Research & Creative Activities

Fall 2013

Frogs on the Move:

A Living Fossil Offers New Insight into the Evolution of Jumping in Frogs

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE
GRADUATE SCHOOL

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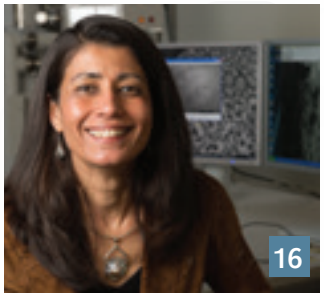

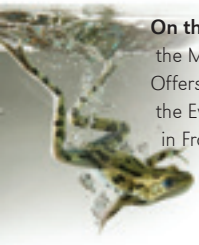

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Dean's Message

In a recent series of short web videos titled "Everything is a Remix", writer, director and speaker Kirby Ferguson presents the thesis that the basic elements of creativity are to "copy, transform, and combine" (Ferguson). In his view, creation or discovery is not just simply a spontaneous moment of genius or originality, but rather a process of combining and transforming existing ideas and productions in new ways. Ferguson argues, "the creation is yours to some degree—you made it—but it relies on the work of others to an extent that most of us aren't aware of because of our biases" ("Everything is a Remix"). In this way, Ferguson highlights the secret that all researchers share—that we rely on the work of our peers and intellectual forerunners to lay the groundwork for our new perspectives.

Indeed, even Ferguson's hypothesis could be considered a remix, an echo of nineteenth-century author Marcel Proust's notion that the real voyage of discovery consists not in seeking new landscapes, but in having new eyes (237). This is Proust's way of saying that the process of discovery is about viewing what already exists in new ways.

Perhaps Proust had been using his new eyes on Sir Isaac Newton's famous letter to his colleague Robert Hooke in 1676, "If I have seen further it is by standing on the shoulders of giants" (416). Newton thus takes credit for his ability to "see further" and build on the body of knowledge produced by others, without which a new perspective on optics would not have been possible.

And even in this instance Newton stood on the shoulders of Bernard of Chartres who, in 1159, was attributed with the phrase *"nanos gigantum humeris insidentes"*, literally translated as "dwarfs standing on the shoulders of giants," or in a more contemporary understanding, "one who discovers by building on previous discoveries" (Merton). In fact, Bernard may have been referring to the Greek myth of Orion, the blind giant, who carried his servant Cedalion on his shoulders (1410).

In the long history of ideas, we scholars have understood our debt to the knowledge-building efforts of our predecessors, to those who have carried us to new heights and allowed us to see the existing terrain with fresh eyes.

In this issue of *Research and Creative Activities,* we are proud to bring you the exciting stories of our faculty who are using their new eyes to "remix" the world in order to discover and create fresh concepts. We believe future scholars will stand on their shoulders.

In this issue you will read about Dr. Richard Essner's passion for studying frog locomotion to better understand the evolution of jumping. You will learn about Dr. Jennifer Rehg's studies of threatened monkeys in Peru and Brazil to create better conservation plans of their environment. You will lose yourself in Dr. Gussie Klorer's art "scavenger hunt," and root for Dr. Guim Kwon's push to prevent and cure type 2 diabetes.

We are proud to share this sampling of our faculty's creative works with you. It is our hope that you take as much pleasure in reading about their endeavors as we do in helping to support them. We invite you to visit our new SIUE Research website: siue.edu/research, which brings both written stories and videos of SIUE faculty. This direct line to current research allows you to personally experience our faculty's excitement for and commitment to research. We encourage you to become a frequent visitor to our web resources as we share with you SIUE activities, creations, community outreach, and discoveries.

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Scholarly Activities

NSF Funds Collaborative Approach to Student Retention

The SIUE School of Engineering has received a grant of nearly $830,000 from the National Science Foundation (NSF). NSF's STEM Talent Expansion Program (STEP) focuses on creative approaches to retaining undergraduates in engineering and computer science during the first two years of college. Led by Dr. Cem Karacal, professor of industrial and manufacturing engineering and associate dean in the School of Engineering, the project will seek to promote pre-calculus and calculus I retention for engineering students. The project employs student peer mentors and teams to encourage student success. Co-principal investigators include: Zenia Agustin and George Pelekanos, professors of mathematics and statistics; Ryan Fries, associate professor of civil engineering; and Ryan W. Krauss, associate professor of mechanical and industrial engineering.

Professor of Physics Hernando Garcia Receives Fulbright Award

Dr. Hernando Garcia, associate professor of physics, has been awarded a Fulbright Scholar grant to lecture and conduct research in Argentina. Garcia will work at the Center for Optics Research at the National University of La Plata (*Universidad Nacional de La Plata,* UNLP) in 2013-2014. He will assist in the implementation of an ultrafast optics laboratory and analyze electronic dynamics in metal nanoparticles. The SIUE faculty member is one of approximately 1,100 U.S. faculty and professionals who will travel abroad through the Fulbright U.S. Scholar Program in 2013-2014.

Carl Orff's Carmina Burana Performed with Cuban Guest Artists at SIUE

SIUE's production of German composer Carl Orff's *Carmina Burana* appeared at the Katherine Dunham Hall Theater on the SIUE campus in April 2013. The ambitious production, arranged and directed by Theater and Dance Professor Calvin Jarrell, employed a blend of music, dance and song. The production entailed a substantial collaboration between the SIUE Department of Theater and Dance, SIUE Department of Music, SIUE Orchestra, SIUE Concert Choir and Community Choral Society, Kirkwood Children's Chorale, and special guest dancers from Cuba.

To create the piece, Jarrell blended diverse sources, including a Middle Age manuscript and musical compositions of the 1930s by Orff. Behind the production were Michael Mishra, director of Orchestral Activities and conductor of the SIUE Chamber Orchestra; Cosette Justo Valdes, guest conductor and director general/ conductor for the Symphonica de Oriente in Santiago; and guest choreographer Alfredo Velazquez Carcasses, vice-president *de UNEAC de Guantanamo* and artistic director of Danza Libre Folkloric Contemporary Dance Company in Guantanamo, Cuba.

In the News

NPR Discusses Post-Sandy Economy with Economics Professor Ariel Belasen

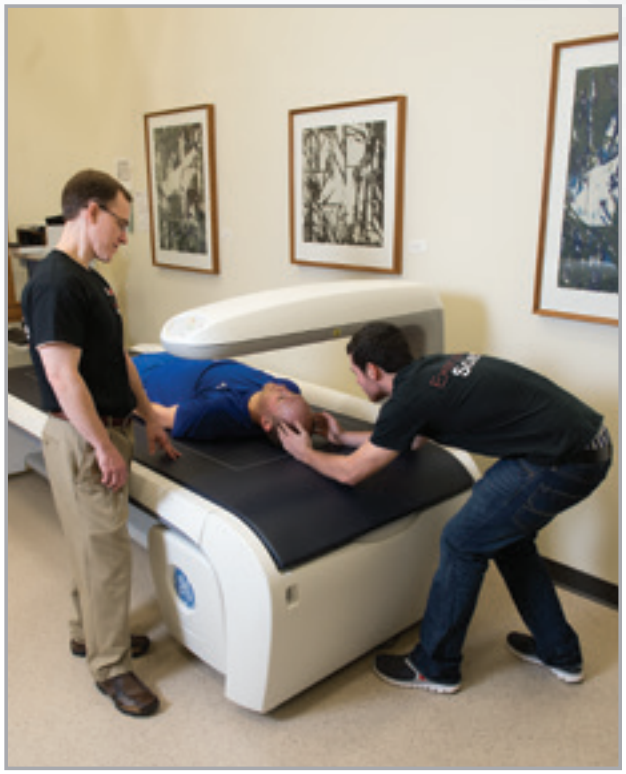
Assistant Professor of Economics and Finance Ariel Belasen, from the SIUE School of Business, was featured in a Dec. 31, 2012, National Public Radio (NPR) article titled "Could Post-Superstorm Sandy Rebuilding Energize the Economy?" The article examines the recent storm that caused tens of billions of dollars in damage to the East Coast areas of New York and New Jersey. Belasen talked specifically about how the economics of Florida and the Gulf Coast rebounded following major hurricanes and addressed the challenges in overcoming time-lags and stress to an economy after a natural catastrophe.

Associate Professor Dennis Mares Interviewed on KMOV-TV

St. Louis KMOV-TV reporter Ray Preston interviewed Associate Professor of Sociology and Criminal Justice Studies Dennis Mares. Mares provides research for The WAVE program, a crime-fighting technique used in the Metro East to unify efforts of several law enforcement agencies. Mares' evaluation will supply the program information needed to monitor and judge its progress.

BBC Visits SIUE Kinesiology Labs

As part of a BBC Horizon documentary series on diet and calorie restriction, members of the British Broadcasting Corporation (BBC) spent time this May in the SIUE Department of Kinesiology and Health Education's weight loss clinic. Dr. Bryan Smith, assistant professor of kinesiology and health education, conducted various laboratory tests for the documentary. The film team was particularly interested in SIUE's BodPod, a device that assesses an individual's composition of lean and fat body mass. The still-to-be-titled episodes explore calorie restriction in one's diet in an effort to stay younger and live longer.



Dr. Fengxia Wang, assistant professor in the Department of Mechanical Engineering

Harvesting Kinetic Energy from Piezoelectric Material

Piezoelectricity, or the energy created by mechanical stress in certain solid substances, is a potential source of green energy that may help alleviate world energy stress. Harvesting usable energy from kinetic energy and other sources is a special interest of Dr. Fengxia Wang, assistant professor in the Department of Mechanical Engineering.

Funded by the National Science Foundation's Broadening Participation Research Initiation Grants in Engineering (BRIGE), Wang is designing a novel piezoelectric generator for vehicle shock absorbers. Her goal is to design a shock absorber with good vibration suppression as well as high energy recovery efficiency that will maximize the energy transferred from the piezoelectric device to a rechargeable battery.

In addition to supporting Wang's research in piezoelectric material, the NSF BRIGE is encouraging Wang's mentorship of underrepresented groups in engineering. BRIGE awards enable junior faculty to integrate diversity and broadening participation strategies in their engineering research, education, and innovation activities. Wang will use the award to recruit undergraduate and graduate students from underrepresented groups into the field of energy regeneration. She also plans to develop a new technology demonstration course with the SIUE STEM Center for East St. Louis area high schools and the Upward Bound program. Wang serves as faculty advisor for the Cougar Baja team, a group of students who design and construct a Baja vehicle every year for collegiate competition. Wang plans to use the award to recruit underrepresented students to the team and test a future iteration of the team's Baja vehicle.

New Research Highlights Importance of Turkish Migrant Workers in Postwar Germany

Dr. Jennifer Miller, assistant professor of historical studies, is conducting research that examines the Turkish community in West Germany. Her research complements recent reconsiderations of migration scholarship and provides a new way to consider postwar European history. According to Miller, "My findings demonstrate that, contrary to much traditional scholarship within German history, Turkish 'guest workers' are necessarily a part of the central issues of German and European social, political and cultural history after 1945," especially in the context of debates concerning European identity.

Miller's newest project, tentatively titled "Cold War Borders and Suspicious Persons: Turkish 'Guest Workers' Between East and West Berlin through the Eyes of the Stasi," focuses on Turkish guest workers who pursued private lives in East Berlin, and on how the East German Secret Police (Stasi) kept a close watch on them in the mid-1970s. In summer 2012, Miller traveled to the archives of the German Federal Commission for Stasi Records *(Bundesbeauftragte für die Unterlagen des Staatssicherheitsdienstes der ehemaligen Deutschen Demokratischen Republik* or BStU) to gather information about the records the Stasi kept on Turkish guest workers.

The archives provide the unique point of view of secret police and their techniques in identifying "suspects" and conducting surveillance. Miller's project uses documents contained in the Stasi Archives to address moments when ethnic Turkish guest workers transitioned from "applicants" or "guests" into social citizens who sought new and more permanent lives in Germany in the late 1970s.

According to Miller, the practical aspects of police surveillance and the geography of surveillance include guest workers in the larger narrative of the East German state's gaze. It also illustrates the ways this particular group of suspects remained suspicious. Miller describes "Cold War Borders" as offering insight into the lives of people who were "marginal, yet threatening—foreigners, transients, migrants—suggesting how frightening porous borders and urban spaces could seem."

Recent publications by Miller on guest workers include "On the Road to West Germany: Turkish 'Guest Worker' Transportation to West Germany in the Post-war Period," *published in German History: The Journal of the German History Society,* and "Her Fight is Your Fight: Guest Worker Labor Activism in Postwar West Germany," which will appear in the fall 2013 edition of *International Labor and Working Class History.*

"Contrary to much traditional scholarship within German history, Turkish 'guest workers' are necessarily a part of the central issues of German and European social, political and cultural history after 1945."

Political Use of Social Networking among Younger Voters Shows Engagement

For decades, political participation among college students has been notoriously low. SIUE Associate Professors of Political Science Drs. Kenneth W. Moffett and Laurie L. Rice, along with Assistant Professor of Management and Marketing Dr. Ramana Madupalli, have found that the political use of social networks is helping to change that trend.

Traditional means of measuring political participation overlook social media. "When we look at web-based forms of political participation for this age group, the picture brightens a bit," said Moffett.

The results of their survey of a random sample of SIUE students during the 2008 presidential election campaign showed that students who friended a candidate or joined the online social network of a political group were more likely to participate in traditional offline forms of political participation as well. The team published their findings in *Social Science Computer Review.*

They also found that even those without a strong interest in politics will friend or join candidates or political groups. "Friending a candidate is a form of participation that manages to draw in those with lower levels of interest, too," said Rice. "Our results suggest it has the potential to help close some of the participatory divide based on age."

Rice and Moffett also conducted a similar survey for the 2012 presidential election.

"We have only looked at the tip of the iceberg, so to speak," said Moffett. "Our results suggest that we should investigate other forms of online engagement beyond friending candidates and joining groups. For example, a substantial portion of younger people blog and post varying things through social networking websites. Do these forms of engagement also spur participation in other ways?" Moffett and colleagues plan to address these questions in future research.

Improving Airport Surface Operations

Airport runway safety and tarmac delay are two major issues in airport surface operations. The Federal Aviation Administration (FAA) predicted that the air transportation system (including airports) will reach gridlock by 2015. Many initiatives, such as the Next Generation Air Transportation System and the FAA Modernization and Reform Act of 2012, aim to make air travel safer and more efficient. In addition to building new runways and taxiways at busy airports, the key to reducing delays while maintaining safety is to prevent collisions between aircraft and ground vehicles traveling on runways and taxiways.

Dr. Xin Chen, assistant professor in the Department of Mechanical and Industrial Engineering, and his research team are collaborating with Lambert-St. Louis International Airport to examine safe fueling procedures for aircraft and effective conflict-resolution plans for airport surface operations. The team has compiled checklists and questionnaires to assess fueling procedures and plans to conduct risk analyses to enhance fueling safety. The team has also been designing a software tool to collect real-time airport surface operations data, which will be used to test various network-based conflict-resolution plans. Chen's research is funded by SIUE's Vaughnie Lindsay New Investigator Grant.

The team has compiled checklists and questionnaires to assess fueling procedures and plans to conduct risk analyses to enhance fueling safety.

History Professor Edits Payne-Butrick Papers for University of Nebraska Press

The Payne-Butrick Papers, also known as the John Howard Payne Papers, began as an extensive documentation of Cherokee culture by Daniel Sabin Butrick in the early 1830s. In 1836, Butrick passed his work to John Howard Payne, who continued to gather first-hand information. Though he published many articles relating to the Cherokee, Payne never published the entire collection. Edward E. Ayer purchased the collection and donated it to the Newberry Library in 1911, where it is currently housed in the Edward E. Ayer Manuscript Collection.

The Papers are divided into 14 volumes, consisting of interviews with Cherokee members discussing cultural traditions and spiritual beliefs, as well as letters and printed matter regarding the social and political issues faced by the Cherokee Nation. As a whole, the Papers present a rare opportunity for scholars to access contemporary observations; in particular, remarks and observations made mainly by non-missionary persons, such as Payne.

Dr. Rowena McClinton, professor in the Department of History, has been asked by the University of Nebraska Press to edit and annotate volumes seven through 14 of the Papers. She is closing working The first six volumes were published by the University of Nebraska Press in the fall of 2010 and were edited by scholars William Anderson, Jane Brown and Anne Rogers. The early volumes focus primarily on the spiritual realm of the Cherokee Nation. Critics have reacted positively to the publishing of the first six volumes, remarking on the importance of making such a unique collection accessible beyond the walls of the Newberry.

photo by Clarence Ellsworth

Volumes seven-14 unfold a deeper and fuller understanding of the political and social climates Cherokees faced in the early to mid-19th century, particularly while preserving their homelands and accentuating the overall devastation of Native loss.

McClinton received a FY 2011 New Directions grant from SIUE and the Lester J. Cappon Fellowship in Documentary Editing from the Newberry Library to aid in her research. Release of the new volumes is expected in 2016.

Frogs on the Move:
A Living Fossil Offers New Insight into the Evolution of Jumping in Frogs

Most of us can probably recall learning about frogs at some point in a science class, perhaps during discussions of tadpole metamorphosis or through frog dissection. These nearly universal experiences attest to the importance of frogs as model organisms in biology.

Given this prominence, you might think that biologists would have a good understanding about something as fundamental as their movement. Surprisingly, that is not the case.

Many components of the unique musculoskeletal system of frogs remain an enigma. Moreover, most of what biologists do know about locomotion in frogs is based upon a few highly specialized species that are not representative of the majority of frogs. Dr. Richard Essner, associate professor of biological sciences, is intent on figuring out not only how frogs move, but also how they evolved their impressive locomotor repertoire from generalized salamander-like ancestors.

Essner's interest in frogs began at an early age. "I am a lifelong herp nerd," he said, referring to his passion for amphibians and reptiles. "I spent countless hours outdoors as a kid searching under rocks and logs." Later as an undergraduate, he became interested in the relationship between animal form and function—an area of biology known as functional morphology.

He recalls taking a herpetology course and being especially amazed at the diversity of frogs. "I couldn't believe that there were more frogs than mammals—over 5,000 species! It was clear to me, even then, that the key to the evolutionary success of frogs is locomotion." It was during this same course that he learned about and became fascinated by one particular frog species, the Tailed Frog, widely considered to be a living fossil, due to their possession of an array of primitive morphological features.

Tailed frogs are found only in the Pacific Northwest of the United States and Canada and belong to an ancient group (Family: *Leiopelmatidae*) that diverged from all other frogs more than 200 million years ago. Essner and his students have been conducting detailed studies of Tailed Frog locomotion in the lab using high-speed video. They compare their locomotion with that of more advanced frogs, in hopes of gaining insight into the evolution of jumping.

Their work recently received media attention, following publication of an article about the landing behavior of frogs. Their research was given a press release and the cover of the German science journal, *Naturwissenschaften.* The study demonstrated that leiopelmatids are unique among frogs in their lack of controlled landings. Essner and colleagues from Ohio University and the University of Otago in New Zealand found that leiopelmatid frogs do not land on their limbs like other frogs, but instead do an aquatic-style bellyflop landing, even in terrestrial environments. Their findings suggest that jumping evolved as a two-step process—with the launch phase of jumping appearing early in the evolutionary history of the group and controlled landings appearing later, following the divergence of leiopelmatids from all other frogs.

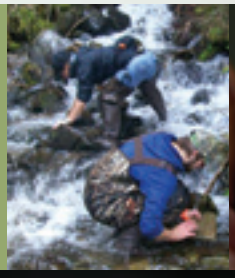
Essner is continuing his collaboration with the Reilly lab and the Ohio Center for Ecology and Evolutionary Studies (OCEES) at Ohio University. The team will investigate other aspects of frog locomotion, including musculoskeletal function. Their goal is determining the mechanisms responsible for differences in locomotor behavior among frogs. "We have been using electromyography to investigate muscle function, as well as high-speed 3D x-ray cineradiography to observe the internal movement of the skeleton," Essner said.

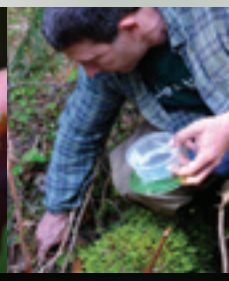
They are especially interested in understanding how the pelvic region of the frog functions during locomotion. Frogs have unusual pelvic anatomy compared to other terrestrial vertebrates, with a greatly elongated pelvis, complete rearrangement of pelvic musculature, and fusion of tail vertebrae into a novel rod-like structure known as the urostyle. "The pelvic anatomy of frogs is strange. We really know very little about how frogs use their pelvis to engage in a diverse array of locomotor behaviors such as jumping, swimming and crawling," Essner said.

Essner is teaching a field course during summer 2013 in the Idaho Panhandle, where he has previously collected Tailed Frogs. He hopes to learn more about their behavior in the wild and plans to have students conduct an ethological study of Tailed Frogs in their natural habitat. His current research has received funding from the SIUE Competitive Application Resubmission Initiative. An article about his frog research, geared toward children, will be featured in the September 2013 issue of *Highlights* magazine.

Read more about this and other SIUE Research at .siue.edu/research

Dr. Richard Essner is intent on figuring out not only how frogs move, but also how they evolved their impressive locomotor repertoire from generalized salamander-like ancestors.





Monkey Business: Shedding Light on Threatened Primate Populations in South America

For Dr. Jennifer Rehg, professor of anthropology, enduring dense heat and insects while crawling through thorny bamboo in the Amazon rainforest is just another day at the office. Success means finding and observing the behaviors of some of the rainforest's squirrel-like primate inhabitants, including the red-bellied tamarin, saddle-back tamarin, emperor tamarin, and callimico.

Rehg's research is an effort to better understand the behavior, ecology and ecosystem roles of the tamarins and callimicos in order to implement strategies that might aid conservation efforts before they disappear. Hunters, pet traders and human activities that result in habitat loss and degradation have all negatively affected the world's non-human primate populations. For example, the Interoceanic Highway in South America offers direct benefits to humans but escalates the negative effects of human activities on natural habitats in Southwestern Amazonia.

Rehg has collaborated with national and international organizations and researchers in this region of Amazonia for over a decade, first in Brazil and more recently in Peru. Her work focuses on several species of small-bodied monkeys known as tamarins (genus *Saguinus*) and a closely-related taxon, the callimico, or Goeldi's monkey (*Callimico goeldii*). Compared to many primates, tamarins appear better able to survive in degraded or disturbed habitats and are found at high population densities at many sites.

In contrast, estimated populations of callimicos are one-fourth to one-twentieth those of tamarins in the same forests, and there are many locations where they seem to be missing altogether. Because of these population patterns, callimico is classified by the IUCN as vulnerable with declining populations. However, a recently-published review of surveys and field studies in Peru by Rehg and colleagues suggests the current evaluation of its status is unreliable, leading to more concern over the actual long-term viability of the species.

Rehg is able to study tamarin and callimico simultaneously because the primates have a propensity to form mixed-species groups, a distinctive behavioral feature. While these monkeys live in small cohesive groups (3-12 individuals) made up of members of their own species, groups of callimicos and tamarins often coordinate activities with each other. Time spent in the mixed-species groups can vary throughout the year and relate to many factors, including resource availability and reproductive phases. Mixed-species groups provide unique opportunities to investigate the functions of group-living, in particular because they are flexible and their formation and dissolution reflect their costs and benefits. They also may provide some insights into why population patterns of tamarins and callimicos are so different.

In 2011, Rehg conducted seven months of on-site sabbatical research, focusing on tamarin mixed-species groups and feeding ecology, supported by a seed grant from the SIUE Graduate School and a grant from Primate Conservation Inc., a nonprofit foundation.

Although at very low numbers, Rehg and colleagues were able to document callimico at Centro de Investigación y Capacitación Rio Los Amigos research station (CICRA) in Madre de Dios, Peru. They were also able to collect hundreds of hours of observation on free-ranging tamarin groups, both alone and in mixed-species groups. With the help of Peruvian colleague Inés Nole, Rehg and team expanded their research to incorporate Concesión de Conservación Rodal Semillero Tahuamanu (CCRST) in the summer of 2012. Rehg and colleagues conducted the first primate research at the site, gathering data on the diet and ranging behavior of several groups of tamarins and callimicos.

According to Rehg, looking for these monkeys requires patience and a touch of stubbornness. She explains, "The tamarins and callimicos are small and a single group can use relatively large areas of forest. It can be fatiguing trying to stay alert all day to small movements in the trees or distant 'long calls' (contact vocalizations) made by the monkeys." The challenge of

tracking and observing the monkeys is not enough to deter Rehg from her research. “It is immensely rewarding, especially getting rare glimpses into their lives, like seeing infants nurse from their mothers, or an adult using both hands to eat a grasshopper while a still-clumsy juvenile noisily begs to share, or watching collaborative defense mobbing of a predatory hawk.

“I am really privileged to study these animals in their natural habitats. No matter the challenges, whatever new information we do discover is a real contribution to what is known about these primates.”

Rehg and colleagues plan to continue their research in 2013. One of the principal goals is to make valid comparisons of the behavior and ecology of the groups of tamarins and callimicos, both within and between sites. They have amassed a database of recorded monkey vocalizations that will allow them to conduct bioacoustic analyses of the primate populations. Collectively, these data could provide insights into the unusual distribution of callimico populations, generate a better understanding of the social and ecological relationships of the tamarins and callimicos, and help researchers to develop more informed conservation plans for Amazonian primates.

Rehg’s work has resulted in an invited presentation to an international symposium on primatology in Peru, as well as presentations at the International Primatological Society and American Society of Primatologists.

“It is immensely rewarding, especially getting rare glimpses into their lives.”

Using the Whole Kernel: Next-Generation Ethanol Production

Dr. Sabrina Trupia, assistant director of research at NCERC

Meeting national goals for renewable biofuels and aiming for a more efficient source of ethanol requires expanding beyond solely using traditional starch-based crops, such as corn. A possible alternative is to look at other feedstocks, such as woody plants and grasses, otherwise known as lignocellulosic biomass. However, at the same time, it is of primary importance that existing starch-based ethanol producers be involved in the next-generation biofuels infrastructure.

One practical way to incorporate first generation ethanol producers in the next step in ethanol production is through conversion of corn fiber (previously considered a by-product of corn-to-ethanol production). New processing technologies, such as those recently installed at the NCERC at SIUE, are enabling research into using the non-edible corn fiber (bran) part of the kernel to create ethanol. Cellulosic conversion, the process of generating ethanol from the fibrous materials like corn bran and woody grasses, is considered the next-generation method of ethanol production.

Since 2009, some of the original research at the Center has been focusing on achieving scale-up of cellulosic conversions by using "off-the-shelf" fermentation ingredients in order to enable existing ethanol producers to avail themselves of the technologies. The research was funded in part by the Illinois Department of Commerce and Economic Opportunity's R&D initiative, as well as a cooperative agreement between the Center and the U.S. Department of Agriculture. This research culminated in a landmark production of ethanol from the cellulosic portion of corn (as opposed to the cellulosic and hemicellulosic portions, which make up most of the corn fiber).

In May 2012, Dr. Sabrina Trupia, assistant director of research at the Center, and her lab staff were able to show at an increased experimental scale that if just the cellulose in corn fiber is fermented using a standard yeast for starch fermentation, the yield of ethanol from corn would increase by at least six percent. In September 2012, the Center team again showed that it is possible to get improved yield results from a larger fermentation of cellulosic and hemicellulosic corn fiber using xylose-metabolizing yeast (required to ferment the sugars generated from hemicellulose). Also in September, whole corn flour fermentation plus cellulosic enzymes showed an increase in yield by about 10 percent.

The cellulosic fermentation research at the Center has focused on using both Saccharomyces Cerevisiae (a standard starch and fiber fermenting yeast) and other organisms that can metabolize xylose, one of the sugars created from hemicellulose. For this portion of the research, Trupia is partnering with the Biofuels Research Unit at the USDA National Center for Agricultural Research and Utilization in Peoria as well as with Biotork, a private company with the proprietary technology to evolve yeast to help it metabolize xylose.

So far, with the help of public and private funding, the Center has been able to move technology for biochemical conversion of corn kernel fiber from the lab to an intermediate pilot scale. The plan to eventually move it up to full pilot-scale is ongoing. A provisional patent has been submitted for the process.

The benefits of finding an efficient way to convert bran to ethanol are twofold: using more of the corn kernel to generate ethanol makes the corn-to-ethanol process more efficient (increasing the ethanol yield from a bushel of corn by up to 10 percent), and understanding how to gain ethanol from corn fiber informs the science of producing ethanol from other fibrous sources.

Trupia's successes in converting bran to ethanol can open the doors to converting and fermenting other woody plants and grasses, allowing other renewable resources to be used in ethanol production.

The NCERC at SIUE: Advancing Biofuels Research

The NCERC at SIUE is a nationally-recognized research center dedicated to the development and commercialization of biofuels, specialty chemicals, and other renewable compounds. Established through federal and state initiatives, with support from the Illinois and National Corn Growers Associations, the Center promotes rural development and economic stimulus and is providing tomorrow's workforce with the skills needed to meet the challenges of a changing energy environment.

Designated as a Bio-refining Center of Excellence, the Center assists in developing the technologies needed to reduce U.S. reliance on foreign oil and provide consumers with economically sound and environmentally responsible fuel options. Research initiatives in renewable energy at the Center are supported through grants, contracts and donor contributions.

FY12 Major Accomplishments

Re-Branding: Successful transition from "National Corn-to-Ethanol Research Center" to "NCERC at SIUE – Advancing Biofuels Research."

Corn Fractionation System: Successful solicitation of a $1 million capital gift donation of a corn fractionation system. The gift was accepted from Cereal Process Technologies at a ribbon cutting ceremony in November 2011.

Fermentation Suite: A capital gift donation of a fermentation suite, including 2-150L fermentation vessels and 2-1500L fermentation vessels was received. Retail value of the fermentation equipment exceeds $1.5 million. The fermentation suite, which was commissioned in July 2012, opens new opportunities for the NCERC in advanced biofuels, cellulosic ethanol, specialty chemicals and other renewable compounds.

Cellulosic Ethanol: In May 2012, the NCERC in collaboration with USDA and Biotork (private sector firm) successfully converted corn bran into cellulosic ethanol. The 30L scale fermentation was the first of its kind, thus opening the door for a variety of cellulosic feedstocks to be converted into biofuels.

Co-Products: A project entitled "Quality of Eggs Impacted by Feeding DDGS to Layers" shows the correlation of DDGS as a feed to human heath.

Private Sector Revenue: More than 90 percent of revenue for FY12 will be via contractual work with the private sector.

Center for STEM Research, Education and Outreach Provides Lessons for Teachers and Students

Building a Community of Practice in Teen Science Cafés

The SIUE STEM Center is part of a national effort to expand and enhance an informal STEM (science, technology, engineering and math) learning program known as **Teen Science Cafés.** The cafés are a free, fun way for teens to explore recent ideas in science and technology. Inspired by the adult Café Scientifique programs that have become popular throughout the world, Teen Science Cafés engage youth in stimulating conversations with scientists, engineers and inventors in an informal and relaxed setting.

Program goals include developing leadership skills and promoting interest in science and engineering. All aspects of the café are led by members, from choosing topics to planning each event. To ensure that the cafes are not simply lectures, program coordinator Sean Herberts of the STEM Center develops a hands-on activity for each cafe in collaboration with the presenter. The STEM Center is partnering with three sites to develop a local café network known as the Gateway Teen Science Café: the St. Louis Science Center, the Academy of Science - St. Louis and the Cahokia School of Choice.

The St. Louis area teen café is part of a national network of cafés funded by a $2.7 million grant from the NSF, based on the model created by Science Education Solutions, Inc. of New Mexico. More information on the program is available on the project websites: teencafestl.org and teensciencecafe.org.

Resource Center Online Inventory

Thanks to the generosity of the STEM Advisory Group at the U.S. Transportation Command (USTRANSCOM), area educators from all grade levels and content areas can now search the STEM Center's **Resource Center**—an online database of materials. The database currently contains 650 items, with more being added each week. The Resource Center provides access to lesson plans, books, and hands-on and demonstration materials such as models and scientific probes. The Resource Center also has meeting and laboratory spaces available where educators can conduct small research projects, test-drive curriculum activities and prepare materials for outreach programs. For more information or to browse the library, visit stemideas.org.

The Center for STEM Research, Education and Outreach is a university-wide initiative to develop, strengthen and promote STEM (science, technology, engineering, and mathematics) research, education and outreach at SIUE and in the region. It is a collaborative enterprise among several SIUE academic units (the College of Arts and Sciences, the Schools of Education and Engineering and the allied health sciences), other regional higher education organizations, local community colleges, school districts, regional offices of education, government agencies, businesses and the community at large. The Center provides expertise in STEM education program design and implementation, research, and evaluation. For more information, visit stemideas.org.

Professional Development for Teachers

Math and Science Leadership Initiative (MASLI) The year 2013 marks the apex of the Math and Science Leadership Initiative (MASLI)-3 program, which provided professional development in engineering design for teachers in rural school districts of southwestern Illinois. Funded by a $500,000 Illinois Math Science Partnerships grant, this project brought together faculty and staff from the Schools of Education and Engineering and the STEM Center to support teachers in integrating engineering concepts into their classrooms.

Teachers 'n Training (TNT) Institute The STEM Center and School of Education have partnered to develop the Boeing-funded Teachers 'n Training (TNT) program, a summer intensive experience for pre-service elementary teachers. The program is designed to increase teaching confidence and competence in STEM fields, while also gaining skills to develop a Teacher Performance Assessment portfolio.

TNT gives future elementary teachers the opportunity to observe and assist qualified science teachers in an informal learning environment, then create and implement an inquiry-based STEM lesson.

Experienced mentors guide the teacher candidates in a rigorous process of planning, instructing, assessing and reflecting on their science instruction in order to improve the teacher candidates' personal science teaching efficacy belief.

MOSAIC

The STEM Center's **Minds on Science Activities in the Community (MOSAIC)** program offers a suite of engaging STEM lessons for K-12 in-school, after school and home-school groups. Initially funded with a grant from the Meridian Society at SIUE, MOSAIC has grown from two sites in 2011 to four sites in the spring of 2013, and has delivered STEM lessons to more than 800 students. To help keep costs low for high-needs schools, the program integrates a volunteer base of SIUE students who are pursuing undergraduate or graduate degrees in science, technology, engineering, mathematics or education. The innovative program design promotes interest in STEM fields among children and youth while also providing future educators, scientists, engineers and mathematicians the opportunity to practice teaching methods and learn how to communicate science to young audiences.

Soft Drinks and Tooth Decay: Studies Show Sodas, Sports Drinks and Energy Drinks are Harder Than You Think on Teeth

Dr. Poonam Jain, Director of Community and Preventive Dentistry

Soft drinks—sodas, sports drinks and energy drinks—together constitute the single largest source of sugar in the American diet. The average American consumed 52 gallons of soft drinks in 2006.

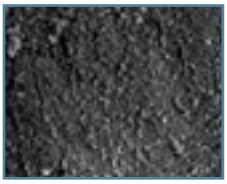
Although most people are well-informed about the amount of sugar in regular soft drinks, they commonly assume that diet versions of these drinks are "safe." While diet drinks contain less sugar, their acidity still poses a threat to tooth enamel. The acidity of these drinks is generally not well understood by the lay person. Acids such as phosphoric and lactic acid are added to soft drinks to improve taste and shelf life. As these drinks have become a "staple" in our diets and continue to displace more nutrient-dense foods and beverages, it is important to understand their effects on our health.

In 2007, Dr. Poonam Jain, Director of Community and Preventive Dentistry at the SIU School of Dental Medicine, set out with her colleagues to measure the acidity of several popular soft drinks and their effects on human tooth enamel. They received a SIU School of Dental Medicine Deans' Summer Student Research Fellowship award for the work. Jain and colleagues published their findings, documenting the pH of 20 popular soft drinks, including cola drinks, non-cola drinks, iced teas and root beer. Five drink types were tested in their regular (sugared) version as well the diet version, with tap water as the control. They also measured the amount of enamel lost through dissolution when immersed in these soft drinks for varying lengths of time.

The study revealed that all soft drinks tested were highly acidic. The pH values for these beverages ranged from 2.5 (regular Coke) to 4.0 (Mug Root Beer). For comparison, the pH of water is 7 (neutral) and that of battery acid is generally 1. The results of this study also showed that non-cola drinks such as Sprite, 7-Up, Mountain Dew and Surge produced significantly greater loss of enamel than cola drinks. The weight loss of tooth enamel corresponded with increases in the time of immersion.

Jain also measured the effects these drinks have on various types of filling materials. Funded by another Dean's Summer Student Research Fellowship, she and third-year dental student Hillary Hudson (now a practicing orthodontist) studied the effect exposure to these drinks would have on silver amalgam, tooth-colored (composite) resin, as well as fluoride-releasing glass ionomer materials. They found that the margins of tooth-colored fillings were the most susceptible to exposure to cola drinks.

Unexposed tooth



Tooth exposed to Gatorade-Fruit Punch

"I have always been intrigued by the question of which is a stronger predictor of the dental caries disease process - what we eat or what we drink," Jain said. "It is also fascinating to find out whether it is our diet (the snack foods and drinks consumed) or oral hygiene (how well one brushes and flosses) that contribute more to dental cavities." Her team of investigators spent a semester gathering food diaries and clinical exam data on about 80 patients and is writing up the results of the study. This work was supported by an Advanced Investigator Award by the School of Dental Medicine. Jain is working with epidemiologist Dr. Julie Gary from Washington University on this project.

As more information regarding the effects of sodas on health becomes available to the public, more and more people are switching to alternatives such as sports and energy drinks. The average person is not sure of the differences between these two types of beverages and assumes sports and energy drinks are healthier than sodas. In 2011, Jain and colleagues published results of a study comparing physical properties of popular sports drinks and energy drinks. With the support of a Dean's Summer Student Research Fellowship, they also compared the amount of enamel dissolved through immersion in these drinks and found energy drinks produce almost twice the enamel dissolution compared to sports drinks. Both sports and energy drinks are highly acidic with a mean pH value of 2.9 for sports drinks and 3.0 for energy drinks.

Jain and associates' results indicate that although sports and energy drinks are generally considered "safer" and "healthier," their acidity and effect on enamel erosion are comparable to those of sodas. In the final analysis, from the body of work that has been done by Jain and her students and colleagues, it appears that the "safest" beverages remain tap water (which is fluoridated in most of Illinois) and fat-free milk. The sugars and acids in popular "soft" drinks are not "soft" by any means on the hardest substance in our bodies – the enamel on our teeth.

As these drinks have become a "staple" in our diets and continue to displace more nutrient-dense foods and beverages, it is important to understand their effects on our health.

Dr. Guim Kwon, associate professor of Pharmaceutical Sciences

Beta Cell Research:

A Path to a Cure for Diabetes

According to the American Diabetes Association, nearly 26 million people in the United States—8.3 percent of the population—have diabetes. This stark number is only the tip of the iceberg; 79 million people are predicted to have prediabetes, and 1.9 million new cases are added each year. Despite extensive research efforts, finding a cure for diabetes is still years away. At best, insulin and several blood glucose-lowering medicines delay the progression and prevent various complications associated with the disease.

Obesity is one of the major causes of type 2 diabetes, the most prevalent form of the disease. As the rate of obesity has been rising over the last few decades, diabetes has become so prevalent that it affects almost every family, including the family of Dr. Guim Kwon, associate professor of Pharmaceutical Sciences in the SIUE School of Pharmacy.

Kwon has been researching ways to prevent and/or reverse type 2 diabetes. Although the exact causes of type 2 diabetes are uncertain, elevated levels of glucose and fat molecules in the circulation in obese individuals are thought to cause insulin resistance (insufficient insulin action) and insulin-secreting beta cell defects (insufficient insulin secretion). The major function of insulin is supplying nutrients to various organs and tissues in the body by stimulating uptake of glucose from the blood to cells. Thus, in uncontrolled diabetic patients, cells are starving to death, although abundant nutrients are circulating in the blood.

Her research seeks to understand the link between obesity and beta cell defects.

In her pursuits, Kwon has recently been awarded a National Institutes of Health (NIH) AREA (R15) grant to study alterations in human beta cell signaling under the conditions of chronic nutrient overload. While the majority of diabetes research is based on animal studies, the NIH grant will allow Kwon to study the link between obesity and beta cell defects in human cells.

"Once the beta cell metabolic signaling is known, new and innovative approaches to preserve beta cell function and mass may be possible, through modulation of the key steps that lead to beta cell defects," Kwon said. "As long as beta cells keep secreting insulin, diabetes does not develop."

The path to Kwon's larger grant project has been long, and she has earned support for her research from SIUE's Vaughnie Lindsay New Investigator Grant Program, the Seed Grants for Transitional and Exploratory Projects (STEP) Program, as well as other internal funding programs. In her pursuit to understand beta cell signaling, Kwon hopes that this important aspect of diabetes research will shed new light on preventative techniques and pave the way to a cure.

Health Literacy, Acculturation, and Health Behaviors among Young Hispanics

The Hispanic population is the largest and fastest-growing minority group in the United States. However, compared to other racial and ethnic groups in the U.S., this booming population carries the lowest health literacy rates. Dr. Amelia Perez, assistant professor of primary care and health systems nursing, is investigating the associations between health literacy, acculturation and health behaviors among Hispanic college students.

Health literacy refers to the ability to understand health-related information in order to make appropriate decisions about managing one's health. If health information is not provided in a way that patients can understand, individuals may find it more difficult to prevent future health problems and manage their current health.

Developing strong health literacy can be particularly challenging for those struggling with language barriers, economic and social barriers, and cultural misunderstandings. Perez is interested in how acculturation, the degree to which a person adapts to or takes in the beliefs, values and behaviors of a new culture, may have an influence on health literacy among Hispanics. In previous studies on Hispanics with high blood pressure, Perez found that acculturation and health literacy influence an individual's perceptions about high blood pressure and how to manage it.

Her current study, supported through SIUE's Seed Grants for Transitional and Exploratory Projects (STEP), focuses on younger Hispanics with higher levels of education. The project explores whether these individuals possess higher levels of health literacy and acculturation and whether these factors influence health behaviors.

"While it seems that levels of health literacy and education would go hand in hand, that may not always be true," Perez said. "A highly educated person in a field that is unrelated to healthcare may not necessarily have a high level of knowledge about health-related information."

Research studies that focus on the relationships between health literacy, acculturation and health behaviors among Hispanic college students are lacking.

By examining younger subjects, Perez hopes to help identify behaviors that can lead to health problems later on in life, such as diabetes, cancer and heart disease.

Perez views these assessments as integral to the development of health promotion interventions and educational materials. Health education materials tailored to the needs of Hispanics could play a critical role in improving the overall health of this population. Looking to the future, Perez hopes to expand the study with colleague Dr. Rebecca Luebbert, assistant professor of primary care and health systems nursing, to other major ethnic communities, exploring whether or not similar disparities exist among various college-age groups.

Dr. Amelia Perez, assistant professor of primary care and health systems nursing meets regularly with the SIUE Hispanic Student Union.

Pharmacy Professor Investigates Antibiotic Treatments of Infections Associated with Prosthetic Devices

Prosthetics can invigorate the well-being of people needing assistive devices, such as hip or joint replacements. But with increased use of invasive medical devices also comes increased risk of infection. Methicillin-resistant *Staphylococcus aureus* (MRSA) is a common pathogen causing infections in hospitalized patients. Dr. Scott Bergman, associate professor in the Department of Pharmacy Practice, is researching a more appropriate treatment of multidrug-resistant organisms (like MRSA) that cause these infections.

Bergman focuses on organisms taken from patients with osteoarticular infections, particularly prosthetic joint infections.

When MRSA attaches to smooth surfaces such as bone, metal or plastic it forms a thick coating, or biofilm, which is difficult to remove (similar to plaque on teeth that needs to be brushed off). Resistance to antibiotics can also develop quickly.

Combinations of antibiotics may be able to eliminate bacteria in biofilm better than they can individually. A common antibiotic vancomycin is considered the gold standard in treating MRSA, but its effectiveness in treating prosthetic joint infections is not ideal and resistance may develop. Another antibiotic, rifampin, has proven effective against these infections, but it becomes ineffective with just a one-step mutation in the bacteria. Thus, a combination of the two may be more effective than a single drug.

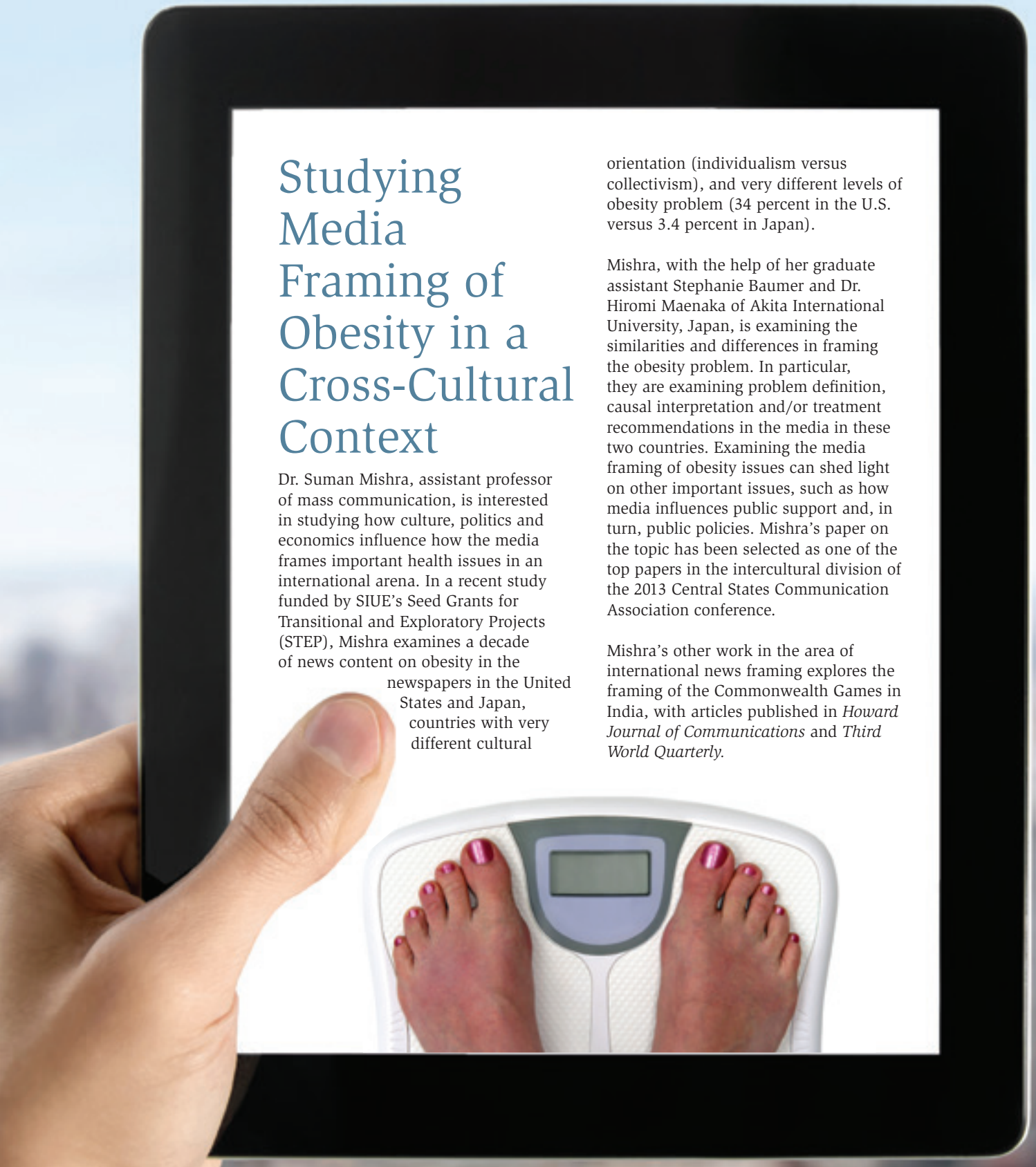
However, in combination therapy the ideal timing of initiating the second antibiotic is not yet known. Funded by an SIUE seed grant, Bergman investigated the effects of using the second drug rifampin on a varying schedule. His results showed that no variations in the concentration of antibiotic were needed to inhibit bacteria released from laboratory-simulated biofilm infections, regardless of whether rifampin was started on day 1 or 2 of therapy.

Studying Media Framing of Obesity in a Cross-Cultural Context

Dr. Suman Mishra, assistant professor of mass communication, is interested in studying how culture, politics and economics influence how the media frames important health issues in an international arena. In a recent study funded by SIUE's Seed Grants for Transitional and Exploratory Projects (STEP), Mishra examines a decade of news content on obesity in the newspapers in the United States and Japan, countries with very different cultural orientation (individualism versus collectivism), and very different levels of obesity problem (34 percent in the U.S. versus 3.4 percent in Japan).

Mishra, with the help of her graduate assistant Stephanie Baumer and Dr. Hiromi Maenaka of Akita International University, Japan, is examining the similarities and differences in framing the obesity problem. In particular, they are examining problem definition, causal interpretation and/or treatment recommendations in the media in these two countries. Examining the media framing of obesity issues can shed light on other important issues, such as how media influences public support and, in turn, public policies. Mishra's paper on the topic has been selected as one of the top papers in the intercultural division of the 2013 Central States Communication Association conference.

Mishra's other work in the area of international news framing explores the framing of the Commonwealth Games in India, with articles published in *Howard Journal of Communications* and *Third World Quarterly.*



The Man in the Nation, the Nation in the Man:

Exploring Argentine Film as Stage for Social and Political Transformation, Gender Construction

Dr. Carolina Rocha, associate professor in the Department of Foreign Languages and Literature, first became interested in film when she observed the powerful reaction of audiences to films that represented the 2001 Argentine crisis, in which the country defaulted by declaring its inability to pay its debts. For her, this moment became the impetus to explore the connections between economic policy, social change and gender roles in contemporary Argentine cinema.

Rocha notes that it is often thought that Latin American and Argentine men are guided by machismo. She departs from this premise as she investigates how the introduction of neoliberalism in the early 1990s relates to the end of the Argentinian welfare state and the father-figure-like institutions established in the 1940s. In the transition away from the authority of these paternal institutions, Rocha argues, Argentina also sees a transformation in masculinities, evidenced in particular by filmic representations of Argentine cinema.

Rocha's research traces the connection between a weakened state and the emasculation of middle-class men, as portrayed in some of the most popular Argentine films of the 1990s. Traditionally, Latin American middle-class men were in charge of the destinies of the nations. They were the *letrados* (lettered men) and thus the representatives of the state. In her book *Masculinities in Contemporary Argentine Popular Films,* Rocha examines many films in which the downfall of the Argentine state is represented as the demise of the main male characters. "When middle-class men do not die, they are shown as disempowered, a fact that also reveals their lack of leadership and control," Rocha said. "Fathers lose their authority and, as a result, their sons are left without guidance."

In her research, Rocha observed that American cinematic genres, such as westerns and road movies, were used in many of the Argentine films selected. "Westerns and road movies are both based on either the preservation of or the challenge to the social order, and thus they are ideal to portray changes in gender roles," Rocha said.

> In her research, she examines the emasculation of Argentine men as they faced the loss of their socio-ecomonic status, a study in power that is informed by psychoanalytic film theory.

Changes in the treatment of film settings also signal cultural changes. For example, since the nineteenth century, Argentina's intellectual debates have been shaped by a dichotomy that pits cities against countryside, privileging the urban sphere as a site of civilization and progress. Yet, in the films Rocha studied from the 1990s, cities are loci of corruption, places where traditional families and their bonds dissolve. The countryside appears as the space of freedom and redemption in a society influenced by consumption and global capitalism.

While her study focuses on Argentine culture, it also contributes to the understanding of the visual representation of gender in other societies that are experiencing economic crises and deep restructuring to compete in a global world. To provide an American context, Rocha cites *Unstoppable* (2010) and *Larry Crowne* (2011), two American films in which the male characters (played by Denzel Washington and Tom Hanks, respectively) are let go by their employers because of company reorganization.

While the studies of masculinities have yielded important insights about societies around the globe, there have been few studies about Argentine masculinities. Anthropologist Eduardo Archetti pioneered the study of Argentine masculinities by exploring "manly" activities such as tango, polo, and soccer in the early twentieth century. Rocha's work looking at the filmic production in the 1990s provides another point of entry into the exploration of the social construction of gender. Yet, much remains unknown about how patriarchy and patriarchal masculinities have been preserved and reinvented in Argentine film throughout the past century.

Since joining SIUE in 2008, Rocha has coedited three volumes involving Argentinian film studies: *Violence in Argentine Film and Literature (1989-2005),* with Elizabeth Montes Garces, *New Trends in Argentine and Brazilian Cinema,* with Cacilda Rêgo, and *Representing History, Class and Gender in Spain and Latin American: Children and Teenagers in Film,* with Georgia Seminet. She has also published *Masculinities in Contemporary Argentine Popular Films* and is the editor of the forthcoming *Modern Argentine Masculinities.*

Rocha's research traces the connection between a weakened state and the emasculation of middle-class men, as portrayed in some of the most popular Argentine films of the 1990s.

Dr. Carolina Rocha, assistant professor in the Department of Foreign Languages and Literature

"When native and non-native specialists successfully cooperate, resources can be maximized to produce high-quality, non-exploitative works representative of native views and voices."

The New Canoe:
Digital Technology and Indigenous Knowledge-Systems

Susie Sampson Peter was a Coast Salish Skagit born in 1863 in what is now known as northwest Washington state. In the 1950s she had no telephone, but she exchanged tape-recorded messages with relatives on other reservations with the help of Leon Metcalf, a music teacher at Seattle Pacific University who recorded Native American elders of the Puget Sound area. Lushootseed (Puget Salish) language and cultural knowledge had become endangered over the century with the influx of settlers and their Euro-American culture and economy.

Metcalf preserved what he could, and his recordings were later transcribed and documented by Dr. Vi Hilbert (Upper Skagit Salish). Owing mainly to Hilbert's work in publishing and teaching, Puget Salish language recovered from the edge of extinction.

Metcalf's collection, regarded as one of the most valuable existing resources for Salish language and oral tradition, is archived at the University of Washington's Burke Museum of History and Culture. Dr. Gregory Fields, professor of philosophy at SIUE, has been working with UW's Ethnomusicology Archives to index the approximately 75 CDs. Fields is also using the recordings as an archival source to complete three books on Northwest Coast thought and culture, under contract with University of Nebraska Press.

The first of the three books, *Totem Pole History: The Work of Lummi Carver Joe Hillaire,* is due for release in fall 2013. Author Pauline Hillaire, a Salish elder (Lummi Tribe), documents the totem poles carved by her father, Joseph Hillaire. The book is a preservation of cultural teachings and values expressed in the 'text' of three-dimensional carved artworks. The project's images and cultural information will help support the perpetuation of the artform and associated history as well as oral literature.

Fields is also working with Hillaire on a book she began writing more than 40 years ago: *Rights Remembered: A Salish Grandmother Speaks on American Indian History and the Future.* This ethnohistory is grounded in native experience and oral tradition, as well as primary source documents of the U.S. government. The book examines how Native American lands, livelihood, lives and lifeways were lost in the Northwest. In the text, Hillaire calls for intercultural reconciliation and a restoration of the truths of history concerning U.S. Native American policy.

The third book, *Sacred Breath: Pacific Northwest Culture and Medicine Teachings,* is written in collaboration with Johnny Moses (Nuu-chah-nulth and Tulalip Coast Salish). Moses is an ancestrally trained singer, storyteller and a skillful teller of epics, an ancient performance art rarely heard in the contemporary world. *Sacred Breath* explores a philosophy of healing and moral life in a spiritual tradition that takes seriously the need—and the moral obligation—for healing (physical, emotional, social and spiritual), understood in terms of a domain where religion and medicine share common ground. In support of the project, Fields received a Summer Stipend from the National Endowment for the Humanities as well as internal funding from SIUE's Research Equipment & Tools and Hoppe Research Professor grant programs

> As a comparative philosopher and interdisciplinary scholar, Fields recognizes that indigenous traditions remain underestimated in academic discourse, owing largely to their non-textual means of knowledge transmission.

Thus, each book includes a media companion (DVDs and audio CDs), including audio and video recordings Fields has been making since the 1990s. The multimedia format allows a presentation style that is more comprehensive and culturally appropriate to an oral tradition than text would be by itself.

Fields observes that non-native scholars and institutions (well-meaning and not) have often misappropriated native peoples' property (tangible and intangible), and have produced scholarship, museum exhibits, and curricula that distort and dilute native traditions. To avoid this, Fields acts as editor and collaborator while the native culture-bearer provides the primary voice of each text. He explains, "When native and non-native specialists successfully cooperate, resources can be maximized to produce high-quality, non-exploitative works representative of native views and voices."

Fields recently completed a sabbatical at Indiana University, where he was appointed a Research Associate of the American Indian Studies Research Institute. He is continuing his work in SIUE's Interdisciplinary Research and Informatics Scholarship Lab (IRIS) using digital technologies for the humanities and social sciences; technologies that Vi Hilbert referred to as "the new canoe" that would help carry ancestral languages and teachings to future generations.

Dr. Gregory Fields, professor of philosophy with a book used in his research: gwəqwulcəɣ: Aunt Susie Sampson Peter: The Wisdom of a Skagit Elder, transcribed by Vi Hilbert, translated by Vi Hilbert and Jay Miller, based on recordings by Leon Metcalf (Seattle: Lushootseed Press, 1995)

SIUE IRIS Center Promotes Digital Scholarship in Humanities and Social Sciences

When we think about research in the humanities and social sciences, we do not typically consider the roles that computers, specialized software and hardware, the Internet, or even a computer laboratory may play in the information gathering methods and analysis in these fields. However, digital, or "informatics scholarship," has become an innovative and crucial methodology for research in the humanities and social sciences.

Informatics research is, by definition, innovative. It can involve the creation of dynamic online archives or the development of digital tools for analyzing languages, literature, images, spaces or periods. At its core, this field re-invents the humanities and social sciences classrooms as laboratory environments using research-oriented collaborations between faculty and students as the central content and output. Informatics scholarship is poised to quickly become standard practice.

SIUE is proud to be a part of this scholastic change. The IRIS Center (Interdisciplinary Research and Informatics Scholarship) was co-founded in 2009 by a College of Arts and Sciences-sponsored interdisciplinary roundtable. Co-directed by Drs. Jessica DeSpain and Kristine Hildebrandt of the English department, the IRIS Center is designed to support individual and collaborative scholarship that applies digital content as a primary methodology. The Center facilitates cross-disciplinary and collaborative projects that involve software application enhancement in the humanities and social sciences. These projects are supported via access to physical facilities and human resources and foster active mentorship and collaboration between faculty and students at undergraduate and graduate levels. Branching beyond academia, the Center promotes digital endeavors that intersect with community initiatives and organizations.

The IRIS Center currently houses multiple workstations with specialized equipment and software for rare book scanning, video editing and conversion, and image modification.

Several faculty research projects are currently underway as of the 2012-2013 academic year, including The Manang Languages Project, The Great Lakes Research Alliance for the Study of Aboriginal Arts and Cultures, and *The Wide, Wide World Digital Edition*. These projects are funded by a number of SIUE-internal grants and programs (STEP, URCA, Vaughnie Lindsay, EUE), and through prestigious external sources (National Science Foundation, the Hans Rausing Endangered Languages Foundation, and the University of Virginia Harrison Institute). Student users, a core part of the Center's success, are recruited through monies awarded from grants. During the last year alone, 23 students collaborated directly with faculty on their large-scale research initiatives in the IRIS Center.

The Center plans for continued growth. Under development is an interdisciplinary minor in digital scholarship that will provide students in the humanities and social sciences with additional tangible, hirable skills linked to their major area of study. These students will engage in design and development of digital technologies, allowing them to explore new methods and pressing questions in their fields.

The Center is continually seeking community partnerships for student interns, faculty members interested in using the Center's resources for their research, and new students who wish to engage in informatics scholarship. For additional news about the Center's growth and to learn more about ongoing digital projects, visit the Center's website at http://siueiris.com.

Drs. Jessica DeSpain and Kristine Hildebrandt of the English department

"Found Art" Documents Personal and Local History: My Story, Your Story, Our Collective Story

Imagine art made from historic documents, old photographs, maps and fragments of history collected from basements, closets and attics. Now imagine them hidden in plain view throughout the Missouri History Museum Library and Research Center.

Dr. Gussie Klorer, professor in the SIUE Art Therapy program, created such an art installation that invited library visitors on a scavenger hunt to find 13 pieces of art, while simultaneously rediscovering the vast resources the library offers. Klorer explains the impetus behind the scavenger hunt: "The metaphor of seek-and-find is exactly what we do when we embark upon any type of research, so it's a fitting metaphor for this show. A library is an unusual venue for a sabbatical exhibit of artwork, but it makes perfect sense in light of the research question being explored." She hopes that viewers will be inspired to think about other uses for historic documents, such as creating art that tells their own stories and preserves them for future generations.

The project's roots go back several years, when Klorer acquired access to the old guardhouse at the Moorlands in Clayton to use as a personal art studio. Klorer describes stepping into the guardhouse for the first time as stepping into a time warp: "The 1948 tax return of the caretaker was still sitting on a table, as if he had just stepped out for a moment. Crammed into the loft were old signs, dead rodents, letters, trash, notes from trustee meetings and fragments of history that gave an unvarnished view of painful social prejudices from years earlier."

Klorer seized the opportunity to use art to tell a story. Photographs and old documents found within the guardhouse inspired a whole series of Klorer's artwork—collages, boxes and books made of these found items. She juxtaposed a scanned copy of a 1947 letter to the trustees of the Moorlands neighborhood association that documented the hiring of a private detective to determine if wives and children of janitors were living in basements of apartment buildings (as there was an ordinance against people of color living in the Moorlands) with a page from an old English lesson about telling stories. Klorer found herself asking, "What do seemingly insignificant pieces of trash, abandoned for over half a century, tell us about culture and local history? What vignettes of history can be found in old letters, housed in museums or libraries or our own attics and basements?" She claims, "My art traversed a path of exploring: the guardhouse story, the story of local history, and, finally, my own family's stories."

Dr. Gussie Klorer, professor in the SIUE Art Therapy program

In addition to creating community-inspired art, Klorer is also interested in inspiring the community to make its own artwork. She has received multiple grants (SIUE Graduate School, the Meridian Foundation, Target Foundation) to conduct workshops helping individuals and families create their own stories from treasures found in attics and basements. As well as the Missouri History Museum, Klorer has hosted collaborations at the Clayton Century Foundation and with SIUE East St. Louis Head Start (hosted at Our Lady of the Snows). The workshop, which involved art therapy graduate students from SIUE, entailed making family memory boxes and concluded with families receiving art supplies along with a booklet of ideas for projects that use recycled materials found in any home. The project was designed to assist 200 families.

"My art traversed a path of exploring: the guardhouse story, the story of local history, and, finally, my own family's stories."

INSTITUTE FOR URBAN RESEARCH

The SIUE Institute for Urban Research (IUR) works with top experts to investigate and discover solutions to issues affecting urban and metropolitan areas. Information gathered and shared through the IUR benefits businesses, government and community leaders who tackle the challenges of urban planning and

The East St. Louis Action Research Project is Underway at SIUE

In 1987, the East St. Louis Action Research Project (ESLARP) began at the University of Illinois with a commitment to then State Representative Wyvetter Younge to supply the area with much-needed technical assistance. Faculty and students focused on large-scale initiatives like riverfront development, street lighting, industrial and railroad redevelopment, as well as smaller-scale projects including community programming, design assistance, and neighborhood and open-space planning. The program grew to national prominence and has helped create visible change throughout the Metro-East Area.

Leadership of the ESLARP shifted from the University of Illinois at Urbana-Champaign to SIUE in 2012 under the direction of Dr. Andrew Theising, Director of the Institute for Urban Research (IUR). ESLARP is also supported through the efforts of Barbara Levin at Washington University in St. Louis and the East St. Louis University Collaborative.

In the year since ESLARP has arrived at SIUE, partnerships have been built and new programming developed, creating an energetic schedule of activity.

ESLARP has three components: long-term collaborations with key non-profits, short-term partnerships with institutions to facilitate defined service projects, and online resources providing the community with information and a sense of collective identity.

The long-term partnerships will span multiple semesters and sustain involvement from various directions. Among these partners is the Katherine Dunham Center for Arts and Humanities, the legacy of former SIU faculty member Katherine Dunham. ESLARP will coordinate internships through the SIUE Museum Studies program, a Meridian Society-funded membership drive and other work weekends with students.

The Mount Sinai Family Life Center, another ESLARP partner, is one of the most dynamic organizations in East St. Louis. It began as a church, but has since developed social service and housing development arms. The Family Life Center provides many services to residents, most notably summer youth programs. ESLARP has been offering administrative consulting to the organization and helping to identify funding strategies.

Meanwhile, short-term relationships are being developed with area institutions to initiate one-time service projects. The Joseph Center, for example, is a homeless veterans' shelter in East St. Louis and has approached ESLARP to conduct oral history interviews with local veterans. Quarterly service-learning projects are also planned with various area partners and The SIUE Experience.

Local history is another star in ESLARP efforts to provide a sense of community via online portals. The Virtual East St. Louis Historical Society was launched in spring 2013 and is hosted on the IUR website: siue.edu/graduate/iur/eslhistory. As East St. Louis does not have its own historical society, IUR created one online that will feature more than 6,000 images from the SIUE Bowen Archives. Additionally, the site has oral history interviews collected from current and former residents. The Society will also have a community advisory board.

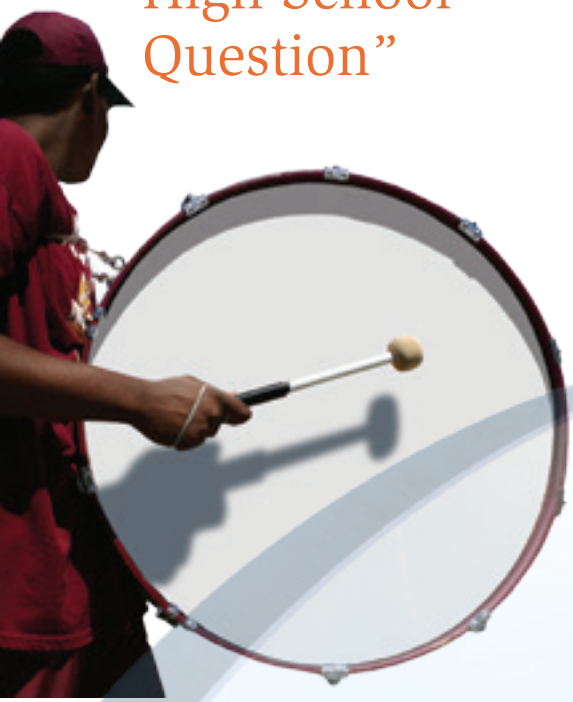
Photos from the Virtual East St. Louis Historical Society Archive. Top: The St. Louis National Stockyards entrance, 1911. Photo part of the SIUE collection; Bottom: Unidentified woman by an anonymous photographer, courtesy the SIUE Petty Collection.

The momentum gained is due in large part to SIUE's embrace of service learning through The SIUE Experience—a program in which all incoming freshmen participate in service activity at the start of the fall semester.

development, data analysis, project management, and strategic planning on a daily basis. Applied research projects impact and shape public policy, as well as facilitate more effective and well-executed community improvement projects.

siue.edu/iur

Urban Scholars Research At-Risk Youth Drum Programs and "The High School Question"



Drs. Aminata Cairo, associate professor of anthropology, and Sarah VanSlette, assistant professor of speech communication, are currently working on projects for the Urban Scholar Program. The program was created in 2008 by the Institute of Urban Research (IUR) as a way to advance research being conducted on urban topics at SIUE.

Urban scholars focus on topics that advance the IUR's goal to investigate and discover solutions to the issues that affect life in urban and metropolitan areas.

Cairo has been involved in community-based research with the Midwest Percussion Alliance (MWPA) since 2010. The MWPA is a collective of regional African-American drumming groups based in Louisville, Ky., Columbus, Ohio, Evansville, Ind., and Dayton, Ohio. The drumming groups use percussion as a means of getting young people on a path toward higher education and away from violence. All drumming groups work in inner city communities that struggle with issues associated with low economic status.

Cairo's main role at the MWPA involves helping them identify and document their unique model, identify its strengths and weaknesses, and to eventually help them replicate it for other communities. She is also using her experience with the MWPA to document the value of drumming as cultural heritage.

Aside from observing and documenting the MWPA, Cairo involves students from the drumming group in her research whenever possible. The presence of student researchers gives current drum members the opportunity to connect with former members who are living examples of the possibility of college education attainment.

VanSlette's research focuses on a different aspect of urban life: the effects a certain local custom has on whether or not the city seems welcoming for newcomers. Particularly, she is investigating the effects of the question "Where did you go to high school?" on non-native St. Louisans. The seemingly-innocuous question has yielded a variety of reactions, and further research may reveal important factors about the experiences of young professionals who relocate to St. Louis.

VanSlette's study examines the culture issues behind the question, as well as its reputational effects on the city. She created a 37-question online survey and has received more than 300 survey responses, three interviews, and three in-depth questionnaires, all from non-natives. Aside from questions regarding the participant's experience with and reactions to the high school question, VanSlette's survey also asks about the general impression of St. Louis and whether or not the participant would recommend the city to a friend looking to relocate.

Ultimately, the answers to these questions could provide insight for various collectives such as the St. Louis Economic Council, St. Louis Development Corporation, and the St. Louis Convention and Visitors Commission as they design messages for attracting and maintaining a growing population to the greater St. Louis metropolitan area.

The Dubious Diagnosis:
Intersex Scholarship Raises Ethical Questions about Biological Sex and the Medical Community

Dr. Georgiann Davis, assistant professor of sociology

When babies are born, they are immediately categorized as "boy" or "girl" based on any number of assigned sex markers. However, Dr. Georgiann Davis, assistant professor of sociology, argues that this categorization process is flawed in the sense that it assumes sex and gender are correlating binary characteristics and that masculinities and femininities are widely-shared rather than culturally-specific phenomena. Davis, a sociocultural scholar who studies intersexuality, notes that the problems with categorization are most visible in those born with intersex traits that surface as "ambiguous" external genitalia, sexual organs and/or as sex chromosomes that deviate from normative expectations.

Davis' current research aims to make sense of how views about the body, gender and sexuality reside in medical authority. According to Davis, "for decades, medical professionals have used technological advancements to surgically and hormonally modify intersex bodies in order to fit them into the sex binary that is presumed to be correlated with gender and sexuality. In essence, these practices erase hard empirical evidence that binary typologies are flawed. It also leaves many adults with intersex traits feeling mutilated and angry about how they were treated as babies and young children who had little or no voice in consenting (or not) to the medical interventions that were forced on their bodies."

From these experiences, a handful of sociocultural scholars, together with intersex activists, started critiquing the medical management of intersexuality. By the year 2000, the American Academy of Pediatrics (AAP) issued a statement acknowledging these critiques and warned against treating individuals with intersex traits as monsters. It also started a critical discussion of the medical management of intersexuality that specifically advocated against keeping the intersex diagnosis secret from individuals with intersex traits as they aged, a practice that the AAP argued was far too common.

However, Davis asserts that the acknowledgement of wrong doing, even if only by some medical providers, was a move of vulnerability by the medical profession that jeopardized their authority over the intersex body. In the wake of this event, Davis questioned how doctors justified the medically unnecessary interventions they continued to perform on intersex bodies.

Her ultimate conclusion was that the medical profession used new terminology (which was strategically requested by prominent intersex activists who had hoped renaming the condition would improve health care for individuals with intersex traits) to reclaim jurisdiction over intersexuality and the intersex body in ways that allowed them to reassert their medical authority. This all happened in a 2006 consensus statement by the AAP

that advocated replacing intersex terminology with new nomenclature, Disorders of Sex Development (DSDs), and gave parameters for the management of intersex conditions.

Davis has been tracking the result of the new terminology on the medical profession and intersex community. According to her, in a relatively short amount of time, DSD has come to replace intersex language in almost all corners of the medical profession. At the same time, DSD has caused a substantial amount of conflict among individuals with intersex traits who were neither consulted nor involved with the behind-the-scenes work of activists who had pushed for its inclusion in the 2006 medical consensus statement. Some adamantly resist the new terminology, finding the language of "disorder" extremely offensive.

> Davis explains, "They feel DSD jeopardizes their ability to claim intersex as an identity, and they worry that it allows the medical profession to reassert their authority over the intersex body."

Others have hope that DSD nomenclature will improve care and depart from the politicized language of intersex that was central to 1990s intersex activism."

Davis has a professional commitment to the topic of intersexuality as well as a personal connection: she was born with an intersex trait. In this early stage of her career, she has already published numerous papers on intersexuality and related topics (including sex testing in the Olympics) in various outlets, such as *Feminist Formations,* a recent volume of *Advances in Medical Sociology* dedicated exclusively to the topic of the sociology of diagnosis, *Psychology & Sexuality,* the international journal *Sociopedia.isa, Current Sociology, Ms. Magazine* and the *American Journal of Bioethics.* She is currently working on her first book, which is under contract with New York University Press and tentatively titled *The Dubious Diagnosis: How Intersex Became a Disorder of Sex Development.* Davis is also a 2013 recipient of the SIUE Vaughnie Lindsay New Investigator award.

Shifting STEM Stereotypes through Critical Media Literacy in Middle School Students

Though sex discrimination in the workplace has been illegal since the 1964 Civil Rights Act, men and women still remain largely in sex-segregated occupations. Sex segregation is most apparent in the occupational fields of science, technology, engineering and math (collectively known as STEM).

Structural discrimination accounts for much of the discrepancy between men and women within STEM professions. However, research shows that gendered stereotypes associated with those professions also account for the difference: women do not pursue job paths in STEM fields, and men do not hire them because neither group perceives those jobs to be appropriate for women. Shifting gendered stereotypes, then, is crucial for moving women into STEM professions.

The media constitutes one source of gender stereotypes, according to Dr. Linda Markowitz, professor in the Department of Sociology and Criminal Justice, and Dr. Laurie Puchner, professor in the Department of Educational Leadership. While teachers are not in a strong position to change what people consume in the media, they do have the power through education to change the way individuals, especially children, interpret gender messages within the media.

Dr. Laurie Puchner, professor in the Department of Educational Leadership and Dr. Linda Markowitz, professor in Sociology

Through a grant from American Association of University Women, Markowitz and Puchner are working on a project to improve critical media literacy skills in middle school students to better their position in questioning and altering the gendered stereotypes to which they are exposed.

Markowitz and Puchner's study focuses on two main goals. The first is to help students understand the hidden messages received from the different forms of media, such as messages fostering sexism, racism, homophobia and other kinds of discrimination. The second is to provide students the tools to create new messages that undermine and shift traditional stereotypes. When students feel empowered to create new forms of gendered knowledge, they can transfer that knowledge to spheres outside the classroom.

In their project, Markowitz and Puchner are working with Collinsville, Ill., middle school teachers and with Media Literacy Consultant Chantal Chandler to develop, implement and evaluate a "Critical Media Literacy Curriculum Unit." In a pilot study, Markowitz and Puchner taught the unit to five seventh-grade and five eighth-grade language arts classes. After evaluating and revising their test unit, the curriculum will be disseminated and made available to all interested teachers.

The project is fundamentally concerned with whether the new curriculum leads to increased levels of critical media literacy about gender stereotypes, especially as related to STEM professions. If students enjoy thinking about media critically during school, they are likely to take those skills and use them in situations outside of school. As students' stereotypes shift, the hope is that sex segregation in STEM occupations will slowly begin to fade as well. While the current study provides information about short-term effects of the curriculum, Puchner and Markowitz plan to conduct future research on how offering children the tools to critically examine the media may have long-term consequences for boys' and girls' occupational choices.

iCan Succeed:
Investigating iPad use for Children with Autism Spectrum Disorders

According to the Centers for Disease Control and Prevention (CDC), approximately one in 88 U.S. children has been diagnosed as having an autism spectrum disorder.

The growing number of such diagnoses comes with new challenges for U.S. schools in supporting and educating these students. Today, many teachers and educational professionals look to tablet computers (such as iPads) as an instructional tool and assistive device thanks to the efficiency, flexibility and portability they offer. In Orange County, California, more than 100 iPads are used by students with disabilities because they are "so intuitive." Yet, while instructional use often guides the evolution of best practices in education, empirical evidence can be just as important in instructional decision-making. Therefore, a team of SIUE investigators are examining whether digital tools used by children with autism are actually meeting their needs.

Drs. Melissa Thomeczek, associate professor of educational leadership, and Wayne Nelson, University Fellow for Online Learning and Assessment, recently conducted multiple case studies of students with autism spectrum disorders interacting with tablet computers. They are part of an exploratory project titled "iCan Succeed: Literacy Education in Children with Autism" by Thomeczek, Nelson, Dr. Amie King, assistant professor of special education and communication disorders, and Dr. Victoria Scott, professor of special education and communication disorders.

In order to examine the impact of the technologies on the learning process, the team sought to establish the capabilities or affordances that the technologies might provide. The case studies focused on two school-based contexts, using more than 30 apps designed for education.

The studies were designed to help the researchers understand how children with autism use tablet computers with gestural interfaces in school contexts.

Participants included both students and teachers from area schools partnering with SIUE's School of Education.

In the first context, the research team videotaped interactions by students using tablet computers with teacher assistance. In the second context, the team tracked students in the classroom working with the devices on their own. Data were analyzed to determine how well tablet computers and apps enhance literacy education of students with autism. The team looked at the type and nature of apps used; the interaction of a teacher with the participants while using an app; and whether or not the app was being used in a manner consistent with its intended function.

Study findings unveiled the difficulty children had in using the app for its intended purpose when a teacher was not present. Thus, the critical importance of educators' roles in teaching with technology became much more apparent. The finding also underscored the need for more appropriate app design specifically for children on the autism spectrum.

According to the team, the significance of this research is best seen through the eyes of the children involved. Students who struggle with social interaction, communication, and literacy are provided an environment rich in communication, interaction, and expression. They are given control over the environment that they have not previously experienced, and they can better play a role in their own education.

Thomeczek and colleagues hope to investigate the effectiveness of tablet computers to enhance education of children with autism on a much larger scale. Future pathways could also include the development of unique apps for students with autism using input from the students themselves, rather than simply utilizing the apps currently available for purchase.

As the prevalence of these devices increases, the researchers anticipate mobile learning apps will make their way from schools into homes, opening up unprecedented opportunities for educational partnerships between schools and parents.

Reverse Transfer Students and College Outcomes: A Potential Opportunity

Reverse transferring, or moving from a four-year institution to a community college, is a main form of college student mobility. Reverse transfer students have a low rate of degree completion, which suggests the need to look more closely at predictors of reverse transfer and what happens to students after moving to a community college. By understanding the factors associated with reverse transfer, universities, educational policy-makers and other advocates could work to improve both retention and graduation rates among students pursuing postsecondary degrees.

Dr. Eric Lichtenberger, associate director for research at the Illinois Educational Research Council, recently completed a study looking at how four-year college students utilize the community college system. The study drew upon information from members of the Illinois high school class of 2003 who initially enrolled at a four-year college during fall semester of 2003. With this information in hand, Lichtenberger focused on factors related to reverse transfer, returning to a four-year college and graduation rates.

The result is compelling: over 20 percent of the students enrolling at four-year colleges reverse transferred to a community college before the end of the study (spring 2010), not including summer enrollment, concurrent enrollment or post bachelor's enrollment. Most reverse transfers occurred early in the study; but, a sizable portion of reverse transfers occurred at points when students might have achieved junior- or senior-level status if they had persisted.

"While many reverse transfer students attend community colleges as a way to continue in postsecondary education, some students reverse transfer as a means of re-entering postsecondary education after taking time off from college," Lichtenberger explained.

Graduation rates for reverse transfer students attending community college were low. The study revealed that only 16 percent of reverse transfer students earned an associate degree during their time at a community college. An additional three percent earned a certificate as their highest level of community college education. Half of reverse transfer students eventually returned to a four-year college, most returning to a different and equally or less selective four-year college. Only one-quarter of reverse transfer students went on to earn a bachelor's degree. According to Lichtenberger, reverse transfer students comprise roughly half of those who failed to complete a bachelor's degree before the end of the study.

Along with reverse transfer, the so-called reverse articulation of credit from a four-year institution to a community college has received more attention in recent years. Reverse articulation of credit happens when an institution retroactively awards an associate degree to a former community college student who moved to a four-year institution a few credits shy of earning a degree. When considered alongside Lichtenberger's study results, exploring and adjusting policy on reverse articulation of credit may benefit reverse transfer students. For example, expanding the policy better enables reverse transfer students to complete an associate's degree in a timely manner. This is shown to significantly increase one's odds of returning and earning a bachelor's degree.

According to Lichtenberger, "the study results, despite limitations regarding student academic performance at four-year colleges, represent a vision of what could be accomplished as more states develop longitudinal data systems to bring together student-level information from K-12 schools, community colleges and four-year institutions."

The limitations experienced in Lichtenberger's study highlight the need for cooperation and collaboration between educational partners and entities. Improved cooperation between 2- and 4-year institutions could pave the way for more detailed databases, more comprehensive research and results, and ultimately a deeper understanding of the students who all too often get caught between the cracks found in the higher learning system.

IERC Makes Significant Strides

The IERC disseminates research through written and electronic reports online at siue.edu/ierc and at the Illinois P-20 Council and subcommittees in state, as well as through presentation at many educational forums and research conferences. Wide dissemination of policy research has helped the IERC make significant strides in 2012 toward its goal to ensure research-informed Illinois educational policy.

Illinois Education Research Council 2012-13 Landmarks

IERC Faculty Research Fellowships: A new program for SIUE faculty to collaborate with the IERC on projects relevant to Illinois education policy objectives. Awarded our first two fellowships for the 2013/14 year to Alison Reeves, Department of Educational Leadership and Melodie Rowbotham, Department of Family Health and Community Health Nursing.

Teacher Education Workforce Research: Directed a project funded by the Spencer Foundation to examine how stages in the teacher pipeline affect the diversity and quality of the Illinois teacher education workforce.

Class of 2003 Cohort Analysis: Extensive analyses of the Illinois high school graduating class of 2003, resulting in four reports on college readiness, college confidence, and postsecondary outcomes.

Teaching Evaluation in Performance Evaluation Reform Act Study: Investigated ways select school districts in Illinois implement teaching evaluations in their schools (with the University of Chicago Consortium on Chicago School Research), continuing statewide via an Illinois State Board of Education subaward from Westat.

Report for IBHE: Formative evaluation of the new Illinois High School to College Success Report.

Foundational Work on Illinois Charter School Teachers: Funded through the SIUE Seed Grants for Transitional and Exploratory Projects; to be followed by a study on teacher turnover in Illinois charter schools.

Illinois Longitudinal Data System Program Funded Studies: Two studies examining patterns of persistence of native college and community college transfer students, resulting in development of degree progress indicators.

Reverse Transfer Analysis: Examining the factors related to students' decisions to transfer from a four-year institution to a two-year institution in a qualitative study funded by a SIUE STEP grant.

Janet Holt
Executive Director

IERC Welcomes New Executive Director

The Illinois Education Research Council welcomed Janet Holt as the new executive director in August 2012. The previous acting director, Brenda Klostermann, continues on at the IERC as the associate director for administration. Holt brings 18 years of experience in quantitative methods and analysis of large-scale data to the Council. Her contributions to educational research include growth modeling of educational data, persistence of women and minorities in STEM fields, adult literacy reading practices, reading comprehension in college students, growth of early reading fluency, and multivariate methods. Holt's professional organizational background includes service as President of the Mid-Western Educational Research Association (2004-05), Chair of the Educational Statisticians Special Interest Group of the American Educational Research Association (2011-12), and service on numerous educational journal editorial boards. Holt came to SIUE from Northern Illinois University, where she held positions as Professor and Program Coordinator of Educational Research and Evaluation, and Methodology Strand Chair of the Center of Interdisciplinary Study of Language and Literacy.

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Sponsoring Agencies of Research and Projects

2012-2013

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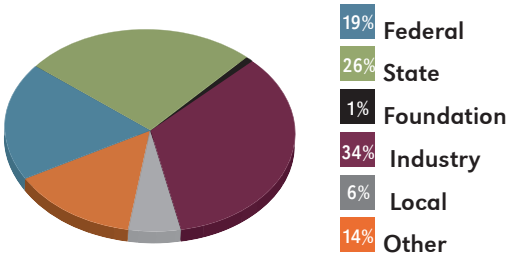
American Association of University Women
American Psychoanalytic Association
Anheuser-Busch, Inc.
Australian Research Council
Blended Integrated Circuit Systems, Inc./National Science Foundation
Chicago State University/National Science Foundation
City of Ferguson
City of O'Fallon
City of St. Louis
City of Troy
Collegiate Shooting Sports Initiative/National Shooting Sports Foundation
Commerce Bank
Dentsply International
DePaul University
Eagle Investment Inc.
East St. Louis District #189/Illinois State Board of Education
East St. Louis School District #189
Fraternal Order of Eagles
Fulbright Scholars Program
Gateway Center
GfK Kynetec
Grill Sponge, LLC.
Harrassowitz/Charleston Conference
Human Resources & Services Association
Hussman Corporation
Illinios Space Grant Consortium
Illinois Arts Council
Illinois Attorney General's Office
Illinois Board of Higher Education
Illinois Campus Compact
Illinois Center for Transportation
Illinois Clean Coal Institute
Illinois Community College Board
Illinois Corn Growers Association
Illinois Corn Marketing Board
Illinois Department of Children & Family Services
Illinois Department of Commerce & Economic Development
Illinois Department of Commerce & Economic Opportunity
Illinois Department of Natural Resources
Illinois Department of Public Health
Illinois Department of Transportation
Illinois Department of Human Services
Illinois Environmental Protection Agency
Illinois Manufacturing Extension Center/Beall Manufacturing
Illinois Space Grant Consortium/NASA
Illinois State Board Of Education
Illinois State Board Of Education/U.S. Department of Education
Illinois State Library
Ipsos Agriculture & Animal Health
Joyce Foundation
Koch Foundation
Lessie Bates Davis Neighborhood House
Library of Congress
Light Energy Technology Inc.
Long Island Veterinary Specialists
Lunar and Planetary Institute
Madison County Community Development
Madison County Employment and Training Department
Madison County Government/ Madison County Community Development
Madison County Planning & Development Department
Mallinckrodt Pharmaceuticals
Maritz Research
Maritz, Inc.
Metropolitan Park & Recreation District
Midwest Sociological Society
Missionary Association of Mary Immaculate
Missouri Baptist Medical Center
Monroe/Randolph County Regional Office of Education
Mt. Sinai Family Life Center
NASA Goddard Space Flight Center
National Science Foundation
National Aeronautics and Space Administration
National Endowment for the Humanities
National Great Rivers Research and Education Center
National Institutes of Health
National Park Service/Great Rivers Cooperative Ecosystems Studies Unit
National Writing Project/University of California
Nestle Purina PetCare
Oates Associates
Pharmadent
Ralcorp
Ralston Foods/Ralcorp
Science Education Solutions, Inc./National Science Foundation
Society of Early Americanists
Society of Infectious Diseases Pharmacists
Space Telescope Science Institute
SSM DePaul Health Center
St. Clair Housing Authority
St. John's Community Care
St. Louis Metropolitan Sewer District
Sumner Group, Inc.
Target Art Workshops
Treatment Alternatives for Safe Communities/Substance Abuse & Mental Health Services Administration
Third Judicial Circuit Madison County
Tri-City Regional Port District
U.S. Department of Education
U.S. Department of Health & Human Services
U.S. Environmental Protection Agency
University of California at Berkeley/California Department of Water Resources
University of Chicago/Consortium on Chicago School Research
University of Illinois/Gates Foundation
University of Illinois Urbana Champaign
University of Nebraska-Lincoln/National Endowment for the Humanities
University of the Pacific
Washington University in St. Louis
Westat, Inc./Illinois State Board of Education
Wolters Kluwer Health

FY 13 Awards by Agency Type



SIUE 2012 Internal Grant Award Winners

2012 Annette and Henry Baich Award

The Annette and Henry Baich Award is given annually to the most outstanding STEP grant proposal for basic research conducted within the parameters of the Sigma Xi Society. Disciplines include the physical sciences, life and medical sciences, earth science, engineering, psychology and mathematics.

Winner: Dr. David Jennings, Biological Sciences, College of Arts and Sciences

Project: "Developmental and Tissue Specific Regulation of Thyroid Hormone Actions"

Dr. Jennings' project employs a novel approach (vacuum filtration) to directly examine changes in thyroid hormone receptor proteins in a variety of tissues during amphibian development and metamorphosis. Dr. Jennings tests the connection between thyroid hormones and receptor proteins. Future applications of the project may be used to address the evolution of thyroid hormone control of development in a wide range of organisms, including mammals.

2012 Hoppe Research Professor Award

The Hoppe Research Professor Awards are made to SIUE faculty members in order to recognize and support individual programs of research or creative activities. These awards recognize faculty members whose research or creative activities have the promise of making significant contributions to their fields of study. The Hoppe Research Professorship supports a significant and discrete portion of a faculty member's larger research agenda for a two-year period.

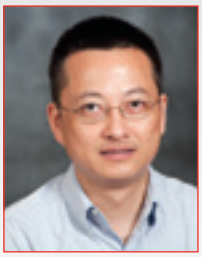
Winner: Leah O'Brien, Chemistry, College of Arts and Sciences

Project: "High Resolution Fourier Transform Spectroscopy"

Dr. O'Brien's project is based in molecular spectroscopy. Part of O'Brien's project involves coupling a Fourier transform spectrometer (FLS) with an intracavity laser spectrometer (ILS), creating the first instrument of its kind in the U.S. and only the sixth such instrument in the world. The coupled instruments provide greater resolution, accuracy, and detection range than either piece of equipment can provide alone. Her spectroscopy work is expected to reveal new molecular properties and energy parameters.

2012 Vaughnie Lindsay New Investigators

The Vaughnie Lindsay New Investigator Awards are made to tenure-track SIUE faculty members in order to recognize and support individual programs of research or creative activities. These awards recognize faculty members whose research or creative activities have the promise of making significant contributions to their fields of study and to SIUE in general. Join us in congratulating the FY2013 Vaughnie Lindsay New Investigator Grant winners, Drs. Xin Chen and Jennifer Gapin.



Winner: Dr. Xin Chen, Mechanical and Industrial Engineering, School of Engineering

Project: "Effective and Efficient Conflict Resolutions for Airport Surface Operations"

Dr. Chen is collaborating with Lambert-St. Louis International Airport (STL) to improve conflict resolutions for surface operations. Data from airplane and ground transportation vehicle transponders is applied to network-based conflict-resolution plans and compared with FAA controller conflict resolutions to identify the most effective and efficient resolutions. The larger project goal is to create a user-friendly and interactive conflict advisory system prototype that may be scaled up for use at busy airports.

Winner: Dr. Jennifer Gapin

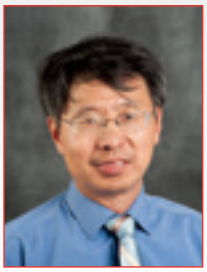
Project: "Physical Activity / Children with ADHD"

Dr. Gapin's project goal was to expand on preliminary studies that have shown a relationship between physical activity and neurobiological mechanisms implicated in Attention Deficit Hyperactivity Disorder (ADHD). Gapin used select core study and control groups to explore the effects of acute exercise on executive function in children diagnosed with ADHD. Gapin's project explored excercise as a non-pharmaceutical intervention for children with ADHD.

2012 Distinguished Research Professors

The Distinguished Research Professor rank recognizes faculty members who have made an outstanding contribution to research as a result of their continued commitment to scholarship beyond the period of their promotion to Professor.

Dr. Richard (Dick) Brugam is the 2012 Distinguished Research Professor of Biology. Brugam specializes in paleolimnology and is currently investigating of the roles ancient diatoms and other particles play in illustrating human impact on the environment at Horseshoe Lake in Granite City, IL. He has published extensively on diverse topics. His research has garnered support from places such as the NSF, the U.S. Bureau of Mines, and the Illinois EPA. He is credited with pioneering the research approach to investigate human-disturbance history using pollen and diatom records from lake sediments.



Dr. Keqin Gu is the 2012 Distinguished Research Professor of Mechanical Engineering. Gu's research focuses on control systems, and he has earned an international reputation as one of the top experts in the stability of time delay systems. His most well-known scholarly credits include a method referred to as "Gu's Discretization" and a widely-cited monograph published shortly after his promotion to Professor in 2002. He holds key editorial positions in two prestigious journals on control systems. Gu currently serves as the Chair of the Department of Mechanical Engineering.

2012 Paul Simon Outstanding Teacher-Scholar Award

The SIUE Paul Simon Outstanding Teacher-Scholar Award is presented to a faculty member in order to recognize the role of interdependence between research and teaching. This highly competitive award confirms SIUE's belief that an individual must be a good scholar to be a good teacher. Winners of the Paul Simon award have demonstrated a significant contribution to their area of research or creative activity as well as a true commitment to the integration of that research with their teaching practices.

Winner: Dr. George L. Engel, Electrical and Computer Engineering, School of Engineering

Dr. Engel is a Professor of Electrical and Computer Engineering with special focus on integrated circuit design and electronic systems design. Since joining SIUE in 1993, he has impressed his colleagues with his passion for research and teaching. His steady stream of external funding from private and public sources has provided him with the ability to incorporate students in his projects. In the past, he has involved students on externally-funded projects such as *Magneprint*, the patented technology to counter credit card fraud, and *AUDIOscreener*, a portable instrument that allows audiologists to screen infants for hearing impairment.

2012-13 Seed Grants for Transitional Projects (STEP) Awardees

Edward Ackad, Physics, "Nanolithography Using Xray-Seeded Plasmas"

Catherin Daus, Psychology, "Examining the emotional labor and emotional intelligence of jobs using the Occupational Network, O*NET"

Denise Degarmo, Political Science, "Achieving External Security for an Independent Palestinian State"

Jessica DeSpain and Kristine Hildebrandt, English, "Establishing an Official Center of Interdisciplinary Research and Informatics Scholarship at SIUE"

Robert Dixon and Myron Jones, Chemistry, "Synthesis and Characterization of Novel Dinitrosyl Iron Complexes"

Xudong Fu, Economics & Finance, "The Effects on Initial Public Offerings (IPOs) Options on IPO Pricing Process"

Jie Gong and Marcelo Azambuja, Construction, "Intelligent Production Process Visualization and Analysis for Improving Lean Construction Implementation"

J. Calvin Jarrell, Theater & Dance, "Friendship and Cultural Exchange (FACE) Project with Cuba"

David Jennings, Biological Sciences, Developmental and Tissue Specific Regulation of Thyroid Hormone Actions"

Eileen Joy, English Language & Literature, "Inhuman Actors: Tracing the Lives of Objects in Medieval Literature"

Vincent Kieftenbeld, "Mathematics and Statistics Developing Measurement Methodology for Surveys with Self-Censoring Respondents"

P. Gussie Klorer, Art and Design, "Art-Based Research: Exploring Community Stories Through Art"

Hoo Sang Ko,"Industrial and Manufacturing Engineering A Preliminary Study of Medical Waste Management Based on Integrated RFID and Wireless Sensor Networks"

Soondo Kweon, "Mechanical Engineering Investigation on the Effect of Anisotropy on the Ductile Fracture Process of Metals"

2012-2013 Research Grants for Graduate Student Awardees

The Competitive Graduate Award (CGA) program supports highly qualified new graduate students, including students from underrepresented groups, who are accepted into advanced degree programs at SIUE.

Lara Alpan, Biological Sciences
Sara Amirahmadi, Biological Sciences
Katherine Bennett, Chemistry
Mahdi Boygloo, Mechanical Engineering
Rebecca Bright, Biological Sciences
Elizabeth Buseakrus, English
Jeffry Cox, History
Elizabeth Desamero, Biological Sciences
Gary Dotson, Mass Communications
Diana Dykyj, Art Therapy
Jordan Finch, Biological Sciences
Sarah Gillespie, Art & Design
Nicole Griffis, Biological Sciences
Susana Henking, Environmental Sciences
Leighann Jones, Biological Sciences
Kanchan Karki, Geography
Paul Le, Biological Sciences
Kristin Lemenager, Biological Sciences
Hollie Lybarger, Biological Sciences
Dexter McElhiney, Biological Sciences
Jamay Michael, Biological Science
Lauren Mikkelson, Biological Science
Afzaal Mohammed, Environmental Sciences
Lisa Mosby, Biological Sciences
Diana Nastasia, Educational Leadership
Akosua Ofori-Tettey, Civil Engineering
Kelsey Reger, Biological Sciences
Bree Richey, Chemistry
Amy Rosenblum, Psychology
Sophia Sarpong, Chemistry
Kathleen Schroeder, Psychology
Swechhya Singh, Environmental Sciences
Rachel Starner, Chemistry
Kurt Stoecker, English
Renee Tate, Art & Design
Jaclyn Taylor, Biological Sciences
Irene Weber, Biological Sciences
Ashley Wells, Biological Sciences

2012-2013 Competitive Graduate Awardees

Research Grants for Graduate Students (RGGS) awards small grants on a competitive basis to support research initiated and conducted by classified graduate students to enhance their academic progress.

Marci Bedwell, Curriculum & Instruction
Carolyn Gillen, Art Studio
Jamie Henderson, Speech-Language Pathology
Sarah Hutchinson, Accounting
Pamela Kodjoe, Public Administration
Zhanna Korneva, Economics and Finance
Austin Korns, Public Administration
Kimberly Martin, Nursing
Alex McBride, Geographical Studies
Olumide Ogunwumi, Environmental Sciences
Burak Onal, Industrial Engineering
Kumari Poudel, Electrical Engineering
Taylor Pulliam, Speech-Language Pathology
Krishna Regmi, Electrical Engineering
Emily Robson, Nursing
Ahmar Ursani, Social Work
Kelsie Ward, Art Studio
Camilla Warning, Social Work
Chelsey Widdop, Accounting
Lingling Yang, Civil Engineering

Eric Lichtenberger and Brenda Klostermann, Illinois Educational Research Council, "Reverse Transfer Students: Reasons for Transferring - in Their Own words"

Sarah Luesse, Chemistry, "Development of a Tandem Ugi-Smiles-Cyclization Reaction for the Assembly of Heterocyclic Compounds"

Elizabeth McKenney, Psychology, "Defining Success for Students with ASD: What Teachers Think and What Students Do"

Jennifer Miller, Historical Studies, "Cold War Borders and Suspicious Persons: Turkish "Guest Workers" Between East and West Berlin through the Eyes of the Stasi"

Suman Mishra, Mass Communications, "Exploring the Mediating Role of Culture in News Framing of Obesity in the U.S. and Japan"

Amelia Perez, Primary Healthcare and Systems, "Health Literacy, Acculturation, and Health Behaviors among Hispanic College Students"

Anushiya Ramaswamy, English Language & Literature, "Translating the Short Story, 'Translator' by Shobasakthi"

Catherine Seltzer, English Language & Literature, "Understanding Pat Conroy"

Katrin Sjursen, Historical Studies, "More than Peaceweavers: Noblewomen as Military Leaders during the Hundred Years War"

Bryan Smith, Kinesiology & Health Education, "Comparison of Weight Management Programs: The Traditional Clinic vs. an At-Home, Minimal Contact Program"

Fengxia Wang, Mechanical Engineering, "Freight Train Instability Induced by Fluid-Tank Interaction

Joshua Wooten, Kinesiology & Health Education, "The Regulatory Role of Oxysterols in Adipocyte Inflammation and Insulin Resistance"

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SOUTHERN ILLINOIS UNIVERSITY
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GRADUATE SCHOOL

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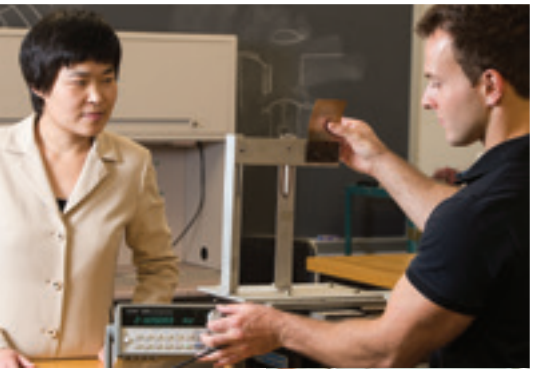
GRADUATE STUDIES AT SIUe



SIUE is committed to educating a distinguished and diverse cohort of master's and doctoral students. A graduate degree from SIUE offers opportunities for career advancement and opens doors in a variety of career areas. The graduate programs at SIUE are academically rigorous, and the intellectual learning environment emphasizes research and practice. You will be challenged and inspired to hone your skills and develop new ones.

- SIUE offers 47 highly regarded master's programs plus specialist degrees, post-baccalaureate certificates, four doctoral degrees and two cooperative doctoral programs.
- *Washington Monthly* and *U.S.News & World Report* consistently rank SIUE among the top master's granting colleges and universities in the nation.
- Graduate programs emphasize real world experience through original research opportunities, student-faculty research collaborations and partnerships with communities, governments, industries and other universities.

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