

Research & Creative Activities

Fall 2019



SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE
GRADUATE SCHOOL

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Giving Opportunities

Scholarship and Research Endowment

The SIUE Graduate School provides educational opportunities to nearly 2,500 students annually. Gifts to support student scholarship and research allow students of exceptional acumen with limited means the opportunity to make a difference in life.

Rosemarie Archangel, Ellen Sappington, and Stephen L. and Julia Y. Hansen Innovation and Excellence in Graduate Education Endowment

Faculty scholarship and teaching determine the quality of the education students receive. Gifts to support this endowment will build on SIUE's culture of scholarship and research by supporting innovative activities and progressive changes in existing and new graduate programs, as well as graduate faculty development related to the strengthening of graduate studies.

Give today: siue.edu/graduate/giving.shtml

SIUE Carnegie Ranking Moves Up to Doctoral/Professional

The Carnegie Commission on Higher Education has upgraded SIUE to the newly created doctoral/professional universities category. SIUE was previously considered a master's-large institution. Among the 161 institutions in the new category, SIUE is among the top three in research expenditures, according to the National Science Foundation (NSF) Higher Education and Research Development (HERD) survey. At \$17.4 million, SIUE is only surpassed by two institutions, each with schools of medicine—Augusta University and Creighton University. SIUE is one of only 31 public institutions in the category.

On the cover: Students Impact Community Health Through Breastfeeding Initiative, page 10

Dean's Message



SIUE Research and Creative Activities Are Strategic

As SIUE faculty and staff are engaged in creating a new strategic plan, it is critical to recognize the vital role our research and creative activities play in meeting all of the goals of the strategic plan. The manner in which we measure scholarly productivity tends to give the appearance that scholarship is a stand-alone activity that benefits only the scholar. However, our scholarly activity is intertwined and integral to all of the activities of our vibrant higher education institution. Bringing our scholarship into the classroom keeps our courses relevant and pushes students to consider the future of their professions; it invites students into the creative process of their areas of study, helping them to develop critical thinking skills. Engaging students in our scholarly activities enhances their learning, improves retention and encourages lifelong learning. Faculty collaboration on and dissemination of scholarly activities, nationally and internationally, raises the recognition and reputation of SIUE, which supports recruitment of high-achieving students and new faculty. Bringing scholarship to our community and public service activities helps us meet our civic duty to use our expertise to support and strengthen our surrounding communities. We apply our scholarship even to the stewardship of our campus grounds, from

improving the welfare of our wildlife to sustaining our environment. As our scholarship is infused in all of the institution's activities, research and creative activities are a part of meeting each of our strategic plan's goals.

GOAL 1: Recruiting Students

Research and creative activities contribute to recruitment by raising the name recognition and reputation of SIUE through publicizing our

- discoveries, inventions, performances and exhibitions
- student's engagement in our scholarly activities
- successes of competitive grant awards from prestigious sponsors

GOAL 2: Students' Academic Experience

Research and creative activities enhance student's academic experience by

- bringing current research into the classroom that lets students see the future of their profession and the creative process of exploring new ideas
- engaging students in scholarly activities, which enhances their learning and expands their future opportunities
- bringing best practices and cutting-edge theories of learning into our classrooms and co-curricular experiences

GOAL 3: Students' Co-Curricular Experience

Research and creative activities enhance student learning by

- engaging in scholarly activities that energize their interest and help them develop critical-thinking skills
- inviting students into an environment that offers opportunities to apply their creativity and knowledge to invent, discover and go beyond the classroom

GOAL 4: Recruiting and Retaining Faculty and Staff

Research and creative activities contribute to the recruitment and retention of high-achieving faculty through

- disseminating our scholarly results in increased name recognition and reputation of SIUE
- creating an environment for them to be successful in their scholarship as a result of resources provided, infrastructure support and collaborative opportunities

GOAL 5: Community Impact/Partnerships

Research and creative activities make a positive impact through

- collaborating with researchers and scholars from throughout the region, state, nation and world
- applying our scholarship and bringing our activities into our community and public service programs

GOAL 6: Stewardship

Research and creative activities contribute to the financial stability of the university through awarded grants and contracts

- providing funds to support our scholarly activities and the infrastructure to conduct externally sponsored programs
- providing funds to support innovation in teaching
- providing funds to support graduate and undergraduate students
- contributing to the recruitment of high achieving students, faculty and staff

I invite you to see all of these impacts in this issue of Research and Creative Activities.

A handwritten signature in black ink that reads "Jerry B. Weinberg". The signature is written in a cursive, flowing style.

Jerry B. Weinberg, PhD
Associate Provost for Research and Dean of the Graduate School

Research Spotlights and News



Most Influential Computer Science Paper

Dennis Bouvier, PhD, associate professor in the School of Engineering's Department of Computer Science, is co-author of a computer science paper deemed #4 most influential in recent history by the Association for Computing Machinery (ACM) Special Interest Group on Computer Science Education (SIGCSE). Bouvier's paper, "A Multi-Institutional Study of Peer Instruction in Introductory Computing," is the result of a multi-institutional study of the practice of teaching computer science. It focuses on peer instruction, a student-centered pedagogy that emphasizes active participation in the classroom. In celebration of the ACM's 50th annual SIGCSE Technical Symposium, the leading computer science education group highlighted research that has shaped the field. The top 10 papers were chosen from among the approximately 2,000 best papers presented at the Symposium during the last 49 years.



iCARE Program is 2019 Arcus Award Finalist

SIUE's iCARE program was a finalist in the St. Louis Regional Chamber's sixth annual Arcus Awards Ameren Corporate Citizenship Award category. The award is for enhancing the quality of life and making positive changes that impact St. Louisans across the social, cultural and economic spectrum. With a focus on mental health wellness and suicide prevention, iCARE is a multi-tiered collaboration among the SIUE Schools of Pharmacy and Nursing and Counseling Services through a grant from the Substance Abuse and Mental Health Services Administration. "Being an Arcus Award finalist is incredibly exciting and gives us a powerful platform to continue to raise awareness surrounding suicide prevention," said Kelly Gable, PharmD, associate professor of pharmacy practice in the School of Pharmacy.



Advanced Nursing Education Workforce Program

The School of Nursing received a competitive four-year \$2.75 million grant from the Health Resources and Services Administration (HRSA) for its innovative Advanced Nursing Education Workforce (ANEW) program. Under the leadership of project director Valerie Griffin, DNP, PPCNP-BC, FNP-BC, PMHS, FAANP, SIUE assistant clinical professor and FNP program director, the ANEW program will provide financial support to student participants, as well as focused clinical educational experiences through deliberate placement in rural and/or underserved settings in the targeted region for a significant portion of their clinical practicum requirements. Bolstering the success of the program will be academic clinical partnerships between the School of Nursing and Chestnut Health Systems, OSF HealthCare, Southern Illinois Healthcare and the SIUE We Care Clinic.

Spokane Prize for Short Fiction

Valerie Vogrin, professor in the College of Arts and Sciences' Department of English Language and Literature, received the Spokane Prize for Short Fiction, judged by Karen Karbo. Her winning short story collection, *Things We'll Need for the Coming Difficulties*, was published by Willow Springs Press. Karbo described Vogrin's manuscript as "original, wickedly funny, satirical at times and heart-bruising." Vogrin teaches undergraduate and graduate courses in creative writing, literary editing and literature. Her first novel, *Shebang*, was published by the University Press of Mississippi. Her short stories have appeared in print journals such as *Ploughshares*, *AGNI* and *The Los Angeles Review*, online at *Hobart and Bluestem*, and in *The Best Small Fictions 2015*.



SIUE STEM Center Announces Faculty Fellows

The SIUE Center for Science, Technology, Engineering and Mathematics (STEM) Research, Education and Outreach announced its FY20 Faculty Research Fellows. The competitive fellowship is granted to outstanding faculty with proposals aimed at innovating ways to engage students in STEM and improve undergraduate STEM learning.

- Nima Lotfi, PhD, is an assistant professor in the School of Engineering's Department of Mechanical and Mechatronics Engineering. As a research fellow, he will study the implications of using open-source hardware and software platforms for control systems education. He will investigate the integration of open-source hardware and software platforms in various courses, aiming at familiarizing students with the implementation of real-time and advanced control algorithms. Additionally, Lotfi is promoting the value of control systems training for industry professionals and the public, as well as the cost-effectiveness of open-source platforms.
- Kathleen Vongsathorn, PhD, is an assistant professor in the College of Arts and Sciences' Department of Historical Studies. Her research centers on integrating STEM and history in undergraduate curriculum. Vongsathorn adds an extra 'm' for medicine in her use of the STEM acronym. With scholarly expertise and training in the history of science, medicine and technology, she is interested in the intersection between history and STEMM. She describes this interdisciplinary exploration as an intriguing puzzle that she is determined to solve by connecting the pieces.



Educational Outreach Recognized for Excellence in Programming

The SIUE Office of Educational Outreach received the 2018 Learning Resources Network (LERN) International Award for Excellence in Programming for its Federal Aviation Administration (FAA) Remote Pilot Certification course. Taught by Adriana E. Martinez, PhD, assistant professor in the Department of Geography, the course prepares individuals for the FAA Remote Pilot Certificate exam. Passing the exam certifies a person to fly unmanned aerial vehicles, or drones, which are increasingly used in research. The course covers exam materials, including airspace classifications, general rules and procedures, reading aviation maps, and other aeronautical knowledge. SIUE was one of only four organizations to win for best programming.



Innovations in Teaching

Improving Teaching with Telepresence Robotics

Telepresence is nothing new in today's advanced technological environment, but there's room for scholarly exploration and development when it comes to the effective use of telepresence robots in classrooms.

The School of Engineering's Mingshao Zhang, PhD, assistant professor in the Department of Mechanical and Industrial Engineering, received \$56,304 from the Wailian Education Group, now WeEducation Group, Inc., in 2017 to pursue the possibilities of this innovative technology in education.

As a result, Zhang and a team of student researchers developed a telepresence robot for use in learning situations where the combination of a video screen on a moving robot that is programmed with social behaviors could enhance student learning outcomes and also improve the credibility of the instructor.

"This telepresence robot will be used in educational settings to allow instructors to teach remotely, with a robot assisting with the social interaction necessary to effectively lead a classroom," Zhang explained.

"Instructors could use this technology to reach students in underdeveloped areas, for example, with just an iOS or Android application. The technology can bring powerful, effective teaching to areas that may be otherwise inaccessible."

Now, with an additional \$26,146 from WeEducation Group, Inc. for phase two, Zhang and his students are adding advanced capabilities to their prototype, ensuring their telepresence robot outcompetes others on the market.

In phase two, new functions are being added to the robot to minimize

the effort of instructors by creating a fluid, natural interaction process with students. The advancements include speech recognition, classroom mapping and the ability to interact with existing classroom technology such as a projector.

While the end goal is simplicity for users in a classroom setting, the technological design and development involved in its creation are complex. Two computer science graduate students and one electrical engineering graduate student are contributing to the research project and enhancing their academic knowledge and applied skills.

"It's exceptional to be a part of this research project," said mechanical engineering graduate student Pengji Duan, who aspires to work in automated manufacturing. "I have worked primarily on the structural elements, the shell manufacturing and the beta prototype's various pieces. We built the acrylic stands and assembled the machine's parts."



According to Duan, added sensors will allow the robot to detect exactly where a noise is coming from and move efficiently to a particular student, so the instructor can directly interact.

"It's one thing to design a product, but another to do so in a manufacture-oriented way as we've done. This will be a commercial product," he said.

Zhang emphasizes that this platform would be effective in special cases and is not intended to take over classroom education as we know it.



Reshaping the Future of Mechatronics and Robotics Engineering Education

The National Science Foundation (NSF) has awarded \$49,957 to support Nima Lotfi's work to advance mechatronics and robotics education by pioneering a more cohesive curricular approach.

Lotfi, PhD, is an assistant professor in the School of Engineering's Department of Mechanical and Mechatronics Engineering. As a teacher-scholar in the mechatronics and robotics engineering (MRE) undergraduate program, he has witnessed the discipline's dynamic growth and identified the need for collaborative development of educational materials.

He is the principal investigator (PI) of the NSF-funded endeavor, "Workshops for the Future of Mechatronic and Robotic Education." Co-PIs include Vikram Kapila, PhD, New York University; Mike Gennert, PhD, Worcester Polytechnic Institute; and James Mynderse, PhD, Lawrence Technological University.

"MRE professionals are shaping the world by designing smart and autonomous systems, and processes that will improve human life and welfare," Lotfi said. "MRE requires an interdisciplinary knowledge of mechanical, electrical, computer, software and systems engineering to oversee the entire design and development process. Our work in MRE education is critical to prepare our students for careers at the frontiers of the human-technology interface."

The project's main goal is to offer workshops aimed at bringing together MRE educators, students and professionals to share experiences and initiate efforts toward defining the field.

"The NSF support enables us to hold several workshops at various technical conferences," Lotfi said. "Through these workshops, we plan to build a community of mechatronics and robotics professionals from around the world to standardize and strategize the future of this field."

"By recruiting the next generation of MRE educators and professionals, we aim to inspire succeeding generations of students to enter engineering and acquire the skills necessary to lead the nation in this emerging field."

Workshops have been held in conjunction with the following technical conferences and were attended by academic and industrial professionals from around the world:

- 2018 Dynamic Systems and Control Conference, Atlanta, Ga.
- 2019 Robotics Summit and Expo, Boston, Mass.
- 2019 ASEE Annual Conference and Exposition, Tampa, Fla.
- Lawrence Technological University, Southfield, Mich.

"This new interdisciplinary program is one of the emerging fields in engineering, and we are happy to be one of the first in our geographic region to offer it," said Cem Karacal, PhD, School of Engineering dean.

Project collaborators are also placing emphasis on outreach initiatives that will ensure inclusivity and diversity among workshop participants. Their future work will expand the MRE educational community to incorporate educators in K-12 institutions, potentially reshaping and reinvigorating K-12 STEM education.



“Through interprofessional, collaborative health coach training and teamwork, we are addressing chronic illness prevention and control.” Jerrica Ampadu

Innovations in Teaching

Developing Nursing Leaders for Primary Care

Nurses traditionally receive the bulk of undergraduate clinical training in acute care settings where they provide short-term patient treatment for injuries, illnesses or urgent medical conditions. Given the growing cost of healthcare, along with clinician shortages, the World Health Organization is stressing the need for the healthcare workforce to be trained to address chronic health conditions, and the Institute of Medicine is emphasizing the need for nurses to work at the fullest scope of their licenses. Nurses who work at the top of their training provide an increase in both efficiency and cost effectiveness.

To address this shift toward preventive health and primary care nursing, the SIUE School of Nursing has received a four-year, \$2.6 million grant from the Health Resources and Services Administration (HRSA).

“The funding for this project enables the School of Nursing to expand the curriculum to incorporate primary care,” said Jerrica Amadu, PhD, assistant professor of primary care and health systems nursing, WE CARE Clinic chronic care provider, and project director for the HRSA grant. “By exposing students to the role of nurses in primary care, we hope to increase the number of nurses entering primary care after graduation.”

The WE CARE Clinic in the SIUE East St. Louis Center previously focused on acute care provided by an interdisciplinary team of professional and student nurses,

social workers, pharmacists, and dentists. Through the grant, delivery of care will be transformed by incorporating a chronic-care model that focuses on the management of chronic diseases such as diabetes, asthma, heart failure and depression, all of which are prevalent among the population served by the clinic.

Clinic staff received chronic care training through the School of Nursing and are now certified chronic care providers. The chronic care model integrates community resources and health care systems into patient care, ensuring comprehensive and disease-specific care to patients. The approach is patient-centered, using undergraduate nursing students as health coaches and licensed registered nurses (RNs) in primary care as “head” health coaches.

The clinic will build upon the interdisciplinary approach, continuing to involve professional and student pharmacists, dentists, and social workers, and also now including public health students.

“By exposing licensed RNs and undergraduate nursing students to a primary care clinical experience, more RNs will be open and prepared to work in a primary care setting,” Ampadu said.

The redesign and expansion of chronic illness care will result in improved access to primary health care, improved health outcomes, and decreased health care costs.



Examining Faculty Attitudes and Strategies that Support Successful Flipped Teaching

Under the flipped classroom approach, lecture content is introduced outside the classroom, allowing more time during class to process the information and practice the content through a variety of active learning strategies, including teamwork and instant feedback.



Despite growing evidence that active learning in flipped classrooms can increase student learning and motivation, some faculty members have voiced resistance, in part due to lack of awareness of how to flip a course and concerns about having sufficient time to prepare effective course materials.

The National Science Foundation (NSF) has awarded \$598,402 in funding to SIUE to support a rigorous, three-year endeavor that will help address these and other barriers to change by supporting cohorts of faculty at SIUE and nearby St. Louis Community College to develop and implement new flipped courses across multiple STEM departments.

Under the direction of principal investigator (PI) Chaya Gopalan, PhD, associate professor in the Schools of Nursing and Education, Health and Human Behavior, the project is examining faculty perceptions, attitudes and intentions about flipping their classrooms by answering three overarching research questions:

- How do faculty perceive and implement flipped teaching?
- How does faculty implementation of flipped teaching at a four-year master's university compare with faculty implementation at a two-year community college?
- What are the essential design principles for implementing a successful flipped classroom at each type of institution?

Gopalan's co-PIs include SIUE STEM Center Director Sharon Locke, PhD; STEM Center Research Assistant Professor Georgia Bracey, PhD; SIUE Faculty Development Director and Professor of Psychology Lynn Bartels, PhD; and St. Louis Community College-Forest Park Acting Provost Julie Fickas, PhD.

The first cohort, comprised of six faculty from the community college and six from SIUE, received professional development in flipped teaching during the fall 2018 semester. The following semester, they taught their chosen STEM course(s) using engaging, inquiry-based learning. The researchers gathered student feedback through surveys while faculty were engaged in the implementation.

In phase two, cohort one will help recruit and mentor a new group of 12 faculty participants. After participating in advanced faculty development, faculty in cohort one will refine their flipped teaching models and teach their chosen STEM courses again.

Successful implementation of flipped teaching by 24 faculty members over the three years of the project is expected to improve retention and success in STEM, including retention of students who are from historically underrepresented groups.

According to Gopalan, significant products from the NSF-funded research project will include a flipped teaching implementation framework, a set of design principles for flipped STEM courses, and new flipped teaching curriculum materials that will be made widely available through free, online STEM education repositories, such as AMSER: Applied Math and Science Education Repository.

"Since this NSF grant is limited to STEM faculty only, my goal is to find other mechanisms to spread flipped teaching methodology to non-STEM faculty at SIUE in the near future," Gopalan said.

SIU System Develops Innovation Interchange

In collaboration with the University of Missouri System, the Southern Illinois University (SIU) System is playing a major role in an innovative economic development effort aimed at helping Missouri and central and southern Illinois businesses and entrepreneurs better access university expertise.

The effort is funded with a matching grant from the U.S. Economic Development Administration, resulting in approximately \$1.4 million being applied to the effort. The grant is funding the creation and facilitation of a web portal that connects industry partners to university faculty.

According to Robert Patino, director of the SIU Office of Technology Transfer, the new model will create more of a “pull” than a “push” for intellectual property.

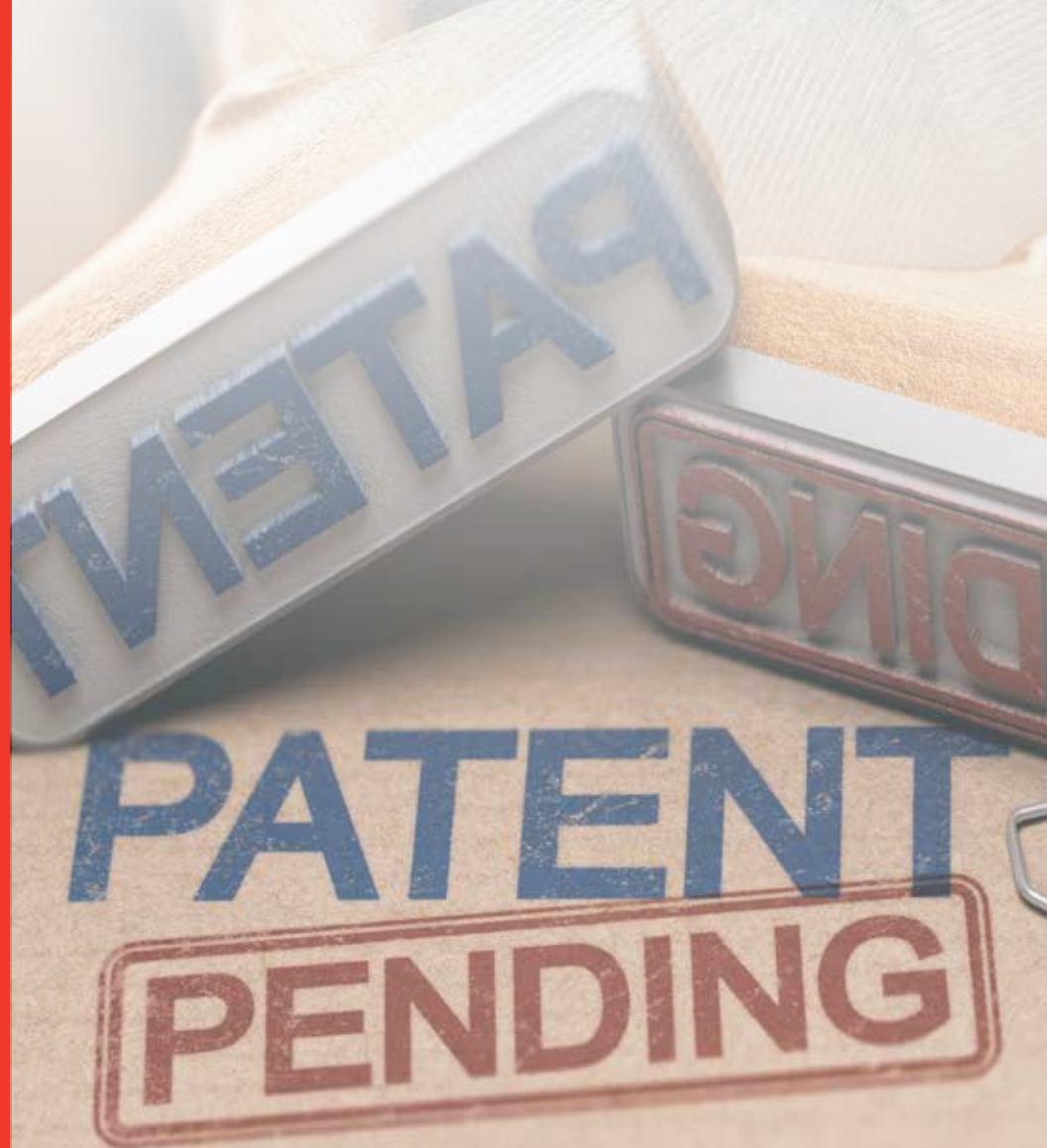
“Industry partners will be able to post their research needs or challenges, and faculty can easily respond to them,” said Patino, who helped organize the effort to win the federal grant. “Students working for faculty will have access to industry mentorship, increasing the likelihood that they will get jobs in their fields of research.”

Technology Transfer: Concept to Commercialization

Universities are the leading catalyst for advancing entrepreneurial success and economic impact, and SIUE plays a vital role in driving economic growth in our region.

“Faculty members at SIUE consistently demonstrate their internal drive and dedication to contributing to their respective knowledge base through innovative scholarship,” said Jerry Weinberg, PhD, associate provost for research and dean of the SIUE Graduate School. “SIUE ranks third among Carnegie doctoral/professional universities for research expenditures, according to the National Science Foundation.”

The Southern Illinois University (SIU) System’s central Office of Technology Transfer works with SIUE faculty to explore the market potential of an invention, protect and commercialize intellectual property, and negotiate licensing agreements with industry partners. Three technologies are highlighted here.



SIUE Issued/Pending Patents

Novel Low-Cost Potentiostat



Patent Issued:
U.S. Patent No. 8,845,870
Inventors

- Brad Noble, PhD, Associate Professor, Department of Electrical and Computer Engineering, SIUE School of Engineering
- Mike Shaw, PhD, Distinguished Research Professor, Department of Chemistry, SIUE College of Arts and Sciences



Potentiostats are common tools used in electrochemical analysis. Currently, potentiostats and their accompanying software cost anywhere from \$5,000 to over \$20,000. As a result, these instruments are not easily accessible for wide-spread use

in academic settings or other research studies, such as in the fields for some small energy-focused businesses. Although there are a number of low-cost potentiostats, such potentiostats can only deliver a low-performance capability. As such, there is a need for an easily manufactured potentiostat circuit that is inexpensive while still providing high precision and accuracy.

The present invention involves an inexpensive potentiostat circuit that can perform electrochemical analysis at a very high performance level using minimal power, allowing for more mobility with a high degree of accuracy.

Oral Composition for the Prevention of Dental Caries



Patent Pending:
U.S. Patent App. 62/722,328
Inventors

- Kevin Rowland, PhD, Former Associate Professor and Pharmacology Section Head, Department of Applied Dental Medicine, SIU School of Dental Medicine
- Brian Hearing, DMD

Caries (or dental cavities) is one of the most prevalent chronic diseases in the world. In fact, 42 percent of children ages 2-11 have had dental caries in their primary teeth, 59 percent of children ages 12-19 have had dental caries in their permanent teeth, and 92 percent of adults age 20 years and older have had dental caries in their permanent teeth. The goal of the oral composition is to significantly reduce the incidence and progression of dental caries.

The proprietary formula will reduce or eliminate the presence of Streptococcus mutans that is responsible for tooth erosion. The unique formula includes natural ingredients that are already consumed by humans, thereby reducing toxicity concerns. The data generated by university laboratory experiments demonstrate that the formula has surprisingly good results when compared to the active ingredients alone.

Novel Syringe System for Isolation of Lipoaspirate



Patent Pending: U.S. Patent App. 15/645,657
Inventors

- Sohyung Cho, PhD, Associate Professor, Department of Industrial Engineering, SIUE School of Engineering
- Ashim Gupta, PhD, Director, Laboratory for Regenerative Medicine and Research Assistant Professor, Institute for Plastic Surgery, SIU School of Medicine
- Michael Neumeister, MD, FRCS(C), FACS, Professor and Chair, Department of Surgery and Elvin G. Zook Endowed Chair, Institute for Plastic Surgery, SIU School of Medicine

The syringe system invention for fluid separation during surgery has a unique feature to separate fat from oil and blood more conveniently and quickly. The system is simpler and more efficient than current methods and therefore will reduce procedure time necessary for such processes as fat grafting, a widely-used breast reconstruction technique.

The novel syringe consists of a new plunger that has holes through which oil moves and a hollow rod that is connected with the plunger through pitches. Once oil is collected in the hollow rod through holes in the plunger, the holes are closed by rotating the rod along the prepared pitch that separates oil from the fat. After this separation of oil from the fat, the rod is further pushed down to discard blood from the fat through the bottom hole of the syringe, leaving the middle fat layer in the syringe ready for injection.



Students Impact Community Health Through Breastfeeding Initiative

Despite the numerous benefits of breastfeeding, many women still face challenges, and one of them is feeling comfortable feeding their child in public. Too often, breastfeeding mothers are unable to find a welcoming public space in which to breastfeed. The lack of public accommodations can lead nursing mothers to wean their children early.

The U.S. Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants and Children encourages women to breastfeed for as long as possible. Breastfeeding is a free and convenient feeding option that provides numerous health benefits and needed nutrients for the baby, along with increased mother-baby bonding.

Undergraduate students in the School of Nursing's regional program in Carbondale observed a lack of availability of places for mothers to breastfeed last year during a community health/obstetrics clinical rotation. Through a grant from the Illinois Healthcare Action Coalition, they partnered with the Jackson County Health Department (JCHD) to increase the number of breastfeeding areas in the region.

"Students were surprised by how few businesses provided breastfeeding areas," said Melodie Rowbotham, PhD, associate professor, family health and community health nursing, and director of the SIUE Regional Nursing Program in Carbondale. "In response, they chose a project that would raise awareness and give businesses the tools to become breastfeeding friendly."

The project assisted businesses with understanding breastfeeding laws and converting to a breastfeeding-friendly customer approach to encourage mothers to breastfeed infants beyond six-months of age. Additionally, the project increased awareness of businesses with breastfeeding-friendly environments.

By partnering with the JCHD, students were able to impact the community by increasing awareness of the importance of supporting women and infants throughout the breastfeeding period.

"This project benefits the community in multiple ways," said Casey Ernfelt, a senior from Marion, Ill., "It helps businesses broaden their client base and helps mothers by providing them with a private place to breastfeed in public."

As a result of the project, mothers now receive a list of breastfeeding-friendly businesses in their hospital discharge instructions.

"This project makes it easier for mothers to be able to go out in public and do normal things without the fear of being unable to feed their child," said Olivia Diaz, a senior from Brookfield, Ill. "New mothers especially can be intimidated by judgement of breastfeeding in public, which can hinder their self-confidence and their ability to accomplish daily tasks."

"Most business owners are receptive to the idea," said Karen Brown, director of nursing at the JCHD. "Implementing lactation rooms and helping women identify these welcoming breastfeeding environments will have lasting, positive impacts on the health of the children in our county."

"It was rewarding to see that even as nursing students we can always work to better situations for community members," Diaz said.

Promoting Wellness Through Meditation and Mindfulness

From offering a free workshop to providing a dedicated room on the third-floor of Lovejoy Library, Library and Information Services (LIS) is actively addressing the mental health needs of SIUE students. These efforts are funded by a grant from the Trust for the Meditation Process, a charitable foundation that promotes health and wholeness and brings silence and stillness to a hectic world.

LIS faculty Marlee Graser, metadata librarian and assistant professor, and Juliet Gray, interim assistant dean, interim director of research commons and health sciences librarian, applied for the grant after recognizing two separate groups of library users—international students and students dealing with anxiety and stress—who would benefit from a space for meditation, mindfulness and contemplative prayer.

International Students

A small team of library faculty developed a mixed-methods research study to investigate the needs of SIUE's international students on campus, their unique experiences and challenges, and how the library might develop new initiatives to enrich the academic lives of this student population.

"One of the themes uncovered in the data was that students of specific religions found it challenging to find a quiet, private space to pray during long study hours in the library, which made balancing their spiritual and academic lives difficult," Gray said.

Students Dealing with Anxiety and Stress

Recent research indicates troubling trends in the reported anxiety and stress levels of students in higher education. The World Health Organization reported in 2018 that more than one in three college students described symptoms consistent with at least one mental health disorder.

"While the stigma surrounding mental health is decreasing, the utilization rate of counseling resources at SIUE is

increasing," said Courtney Bodie, PhD, director of SIUE Counseling Services. "In fiscal year 2019, our top diagnoses were unspecified and generalized anxiety disorder, unspecified depressive disorder, and unspecified trauma-and-stressor-related disorder."

Initiatives

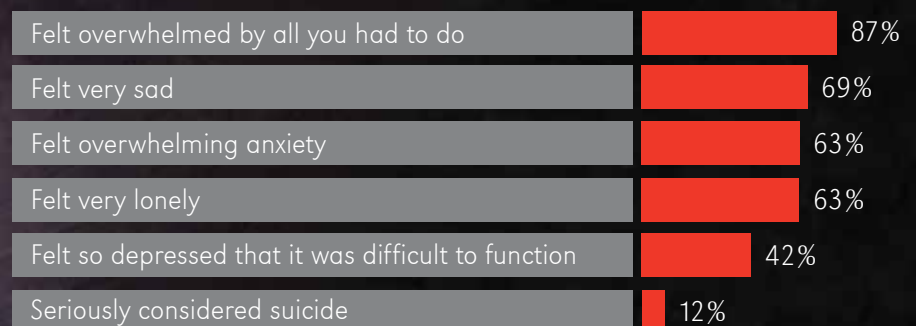
According to Gray, the goal of these initiatives is to continue building an infrastructure of support for the 'whole student' in LIS and at SIUE by making it easier to implement mindfulness or religious practice in our their busy academic lives.

"Over the next two semesters, we will be collaborating with campus partners and interested students, staff and faculty to offer the Meditation Room for both drop-in and scheduled meditation/mindfulness, contemplation, and inclusive prayer practice sessions," she said.

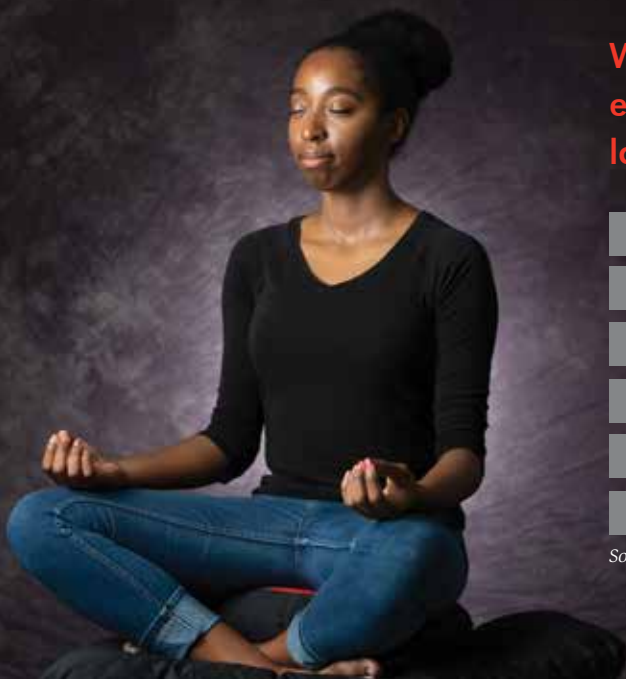
Efforts are also being made within the larger University community to support students' mental health and wellness. Examples include the following:

- Counseling Services has made a dedicated effort to respond to the needs of students by hiring more counseling staff and offering a mindfulness and meditation series for students outside of regular counseling sessions.
- Faculty across campus have developed courses aimed at teaching both the historical context of meditation, as well as embedding the practice into the activities of class. For example, "Mindfulness as the Center of Human Experience: Mind, Body and Society" was taught by Gray, along with faculty in the Departments of Sociology and Teaching and Learning.
- The Office for Accessible Campus Community and Equitable Student Support (ACCESS) is expanding in order to accommodate the growing number of students requiring accommodations.

When students are asked whether they had experienced any of the following feelings in the last 12 months, the results are staggering:



Source: American College Health Association-National College Health Assessment II



Understanding the Microscopic Mechanism of Chemical Reactions in Solution

A three-year \$320,000 grant from the National Science Foundation is advancing the research of organic chemist Yun Lu, PhD, associate professor in the College of Arts and Sciences' Department of Chemistry.

Lu is principal investigator of the project "Isotopically Different Tunneling Ready States in Hydride Transfer Reactions in Solution." The co-principal investigators are Kevin Tucker, PhD, assistant professor specializing in analytical chemistry, and professor emeritus James Eilers, PhD, who specializes in computational chemistry.

"We are the first to test some important concepts in the contemporary enzymatic hydrogen tunneling theories using solution reactions, and the work may change the views of chemists regarding how hydrogen moves between its donor and acceptor, and how enzymes 'help' the chemical process," Lu explained.

According to Jerry Weinberg, PhD, associate provost for research and dean of the SIUE Graduate School, this grant is a testament to the significant contribution of this research to the understanding and application of hydrogen transfer reactions in solution. "Drs. Lu, Tucker and Eilers are conducting unique, innovative research on chemical reactions at the molecular level that places them among the prominent researchers in their field," he said.

Lu's previous scholarship related to this work has been published in the *Journal of the American Chemical Society*, the world's preeminent journal in all of chemistry and interfacing areas of sciences.

"Those works have been well received by chemists and have laid a solid foundation for the proposed work in this NSF grant funded by the Chemical Structure, Dynamic and Mechanism B Program of the Chemistry Division," Lu explained. "The grant funded the purchase of a cutting-edge, stopped-flow fast kinetic measurement instrument, which is greatly enhancing our research productivity.

"Results could provide information for scientists to develop catalysts for the H-transfer chemistry, to explore inhibitors for the related enzymatic reactions for drug design and help scientists understand reasons underlying the mysteriously fast enzymatic reactions."

Lu is committed to providing his students opportunities to conduct research and utilize new techniques. During the three-year NSF funding period, three master's-level students and two undergraduates will be assigned to each sub-project each year.

"I want to see students successfully apply what they have learned in the classroom to practical research. This research opportunity will further students' understanding of organic synthesis, mechanistic analysis techniques, computational chemistry methods, quantum chemistry, the use of analytical instrumentation, as well as H-transfers in enzymes," he said. "With these experiences, students are prepared to enter doctoral programs, become educators or become problem-solvers for chemical companies."



Motor Vehicle Crashes Among Older Populations



Adults ages 65 and older form a vulnerable population that is susceptible to road traffic injuries. According to the U.S. Department of Transportation, more than 6,100 people 65 and older were killed and an estimated 240,000 were injured in traffic crashes in 2015. By 2030, 70 million Americans in the U.S. will be over age 65—and 85-90 percent of them will be licensed to drive.

Older adults are more vulnerable roadway users due to their aging, medical conditions, prescription medications and socio-economic circumstances. More than 75 percent of drivers age 65 and older report using one or more medications, but less than one-third acknowledged awareness of the potential impact of their medication on driving performance.

As our population ages, agencies are facing more challenges as they work to improve safety for older adults. The Illinois Department of Transportation (IDOT) has identified older drivers as an emphasis area in the Illinois Strategic Highway Safety Plan.

According to Yan Qi, PhD, associate professor in the Department of Civil Engineering, there is limited research on how different roadway and traffic conditions impact crash risks for older drivers. As a result, she is working to better understand the conditions in which motor vehicle crashes are more likely to happen.

With a \$75,000 two-year grant from IDOT, Qi is examining mortality risks of crashes among the elderly compared to other age groups and identifying specific areas where crashes among the elderly may be improved by mitigating vehicle crash risks among older people.

Qi, along with two civil engineering graduate students, started by collecting historical crash data, as well as related roadway, traffic, demographic and vehicle data. Preliminary analysis has been performed on the crash data and socio-economic data.

“Results indicate that roadway geometry, traffic controls, and environmental and health conditions are highly associated with older people’s crashes,” Yan said. “Further statistical analysis is being conducted to identify significant contributing factors and to what extent those factors affect motor vehicle crashes among the senior population.”

Yan plans to recommend strategies to improve safety while promoting mobility and independence among older people with the hope that agencies will combine efforts to reduce mortality risks of crashes among the elderly.

Douglass Crossroads: An NEH Summer Institute



The National Endowment for the Humanities (NEH) awarded SIUE \$106,002 to coordinate a summer institute for school teachers concentrating on an 1845 autobiography by Frederick Douglass, an ex-slave who went on to become a significant advocate for justice and civil rights.

Howard Rambsy II, PhD, professor in the College of Arts and Sciences' Department of English Language and Literature, served as the director of the Frederick Douglass and Literary Crossroads Institute, which was held in July 2019.

"Many secondary school teachers face challenges gaining access to conversations and discoveries based on new scholarship and focused discussions on major African American authors," Rambsy said.

Department of English Language and Literature faculty Tisha Brooks, PhD, associate professor, and Elizabeth Cali, PhD, assistant professor, were resident lecturers for the project and co-wrote the grant with Rambsy.

The three professors specialize in African American literary studies and regularly highlight Douglass in their courses. Each academic year, Rambsy, Brooks and Cali teach approximately 14 different African American literature courses—more than most English departments in the country. They also coordinate a large number of public programs every semester. The Institute is a result of their efforts to expose students, teachers and the public to literary art and cultural history involving African Americans.

"This Institute was an important opportunity to extend the reach of our African American literary studies program and expand SIUE's impact in the region and nationally," Brooks said.

This institute provided 25 teachers from across the country opportunities to enhance their knowledge and expertise in covering Frederick Douglass' *Narrative of the Life of Frederick Douglass* with students in their classes. In particular, learning and collaborative activities offered:

- Exposure to scholars with expertise on Douglass studies and African American literary studies
- Conversations about new scholarship on Douglass and useful approaches to understanding and teaching his narrative and other African American literary texts
- Chances to interact with a variety of secondary teachers who cover American and African American literature
- Information about an array of pedagogical print-based, mixed media texts and digital resources

"This was an all-too-rare opportunity for several scholars of African American literature to share research and teaching practices with high school teachers that will create and enhance opportunities to teach Douglass as a literary figure," Cali said. "I was able to share methods for teaching and learning about Douglass that will get high school students thinking about Douglass' use of creativity and literary innovation in his works."

Sessions were led by Rambsy, Brooks and Cali, along with:

- Jessica Despain, PhD, Associate Professor, SIUE Department of English Language and Literature
- Kristine Hildebrandt, PhD, Associate Professor, SIUE Department of English Language and Literature
- Joycelyn Moody, PhD, Sue E. Denman Distinguished Chair in American Literature, Department of English, University of Texas at San Antonio
- Barbara McCaskill, PhD, Professor, Department of English, University of Georgia
- Courtney Thorsson, PhD, Associate Professor, Department of English, University of Oregon
- Donovan L. Ramon, PhD, Assistant Professor, Liberal Studies, Kentucky State University



“Our institute provided participating teachers with enriching opportunities to learn and share new developments concerning Douglass and African American literary studies with a diverse group of scholars and teachers.”

Howard Rambsy

The University’s Interdisciplinary Research and Informatics Scholarship (IRIS) Center, co-founded by DeSpain and Hildebrandt, provided technical support for the Institute, including facilitating the introduction and training of a wide range of digital applications and tools to participating teachers.

“I acquired resources that will be helpful in a high school setting. With open discussions and opportunities to reflect, I have a greater understanding for how Frederick Douglass’ life can be applied to current societal issues,” said Gia Wright, high school English teacher from Charlotte, N.C. “I can’t think of many environments that cultivate relationships among educators with such positivity and enlightenment as I’ve experienced during this seminar.”

The Institute offered unique learning opportunities for participants, as well.

“I had the opportunity to explore the literature in the context of Frederick Douglass’ time period, its culture, other genres and his legacy for contemporary African American literature—an interdisciplinary exercise university faculty engage in regularly, but teachers have limited scope to undertake except in this context,” said Sarah Heilbronner, high school English and history teacher from Longmont, Colo. “Beyond watering my academic roots, it offered practical solutions, including in the digital humanities, which I have already put to work in my classroom.”

*“We certainly achieved our goal to enliven and strengthen pedagogical engagements with *The Narrative of the Life of Frederick Douglass*,” Rambsy said.*



Finding Solutions in the Midst of Tragedy

A catastrophic earthquake and its aftershocks devastated the South Asian country of Nepal in April and May 2015. The quake severely damaged large parts of the capital, Kathmandu, and caused devastation across the impoverished Himalayan nation. Nearly 9,000 were killed, more than 21,000 were injured and 3.5 million people were left homeless or displaced.

After the earthquake, two SIUE researchers—a faculty member with expertise in linguistics and a graduate student from Kathmandu—responded to the tragedy by initiating innovative research projects.

Narrating Disaster: Calibrating Causality and Responses to the 2015 Earthquakes in Nepal

Kristine Hildebrandt, professor of English Language and Literature, knew the media coverage wouldn't include the perspectives of Nepalese people who live in the remote villages that were also heavily impacted and speak un- or under-documented languages. Without immediate action to document survivors' experiences and voices, their nuanced and diverse stories would risk being amalgamated into more generalized narratives aimed for broad media consumption.

More than \$94,000 of National Science Foundation (NSF) funding for Rapid Response Research allowed Hildebrandt to travel to Nepal and gather the stories of Tibeto-Burman language-speaking peoples. Her co-investigators included Geoff Childs, PhD, of Washington University in St. Louis; Sienna Craig, PhD, of Dartmouth College; and Mark Donohue, PhD, of Living Tongues Institute.

Hildebrandt provided 16 researchers, who represented native residents of the affected areas, with the necessary equipment and trained them on best practices in documentation fieldwork. Two linguistics researchers and the field-based researchers then spent several months interviewing earthquake survivors and collecting hundreds of audio and video narratives representing 11 Tibeto-Burman minority languages.

The majority of the interview material was archived at the University of Virginia. Hildebrandt received funding from the NSF Research Experiences for Undergraduates (REU)

program to hire two undergraduate students to help build the infrastructure of a local archive to store the remaining materials. The archive is housed in SIUE's Interdisciplinary Research and Informatics Scholarship (IRIS) Center, which Hildebrandt co-founded.

One area of interest in the narratives was the cultural interpretations of causality and consequences of the earthquakes. Additional NSF REU funding enabled Hildebrandt to recruit Christina Juenger, a senior anthropology major, to identify causality and impact statements in the narratives, and code the passages within the database.

"The cultural perspective of the project has been very enlightening," Juenger said. "It has given me a broader sense of anthropology and a better understanding of the field, which will make be a better anthropologist."

Juenger found a wide variety of patterns in the narratives regarding the cause of the disaster, including animal attributions, imbalance of the earth's elements and immorality. "There were many instances where people thought an animal interacted or interfered with the earth and caused the earthquake; for example, an ox inside the earth moved," she said.

The data also revealed patterns in how the earthquake impacted people. Using their own linguistic and cultural resources, people described their post-traumatic stress symptoms as being unable to sleep and feeling intoxicated, out of control or fatalistic.

"It was important to examine our corpus to see what we could learn about the psychological, physical, emotional and spiritual aspects of how people view the earthquakes," Hildebrandt said. "While different from Western worldviews of natural disasters, the cultural interpretations of the earthquake survivors are equally complex, sophisticated and meaningful."

"These communities are resilient and have rebuilt themselves. The narratives and interviews are valuable in helping us uncover and investigate more nuanced impacts of events such as these and to better understand the complex relationships between linguistic expression and the traditions, practices and worldviews in these communities."





Retrofitting Historic Temples in Kathmandu

Nitisha Parajuli, a recent master's recipient who studied civil engineering with a structural engineering specialization, will never forget how the earthquake ravaged her neighborhood in Kathmandu. After graduating from Kathmandu University and wanting to help in the aftermath, she volunteered with a team of engineers who conducted post-earthquake inspections. She later was hired by the Ministry of Urban Development to work on the Earthquake Emergency Assistance Project, the largest reconstruction project in Nepal.

Construction technology in many rural areas of Nepal has been confined to hybrid construction using timber, bamboo and mud mortar. The majority of the historic temples in Kathmandu were built with mud cladded over clay tiles and hardwood timber. The heavy weight of these materials resulted in buildings not being able to withstand the earthquake. According to Parajuli, the Nepalese are reluctant to build reinforced concrete structures because of economic constraints and the concern that the conventional practice will degrade the historic fabric and disrupt the traditional aesthetic of many buildings.

Committed to helping rebuild her city, Parajuli decided it was time to go back to school to learn how she might retrofit these structures using more primitive resources without demolishing them. She applied for and received a Competitive Graduate Award (CGA) from the SIUE Graduate School to assist with her research and began her graduate studies at SIUE in August 2017. CGAs support research and creative activities initiated and conducted, with the support of a faculty mentor, by highly qualified new graduate students.

Using a combination of modern engineering techniques and lighter, locally sourced materials, Parajuli researched a method of reinforcement that not only makes historic temples structurally sound, but also maintains the historic and cultural context held by these locations. Similar techniques also can be used locally in the St. Louis region to upgrade and strengthen historic steel high-rises.

During her research, Parajuli reconnected with a professor from California who had been a visiting faculty member at Kathmandu University. He invited her to submit her work to the American Society of Nepalese Engineers annual conference. She was also selected to present her work on St. Louis historic buildings at the Association for Preservation Technology annual conference.

"Nitisha did a remarkable job gaining a deep understanding of state-of-the-art techniques for historic preservation," said Brad Cross, PhD, professor of civil engineering and Parajuli's thesis advisor. "Her research, conducted in partnership with the earthquake engineering firm KPFF in St. Louis, will potentially lead to safe, inexpensive upgrades to both high-rise buildings here and temples on the other side of the world."

Parajuli graduated in May and joined the engineering and geospatial services firm TWM Inc. in Waterloo, Ill. as a structural engineer.



Outstanding Thesis Award

Joshua Pritsolas, MS geography '18, is the recipient of the SIUE 2018 Outstanding Thesis Award for his research, "Principal Component Analysis and Spatial Regression Techniques to Model and Map Corn and Soybean Yield Variability with Radiometrically Calibrated Multitemporal and Multispectral Digital Aerial Imagery."

Farmers around the world use remote sensing technology to maximize crop yield and farm efficiency. Pritsolas recognized the use of remotely sensed technology, and the data it collects, as a possible alternative to other standard precision agriculture monitors. Typically mounted upon combines, these systems are costly, burdensome, fraught with inherent errors and limited to end-of-season use.

The primary focus of Pritsolas' thesis was to test the relationship between multitemporal and multispectral digital aerial imagery with corn and soybean yield. He captured digital aerial images on nine dates throughout the 2015 growing season from two fields—one corn and one soybean—located on a 120-hectare farm in Story County, Iowa. His research was funded by the Iowa Soybean Association and Iowa State University through multiple grants totaling over \$62,000.

In order to assess this relationship, Pritsolas properly calibrated the digital aerial images using calibration tarps with known reflectance values. The remotely sensed imagery was used to measure visible wavebands (to measure chlorophyll production) and near-infrared wavebands (to measure plant biomass) to assess overall plant health throughout the growing season.

Without ever stepping foot in an agricultural field, his final data demonstrated that farmers can use remotely sensed imagery to model absolute corn yield and soybean yield with an extremely low margin of error (± 7 bushels and ± 2 bushels, respectively).

"Josh developed an extraordinary method of calibrating aerial imagery into percent reflectance," said Susan Hume, PhD, chair of the Department of Geography. "The image processing methods and statistical design can be used not only for agriculture, but also in wetland delineation, forest type mapping and more."

Randy Pearson, PhD, professor of geography and the director of the Laboratory for Applied Spatial Analysis (LASA) at SIUE, worked with Pritsolas as both his thesis and graduate assistantship advisor.

"Josh's thesis lays a new foundation for the use of remote sensing in agriculture," Pearson said. "His methods are less costly and perhaps even more accurate than traditional, equipment-based yield monitors. The methodology can also be transferred to different satellite-based imagery software with ease, and farmers can use his strategies to assess yield production around the globe."

Pritsolas' research has captured the interest of aerial imagery experts across the country, as well as key agricultural players in both government and large, private industry. In fact, LASA, where Pritsolas now works, recently signed a confidentiality disclosure agreement with a large, private agricultural company in St. Louis designating a new research relationship formed largely due to the results of his research.

The Outstanding Thesis Award recognizes a graduate student whose thesis has been selected by the Graduate Student Award Committee as outstanding among all those nominated during the previous academic year. The winner receives a monetary award and their thesis is forwarded by the University to the Midwestern Association for Graduate Schools Distinguished Master's Thesis Award competition.

Competitive Graduate Awards

Competitive Graduate Awards support highly qualified new graduate students who are accepted into master's programs at SIUE.

College of Arts and Sciences

Applied Communication Studies: Erica Winter

Biological Sciences: Rachel Smith, Katherine Wiesehan

Environmental Sciences: Jannatul Ferdous

Geography: Guisel Marmolejo

Social Work: Josie Koontz

School of Education, Health and Human Behavior

Clinical Psychology: Amanda Raymond

Kinesiology: Cory Mahan

Industrial-Organizational Psychology: Haley Adams,
Melissa Cugno

School of Engineering

Electrical Engineering: Miranda Fulton

Civil Engineering: Anan Alswaiti

Industrial Engineering: Iman Khoshnazar

Mechanical Engineering: Austin Cibulka, Ebrahim Bhuiyan

Graduate School

Integrative Studies: Dana Channell, Katie Leslie, Kayla
Pruitt

Research Grants for Graduate Students

Research Grants for Graduate Students support research and creative activities initiated and conducted by SIUE master's students to enhance their academic progress. Although faculty advisors oversee the research or creative activity, these grants support the graduate students' work as it relates to their thesis or final project.

College of Arts and Sciences

Art Therapy Counseling: Libby Fisher, Theresa Hitchcock,
Katrina Lacombe, Unhye Myong, Cecilia Ramsey-Hebert

Art Studio: Alexandria Bailey, Jesse Crane, Samantha
Hunerlach, Jennifer Kettler, Christina McNealy, Vincent
Stemmler

Biological Sciences: Amber Bouren, Anuja Dahal, Madison
Eschbach, Jordyn Grawe, Hannah-Beth Griffis, Negar Zati
Mahboob, Connor Melton, Callie Mincy, Randahl Nickerson,
Josie Smith, Rachel Smith, Kaitlyn Stanton, Katherine
Wiesehan, Ganiu Adeogun, Haleigh Bauer, Kritisha
Bhandari, Sarah Bilskey, Jake Brandenburg, Rachel Davis,
Sun Jeong Im, Rashmi Karki, Adam Litterst, Laura Lloyd,
Peter Maness, Israel Olayide, Ashley Robinson, Prakriya
Shrestha, Kailash Shrestha, Jacob Webb, Samantha Wilhelm

Criminal Justice Policy: Tracy Hancock

Environmental Sciences: Olusegun Akindeju, Suprasanna
Aryal, Omolola Badmus, Victoria Cheatham, Tochukwu
Ekwoona, So Yeon Lee

Geography: Guisel Marmolejo, Alicia Terry

Public Administration: Westenor Valmera

School of Education, Health and Human Behavior

Clinical Psychology: Kaitlin Henning, Rachael Huck,
Christopher Waller

College Student Personnel Administration: Chelsea Gilles,
Rei Oliveros, Casey Yocum

Exercise and Sport Psychology: JaiLin Allen, Destinee
Ganious, Daniel Lange

Exercise Physiology: Paige Davis

Industrial-Organizational Psychology: Miranda Buettner,
Brittany Faber, Lauren Phillips, Adira Romanoff

Learning, Culture and Society: Benjamin McClusky,
Jaimee Phegley

School of Engineering

Electrical Engineering: Julian Buritica

Industrial Engineering: Jagath Gunasekera, Shaida
Kargarnovin, Mete Naz

Mechanical Engineering: Huan Phan-Van, Melika
Salehabadi, Mehrdad Zandigohar

School of Pharmacy

Pharmaceutical Sciences: Suyehsa Bhandari, Prapanna
Bhattarai, Sagar Gilda, Hannah Lupton, Ashok Silwal,
Konstantina Stavroulaki

Selected Research Grants for Graduate Students

The SIUE Graduate School provides a dynamic environment for master's students to enhance their education and advance knowledge in their fields. The following projects were supported in part by Research Grants for Graduate Students.



Identification and Quantitation of Sugar Components throughout the Corn-to-Ethanol Fermentation Process

Sarah Bilskey, MS Chemistry

Starch and cellulosic fiber from corn kernels can be broken down into smaller units of glucose and fermented by yeast to yield ethanol. As ethanol production from starch can be consecutively followed by production from cellulose, it is important for chemists to distinguish the conventional methods from cellulosic methods. Sarah Bilskey's research utilized the relationship between glucose and ethanol during fermentation to develop analytic methods for quantifying ethanol difference outside the margin of error using liquid chromatography-mass spectrometry. In collaboration with the NCERC at SIUE, Bilskey compared mass spectrometry methods to industry-practiced methods of high-performance liquid chromatography with a refractive index detector and glucose-oxidase-peroxidase analysis.

Logjam Influences on a Channel Morphology in a Midwestern Agricultural Watershed: Upper Silver Creek, Illinois

Guisel Marmolejo, Master's Candidate, Geography

Riparian zones, or areas bordering rivers, streams and other bodies of surface water in regions such as Upper Silver Creek in Illinois, serve as the last line of defense to filter water and sediment entering streams. These areas are often flooded due to logjams or other large woody debris. By combining fieldwork, lab work and geographical information system mapping, Guisel Marmolejo hopes to answer the following questions about the impact of logjams. What is the current state of Silver Creek regarding logjam locations? How have the jams influenced water velocity, sediment size distribution, stream complexity and macroinvertebrate biodiversity? What possible effects might the removal of logjams have on the stream?

Home is Where the Heart Is: Live-In Residence Life Professionals' Perceptions of Their On-Campus Living Space

Rei Oliveros, MSED College Student Personnel Administration

Newly hired live-in residence life professionals are typically excited to begin their careers in college student affairs. However, their living spaces can have a strong impact on their mental health and wellness, as well as their job satisfaction in their new role. Rei Oliveros examined live-in residence staff's perceptions of on-campus living spaces, how departmental policies affect those perceptions, and what might help make these spaces more conducive to job and living satisfaction.

Experiences of Culturally Deaf Students in Student Life at Predominantly Hearing Institutions

Casey Yocum, MEd College Student Personnel Administration

Current research about deaf college students at predominantly hearing institutions consistently emphasizes the development of students and their learning inside the classroom. Student affairs personnel note that learning opportunities outside of the classroom are just as necessary and enriching as traditional classroom learning. Casey Yocum interviewed 100 deaf college students from predominately hearing institutions across the United States and gathered valuable data and information about deaf students' experiences that could assist higher education institutions in becoming more accessible to this segment of their student population.



Examining Race-Biased Bias in White Teachers

Ben McClusky, MEd Diversity and Equity in Education

Beliefs about race and culture are fundamental to a teacher's pedagogical efficacy and cultural competency. Teachers' race-biased beliefs can influence the self-identity of students of color, which might lead to unjust discipline responses, overrepresentation in special education and underrepresentation in gifted education programs. In his study, Ben McClusky examined racial awareness and attitudes of 10 white, male and female teachers in metropolitan St. Louis in order to learn how the teachers' racial awareness and attitudes correlate with student behavior and academic performance. McClusky also considered what might be done to improve teachers' effectiveness in developing culturally competent pedagogies.

Identity Development and Schooling Experiences for Biracial Middle and High School Students

Jaimee Phegley, Master's Candidate, Diversity and Equity in Education

Black/white biracial adolescents commonly feel tension regarding their own racial identities, which might lead to guilt or internalized oppression. These internal conflicts can affect their daily social interactions and academic life. Jaimee Phegley hopes to gain insight into biracial students' experiences by interviewing seven black/white biracial middle and high school students about their academic and social interactions with peers and educators. By gaining awareness of their unique experiences, Phegley hypothesizes that teachers, school officials and parents alike will be more prepared to help these students through their social and academic struggles.



Selected Research Grants for Doctoral Students

Research Grants for Doctoral Students are awarded on a competitive basis to support research and projects initiated and conducted by SIUE doctoral students.

Assessment of Electrokinetics as an Innovative Method in Stabilization of Loessal Slopes

Pourya Kargar Ghomesheh, Doctoral Candidate, Civil Engineering

Loessal soil, or deposits of wind-blown sediment, can severely damage infrastructure built in or over slopes. Conventional methods intended to improve this type of soil for development or agriculture have been considered impractical. Pourya Kargar Ghomesheh is proposing that electrokinetics, the process of placing electrodes in the ground and applying a low-intensity direct current, could help improve the soil's strength and deformation characteristics. Ghomesheh is collecting undisturbed samples of loessal soil in Illinois and subjecting them to the electrokinetics method. Using results of direct shear and oedometer tests, Ghomesheh will create numerical models to assess the method's efficiency in stabilizing loessal soil.

Educator Bias and Disproportionate Discipline

Wendy Adams, EdD Educational Leadership

Wendy Adams interviewed 10 social justice-minded educators in order to understand their experiences with and perceptions of biases and stereotypes and how they impact school discipline. Adam also sought to understand the ways school districts address disparate discipline. By examining the racially aware teachers' experiences, Adams revealed what they see and experience in schools in terms of disparate discipline, how they view these situations, and how they perceive the school's reactions to these issues.

Successful Implementation of Positive Behavioral Intervention and Supports and Restorative Practices as an Alternative to Exclusionary Discipline

Allen A. Duncan Jr., EdD Educational Leadership

Existing research notes that exclusionary discipline, such as suspension or expulsion, can negatively affect students' academic and social outcomes. However, there has not been adequate research on effective, data-driven interventions that will replace these strategies. Allen A. Duncan Jr. researched how to successfully implement Positive Behavioral Interventions and Supports along with restorative practices as an alternative to exclusionary discipline. Duncan interviewed principals, assistant principals, primary disciplinary figures and teachers from three school districts who have successfully implemented these intervention methods.

Teacher Attitudes and Beliefs Related to Restorative Practices

Malcolm Hill, EdD Educational Leadership

Restorative practices are gaining popularity with teachers, counselors and administrators for their ability to improve behavior, reduce violence and bullying, repair harm, and restore relationships within a student body. Malcolm Hill sought to understand educators' attitudes and beliefs toward restorative practices. Using both qualitative and quantitative methods, Hill held open-ended interviews with educators, used existing data from a survey given during a professional development session on the topic, and conducted a quantitative survey of high-poverty high school staff members who implement restorative practices.

Teachers' Perceptions of Restorative Practices

Roger A. Hetge, EdD Educational Leadership

Traditional discipline practices such as zero-tolerance policies and exclusionary consequences are mindsets that continue in current school discipline models. Teachers who do not implement a culture of caring in their classrooms attempt to elicit power by punishing and removing students. These conflicts are shown to affect black students disproportionately compared to white students who have exhibited the same or similar behaviors. Roger Hetge sought to recognize alternatives to traditional exclusionary responses within the classroom. By understanding teachers' perceptions and experiences of restorative practices, Hetge explored how disproportionate exclusion continues for black students through teacher's responses to student behavior.

African-American Male Students in School

Veronica Jeffries, EdD Educational Leadership

Teacher-student relationships can positively or negatively affect a student's academic performance or behavior. Veronica Jeffries explored the relationship between black male students and their teachers in order to understand the role teachers play in the students' educational experiences. Jeffries recorded and interviewed 10 black male students from the SIUE East St. Louis Charter High School, focusing on the students' perspectives of teacher relationships, the effect these relationships might have on their schooling, and factors attributed to positive and negative relationships. Jeffries conducted a thematic analysis on each transcript.

Implementation of a Trauma-Informed Approach at One Elementary School: An Action Research Study

Sandra Padak, EdD Educational Leadership

Despite individualized plans created to meet the needs of traumatized students at the elementary school where she works, Sandra Padak noted that these students continued to academically, socially and emotionally struggle. During the 2018-19 school year, her school implemented a pilot program to create a more trauma-informed culture. In her action research study, Padak examined the process of building the trauma-informed program and the effectiveness of the process, including students and teachers' perceptions of the program's implementation. Padak hopes the information gathered will be used to help students feel safe, develop quality relationships, promote academic achievement and develop an overall sense of well-being.



Teacher and Administrator Beliefs and Expectations of Exclusionary Discipline at Five Midwestern Alternative Schools

Mary Pearson, EdD Educational Leadership

Punishment or exclusionary measures remain the dominant approach to student behavior management. In a setting like an alternative school, punishing children who already feel disconnected from school and may know aggression as a part of life might magnify the students' issues. Mary Pearson hypothesized that exclusionary discipline in alternative schools increases alienation and accelerates problems for vulnerable students. Pearson's research attempted to realize teachers and school administrators' beliefs and expectations about exclusionary discipline in alternative schools in order to understand why students continue to be suspended or expelled. Pearson believes a better understanding of the thoughts guiding this process can change disruptive students' educational outcomes.

Low Socioeconomic Students' Experiences with Peer Tutoring

Jay Simpson, EdD Educational Leadership

Some students from low socioeconomic backgrounds have been shown to struggle academically. Much like students in special education, individualized attention may be required to help these children succeed in and out of the classroom. Jay Simpson wondered if cross-age peer tutoring with low socioeconomic students could enhance learning and engagement within the school district where he works. Fourth- and fifth-grade students from both low and non-low socioeconomic backgrounds served as tutors to first-grade students for 30-minute sessions over a 16-week period. Simpson administered surveys before and after the study, and teacher participants helped Simpson evaluate the cross-age peer tutoring experiences' effectiveness.

Driving Change Through Research

Emeriti Faculty Association Awards

The SIUE Emeriti Faculty Association provides opportunities for retired faculty to remain active participants of the University community. The group awards grant funding to select faculty projects aimed at strengthening the academic quality of programs and enhancing the University's reputation. The yearly award competition provides funding for a variety of projects that span across academic disciplines.

- **Michelle Cathorall, DrPH, Assistant Professor, Department of Applied Health; and Kathleen Vongsathorn, PhD, Assistant Professor, Department of Historical Studies**
"Global Health Speaker and Networking Event"
- **Jayashree George, DA, Assistant Professor, Department of Art and Design, and Laura Strand, MFA, Professor, Department of Art and Design**
"Art Therapy and Textile Studio Workshop/Faculty Exchange in India"
- **Anne Powell, PhD, Professor, Department of Computer Management and Information Systems, and Markus Nauroth, Professor, Computer Science, University of Applied Science, Mainz, Germany**
"Mobile Application Development"
- **Carolina Roche, PhD, Professor, Department of Foreign Languages and Literature**
"SIUE-Limerick Exchange Program"



Paul Simon Outstanding Teacher-Scholar Award

This award recognizes a faculty member for being an outstanding teacher and researcher and for demonstrating the belief that to be a good teacher, one must also be a good scholar. Winners have shown significant contributions to

original research or creative activities and have successfully integrated those contributions into their teaching and mentoring practices.

Jeff Darabi, PhD, Professor

Department of Mechanical Engineering

Darabi's research interests are in the areas of microelectromechanical systems (MEMS), micro/nanofluidics, biomicrofluidics, energy and thermal systems, and multiphysics modeling. His accomplishments include 32 journal articles, 39 peer-reviewed conference papers, two book chapters, seven book reviews, four issued and pending U.S. patents, and over 50 technical presentations. Nearly 60 of his publications are co-authored with his students. Darabi has supervised and chaired 19 master's theses and two doctoral dissertations. He has served on 32 master's and eight PhD committees. More than half of his MS students have gone on to earn a PhD. Darabi has served as PI or Co-PI on 19 research grants totaling approximately \$1 million. He established a MEMS and Microfluidics Laboratory and developed a research program in these emerging and multi-disciplinary fields that did not previously exist at SIUE.





Vaughnie Lindsay New Investigator Award

This award is presented to junior faculty members to recognize and support individual programs of research or creative activities that have the promise of making significant contributions to their field of study and to SIUE in general.

Andrew Greenwood, PhD, Assistant Professor Department of Music

Greenwood's research project, "The Musical Enlightenment in Eighteenth-Century Scotland," aims to understand how music can contribute to the building of new forms of community, understanding and citizenship. "In 1707, Scotland lost its sovereignty, and its people turned to their own musical traditions in seeking ways to rebuild connections in the face of social fragmentations," Greenwood explained. "The larger stakes of this research raise questions about music's power as a force in strengthening communities, not only in the Scottish Enlightenment, but also in today's world." His research endeavor will involve conducting new archival research with Scottish song collections in the U.S. and Scotland, and revising his dissertation for a book publication.



Concept Commercialization Award

This award promotes interest in and involvement with intellectual property development and commercialization in order to benefit the health, safety and welfare of the community and the economic welfare of

the University. The award is primarily intended for patentable inventions or discoveries, but can also support trade secrets and copyrighted materials.

Kamran Shavezipur, PhD, Assistant Professor Department of Mechanical Engineering

Shavezipur's proposal is entitled "Pathogen Transport Modeled Biomimetic Sensor, Sensing Method and Produce Sanitization." The technology relates to food safety and is intended to address two issues: 1) creating a laboratory platform to investigate pathogen-produce interaction in real time and under different ambient conditions and 2) providing a measurable metric for sanitization of fresh produce, such that the process qualitatively and quantitatively can be monitored.



Annette and Henry Baich Award

This award is given annually to the most outstanding Seed Grant for Transitional and Exploratory Projects 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.

Mina Sumita, PhD, Assistant Professor Department of Chemistry

Sumita's proposal is titled "SPR-SELEX: New Method to Determine Nucleic Acids Aptamers." Aptamers are short DNA or RNA sequences that bind to a specific target molecule and can be essential for biosensor development. Sumita's proposed method—SPR-SELEX—is expected to prove more time- and cost-effective than the current aptamer identification technique—SELEX.



Hoppe Research Professor Award

This award recognizes and supports faculty members whose research or creative activities have the promise of making significant contributions to their fields of studies. The award supports a significant and discrete portion of a faculty member's

larger research agenda for a two-year period.

Sinan Onal, PhD, Associate Professor Department of Industrial Engineering

Onal's collaborative research project, "Gait Alterations in Children with Autism Spectrum Disorder (ASD)," uses the University's state-of-the-art motion capture and analysis system along with kinematic, kinetic and electromyography data to investigate whether the gait cycle or muscle activity in children with ASD is distinct from that in other children. Onal said the multidisciplinary approach takes advantage of the latest advancements in engineering, kinesiology and psychology and offers a more comprehensive investigation into gait deviations in children with ASD than has been previously conducted.

Visualizing Research Impacts

The SIUE Graduate School's Visualizing Research Impacts (VRI) competition offers SIUE faculty, staff and students the opportunity to share the results and impact of their research and creative activities through imagery.

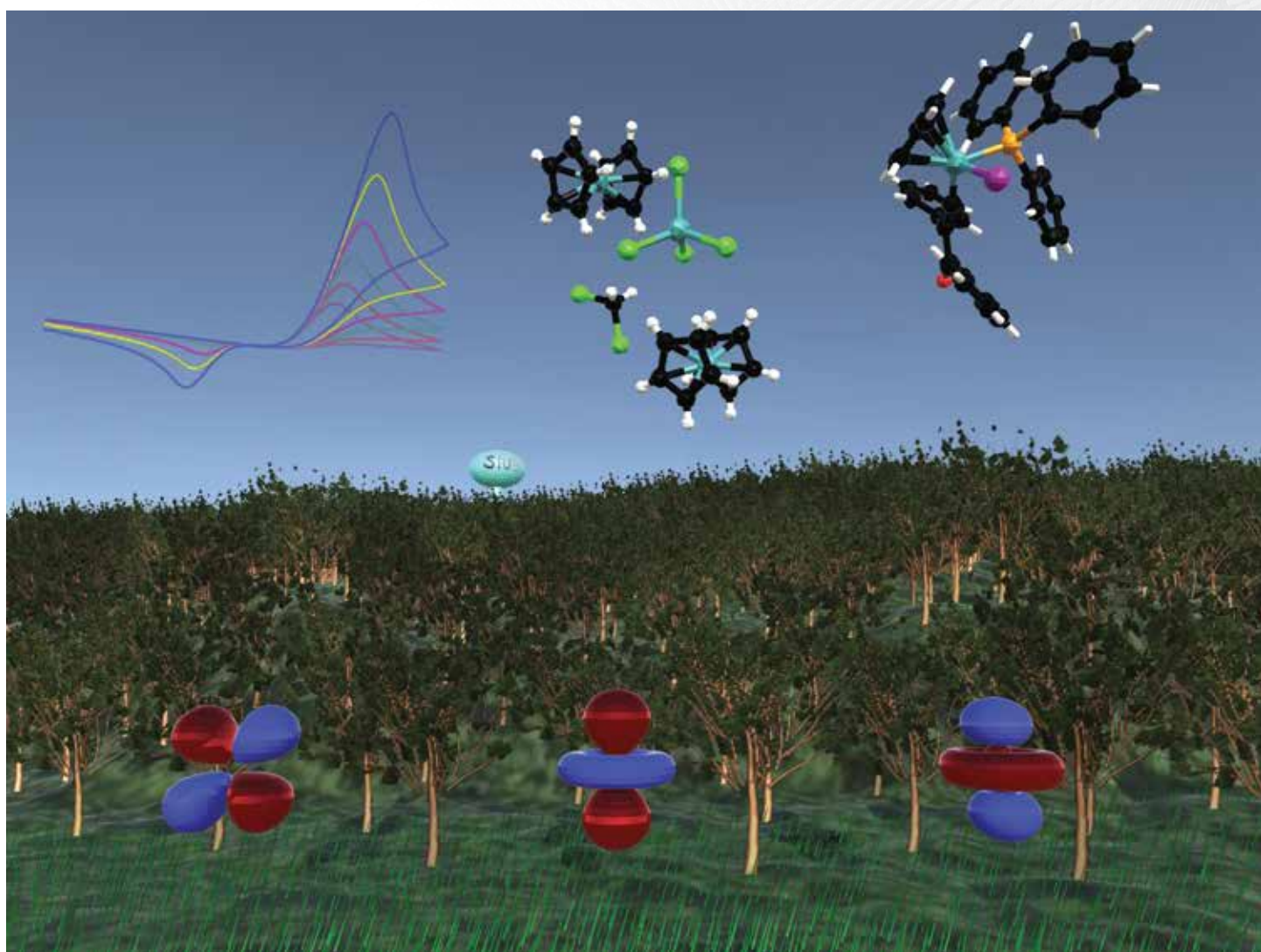
Faculty and students submitted a wide array of entries that depicted a wonderfully rich diversity of creative activities and disciplines from across the institution, including entries from the sciences, engineering, arts, humanities and business. A panel of SIUE alumni selected the award winners, who each received a \$1,500 monetary prize to fund their continued scholarly activities.

Most Creative Representation of Research Impact

"Organometallic Electrochemistry"

Mike Shaw, PhD, Distinguished Research Professor, Department of Chemistry

The SIUE water tower supervises Shaw's virtual reality landscape that features d-orbitals lurking in the forest as x-ray crystal structures of compounds gently float by. Electrochemical data is visible in the eastern sky. Electron behavior in transition-metal compounds is governed by the physical spaces they occupy around atoms, and those spaces have shapes typified by the orbitals in the forest. The molecules in the sky were generated from x-ray crystallographic data and represent snapshots of compounds made in Shaw's lab. The electrochemical data are plots of currents versus voltage, and the shapes yield intimate details of the consequences of electron transfer. The entire landscape represents efforts to bring research into the classroom through virtual reality.

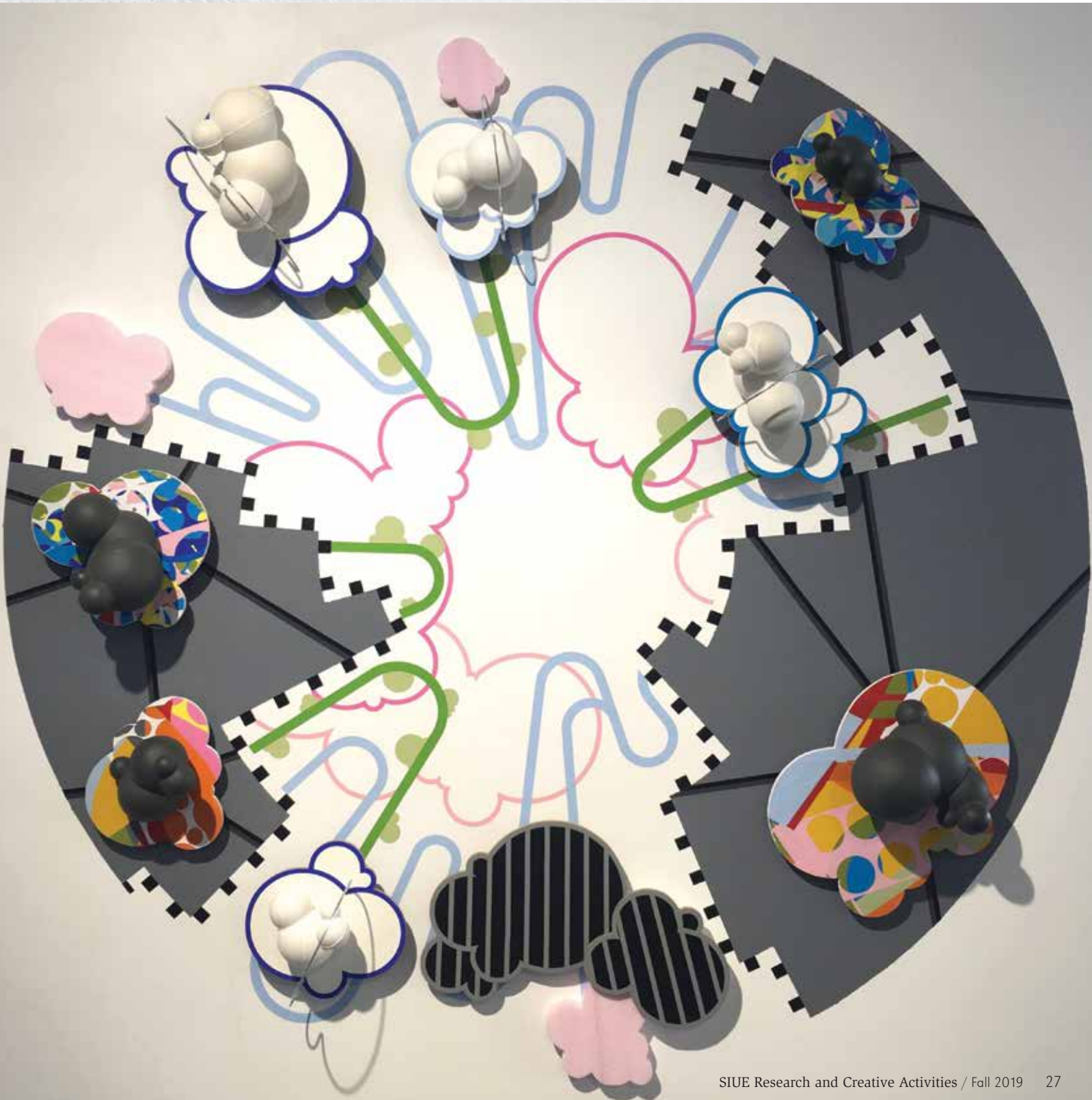


Best Representation of Research Impact

“Flow Chart: Vortex”

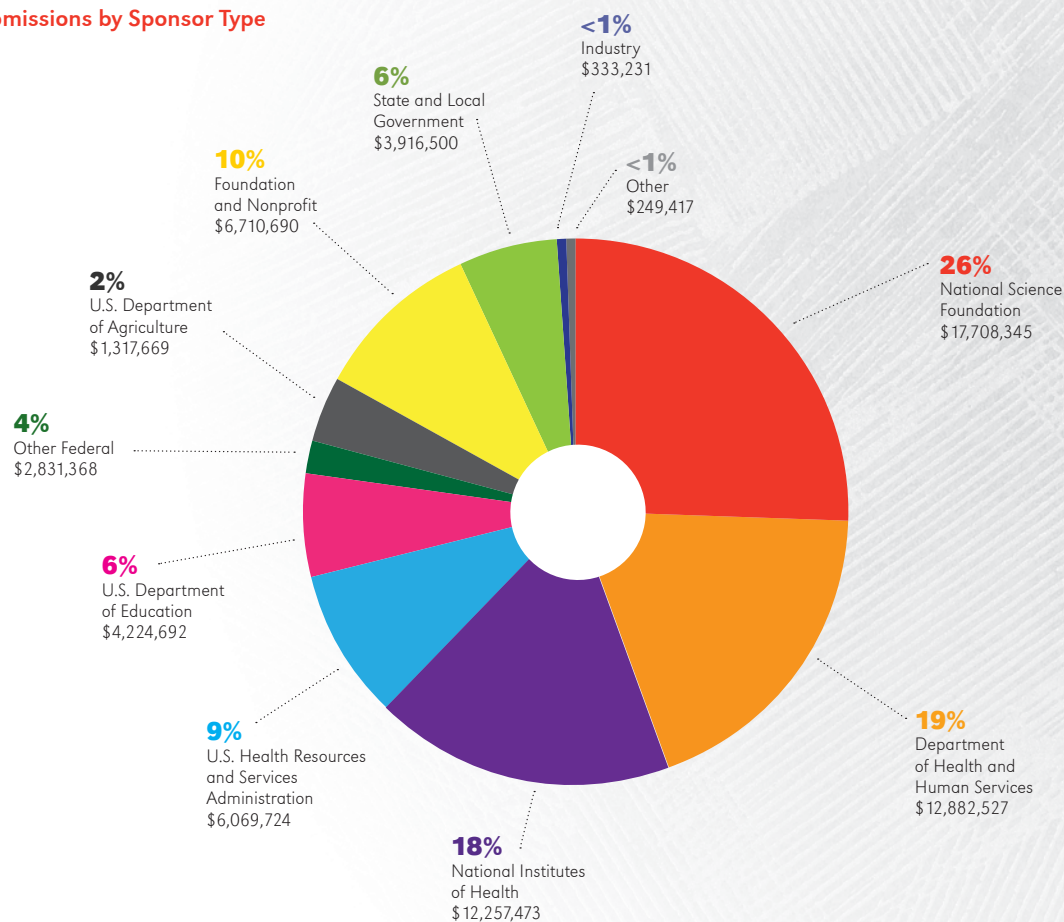
Joe Page, Assistant Professor, Department of Art and Design

The vibrant colors, reductive imagery, and illustrated movements within Page’s “Flow Chart: Vortex” series of wall installations are deceptively simple, a rumination on early video games, pinball machines, mass transit maps, and schematic diagrams. A condensed version of his larger body of work, this piece borrows upon the visual language of classical labyrinth and mandala motifs, inviting viewers to enter a meditative state of mind. The multimedia artwork incorporates porcelain, paint, vinyl, wire, and wood, reflective of the varied historical and contemporary influences within the work.

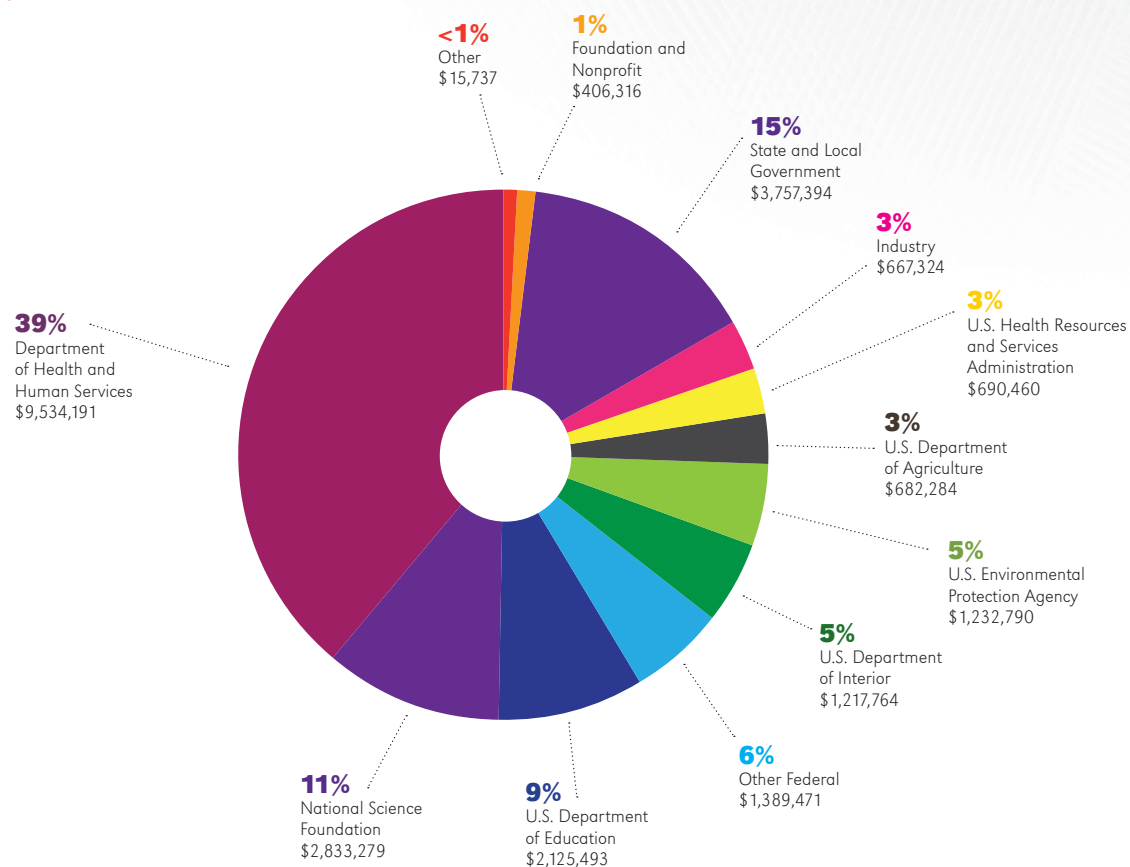


Externally Sponsored Projects

FY19 Proposal Submissions by Sponsor Type



FY19 Awards by Sponsor Type



Selected Published Books and Music

School of Business

Berkley, Robyn and David Kaplan. *Strategic Training and Development*. Sage Publications, 2019.

School of Nursing

Boyd, Mary Ann. *Psychiatric Nursing: Contemporary Practice*. 6th ed., Wolters Kluwer, 2018.

School of Education, Health and Human Behavior

Fuchs, Wendy. *Mindfulness for Students: A Curriculum for Grades 3-8*. Taylor & Francis, 2019.

Hupp, Stephen, editor. *Child and Adolescent Psychotherapy: Components of Evidence-Based Treatments for Youth and their Parents*. Cambridge University Press, 2018.

Axelrod, Michael I., **Stephen Hupp, Jeremy D. Jewell**, and Mitchell J. Prinstein. *Great Myths of Adolescence*. Wiley, 2018.

Reinking, Anni. *Not Just Black and White: A Mother's Story of Raising a Black Son in Multiracial America*. Front Edge Publishing, 2019.

Reinking, Anni. *Difficult Conversations: A Toolkit for Educators in Handling Real-Life Situations*. Rowman & Littlefield Publishers Inc., 2019.

College of Arts and Sciences

Clark, Tiana. *I Can't Talk About the Trees Without the Blood*. University of Pittsburgh Press, 2018.

DeSpain, Jessica, and Jennifer Travis, editors. *Teaching with Digital Humanities: Tools and Methods for Nineteenth-Century American Literature*. University of Illinois Press, 2018.

T. Edmond, **Elizabeth Heil**, and Andrea J. Nichols, editors. *Social Work Practice with Survivors of Sex Trafficking and Commercial Sexual Exploitation*. Columbia University Press, 2018.

Hicks, Gary R., and William S. Hamrick. *Global Media Ethics: Cases for Today's Convergent Media*. Roman & Littlefield Publishers, 2019.

Jack, Bryan M., editor. *Southern History on Screen: Race and Rights, 1976-2016*. The University Press of Kentucky, 2019.

Klaw, Barbara, Sylvie Le Bon de Beauvoir, **Margaret A. Simons**, and Marybeth Timmerman. *Simone de Beauvoir: Diary of a Philosophy Student, Volume 2, 1928-29*. University of Illinois Press, 2019.

Lueck, Bryan. *Obligation and the Fact of Sense*. Edinburgh University Press, 2019.

Mishra, Suman and Rebecca Kern-Stone, editors. *Transnational Media: Concepts and Cases*. Wiley-Blackwell, 2019.

Petrocelli, Matthew, and Joseph Petrocelli. *Stop and Frisk Done Right*. Looseleaf Law Publications, Inc., 2018.

Simidtchieva, Marta, and Kris Pineda. *Bulgarian Sketches, Shock City Studio*, 2018.

Theising, Andrew J. *Main Street USA: The Life and Photography of H.H. Bregstone*. Reedy Press, 2018.

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