use disorders and their families.



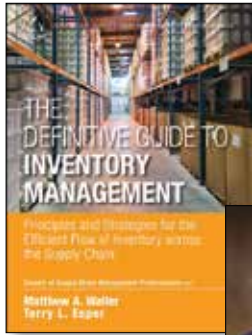
I Do Wish This Cruel War Was Over, edited by Mark K. Christ and Patrick G. Williams, offers a first-hand account of the horrors and hardships of the Civil War as told through diaries, letters and memoirs. It is published by University of Arkansas Press.



While documenting the history of a denomination, **The Rise to Respectability: Race, Religion, and the Church of God in Christ** by Calvin White also interweaves the Great Migration, the struggle for modernity, class tension and racial animosity – all parts of the African-American experience. The book is published by the University of Arkansas Press.



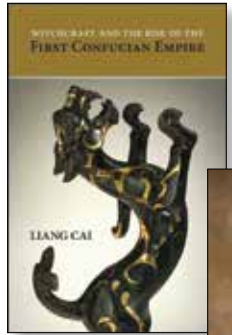
The Role of Emotion and Emotion Regulation in Job Stress and Well Being, edited by Pamela L. Perrewe, Jonathan Halbesleben and Christopher Rosen, includes essays examining approaches to emotion regulation at work with sections on the military and service work in particular. It is released by Emerald Group Publishing as part of the series Research in Occupational Stress and Wellbeing.



The Definitive Guide to Inventory Management: Principles and Strategies for the Efficient Flow of Inventory Across the Supply Chain, by Matthew A. Waller and Terry L. Esper, is a comprehensive guide to inventory management in any organization. It explains approaches to managing supply chain inventories and decision-making about inventory levels and is published by Pearson Higher Education.



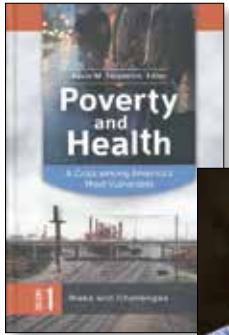
In **Accounting Information Systems**, Vernon Richardson, Chengyee Chang and Rod Smith explain the roles of accountants in various aspects of information technology, including as users, managers, designers and evaluators. Unlike the broad survey offered by previous books, this text concentrates on real-world business analysis skills. It is published by McGraw Hill.



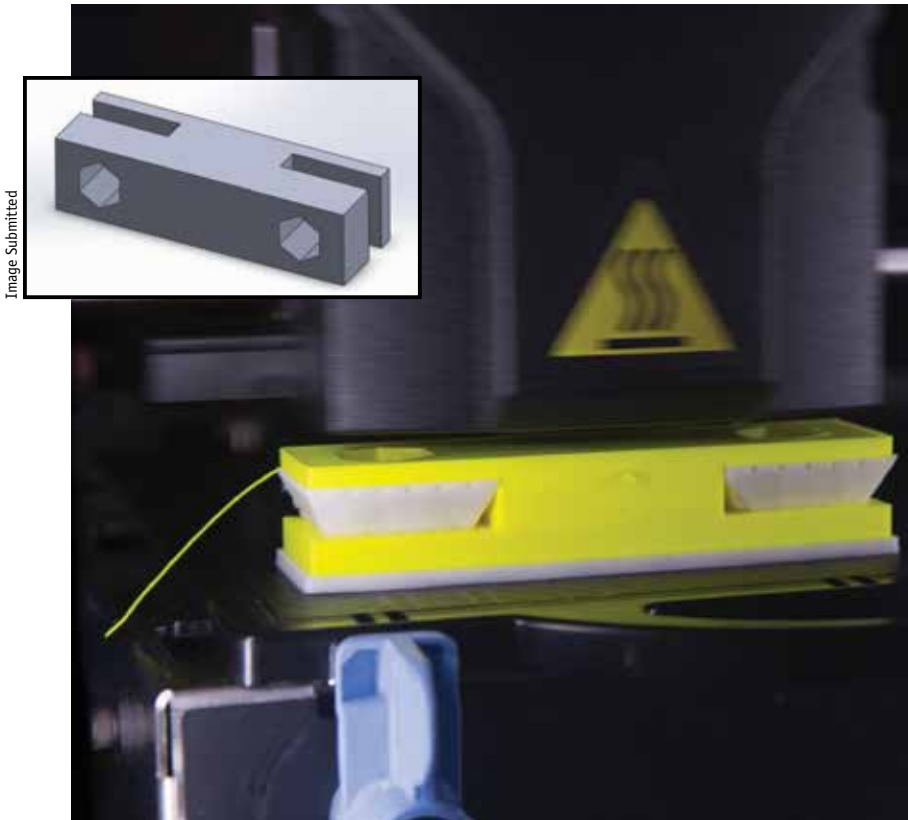
In **Witchcraft and the Rise of the First Confucian Empire**, Liang Cai argues that Confucianism did not become the prevailing political ideology of imperial China until a five-year witch hunt reshuffled the central political power of the Western Han dynasty, a claim that upends conventional wisdom on the subject. Her book is published by SUNY Press.



In an eBook titled **Discovering Architecture: Built Form as Cultural Reflection**, Frank Jacobus explores architecture as a cultural phenomenon and uses building type as a window into culture. Essays examine the architecture of memory, daily life and the city. The book, which is published by Kendall Hunt, includes essays by Alison Turner, Marc Manack and Amber Ellett.



In the two volumes of **Poverty and Health: A Crisis Among America's Most Vulnerable**, editor Kevin M. Fitzpatrick presents a collection of essays offering history, background and insight into health issues facing poor people in the United States, including the crucial factor of place in relation to health. *Poverty and Health* is published by Praeger.



Engineers and students used a uPrint SEplus 3-D printer to produce a part for the drive belt of a solar-powered boat. An engineering student, who had never used a 3D printer before, was able to go from Conceive-Design-Build in four hours and see how the part worked. The student saw a way the part could be improved and made a revised part the next day that was stronger and easier to install.



Photos by Russell Cothran

Question:

What will it take to go from 3D printers to Star Trek replicators?

John Gauch, professor of computer science and computer engineering, was happy to answer:

In order to replicate objects, we must first be able to make extremely accurate 3D models of the objects we want to make. Our current MRI and CT scanners let us create images with resolutions of thousands of dots per inch. But in order to create the quality of objects they can make on Star Trek, we will need scanners with billions of dots per inch. Furthermore, we will need to know the chemical/molecular composition of each of these dots. The current generation of MRI and CT scanners only give us size/density information.

Secondly, we will need 3D printers that can output a huge range of materials – metal, plastic, paper, wood, cloth – in order

to replicate most real-world objects. The current idea of squirting out liquids will work for some things, but not for others that cannot be melted and reformed easily. I think this will actually be a harder problem to solve than the modeling problem above.

And finally, creating objects that are alive would be the “final frontier.” I can see us creating something simple like an algae in the near future, but replicating more complex plants, insects, or animals would be a huge technical and ethical challenge. I can imagine some science fiction worst-case scenarios where we create something – like a tribble – that escapes the lab and takes over the earth!