RESEARCH AND GRADUATE STUDIES

ANNUAL REPORT FISCAL YEAR 2024

ILLINOIS STATE UNIVERSITY

Illinois' first public university

Mission

Illinois State University is committed to the creation, dissemination, and preservation of knowledge through scholarship, research, and creative expression. These activities fulfill a solemn and longstanding obligation to the community at large by:

- **Furthering our understanding of the natural and physical worlds;**
- **Exploring human behavior and culture, past and present;**
- **Developing the organizational practices and technological innovations that power human and economic development; and**
- **Improving the quality of life through cultural enrichment.**

This we do while embracing students as active participants in a community of scholars, thereby facilitating a lifelong, research-centered mode of learning that provides for a more informed and active citizenry to the benefit of society.

Research and Graduate Studies

Units:

Research and Sponsored Programs
Jason Wagoner, Senior Director

Research Ethics and Compliance
Kathy Spence, Director

Graduate School
Dr. S. Gavin Weiser, Interim Director

Innovation and Strategic Partnerships
Harriett Steinbach, Director

Outreach
Eric Boerngen, Coordinator

Centers:

Center for Mathematics, Science, and Technology (CeMaST)
Dr. Rebekka Darner, Director

Center for Collaborative Studies in Mathematical Biology
Dr. Olcay Akman, Director

Center for a Sustainable Water Future
Dr. Joan Brehm and Dr. Noha Shawki, Directors

Office of Student Research
Dr. Gina Hunter, Director

Stevenson Center for Community and Economic Development
Dr. John Kostelnick, Director

Message from the associate vice president

On behalf of the Office of Research and Graduate Studies (ORGS), I am pleased to present an overview of some of the many activities in research and scholarship that happened during Fiscal Year 2024 (FY24) at Illinois State University. As a doctoral university with high research activity (aka R2 in the current Carnegie classification system), we have diversified our scholarship portfolio in both type and scale. We continue to work to create more programs with a broad appeal to help to solve some of the world's biggest problems. We are committed to supporting scholars across their whole careers at Illinois State University, from students through to the end of people's careers. I try to remain consistent in sharing my belief that research and scholarship are a public good, which make an impact on our community both locally and all around the world. Years of steady, incremental change begin to make that impact clear and we continue to hire new scholars and attract new students who will make their impact on the world for years to come. As some examples, in FY24 we saw positive progress with our efforts in innovation and community partnership, with even more already happening in Fiscal Year 2025 (FY25) as of this writing.

The people and their impactful work are what inspire me in trying to support our scholars. I am humbled to be part of a dedicated leadership team at Illinois State, that worked to help influence those small efforts at improvement. FY24 marked several transitions – ISU hired a new President, Dr. Aondover Tarhule, and a new vice president for Academic Affairs and provost, Dr. Ani Yazedjian. They bring their own perspective as successful scholars to the positions, along with their other academic leadership potential. Thank you so much to Drs. Noelle Selkow and Frank Beck for leading the Graduate School and Stevenson Center, respectively, and helping set each up for a bright future. For FY25, we welcome Dr. S. Gavin Weiser serving as interim director of the Graduate School and Dr. John Kostelnick as director of the Stevenson Center. Thanks, also, to Dr. Sarah Boesdorfer for assisting Dr. Bekky Darner inthe Center for Mathematics, Science, and Technology (CeMaST), which allowed her to pursue some educational pursuits, and Dr. Robyn Seglem for overseeing the Office of Student Research while Dr. Gina Hunter enjoyed her sabbatical. Another addition to the ORGS team for FY24 was Dr. Harriett Steinbach, who joined as director of innovation and strategic partnerships. We have big plans as a unit in that space for FY25!

This annual report contains a mix of the facts and figures that one expects for a research office for a large national research university like Illinois State University. But we've also included some of the stories from the past year as well. This report highlights significant investments in grants and contracts support, the work of our interdisciplinary centers, and our efforts in the Office of Student Research and the Graduate School for FY24. In the selected stories, I have also included activities from all across campus to highlight a broader view of our scholarship accomplishments at Illinois State. The funding that makes substantial contributions to the advancement of student and faculty scholarly activities, student

experiential learning, and university outreach comes from both internal and external sources. Support comes through a variety of channels (e.g., grants, contracts, agency dollars, foundation support, etc.) and for a number of functions (e.g., research, instruction, public service, etc.). We attempt to capture that here.

Several activities were points of pride from the previous year, including:

- Our scholarship continues to make an impact beyond our campus boundaries, especially in our work with community partners; A signed agreement with State Farm has led to improvements in teen driver education and one with OSF HealthCare has led to new training for rural healthcare providers.
- Our impact on education across the nation through our scholarship remains profound, particularly in Science, Technology, Engineering, and Math (STEM) education in FY24. Scholars like Dr. Natalie Shaheen are making a difference in making science available to more students, and Dr. Bekky Darner and her team are attempting to help faculty become better STEM educators. Shaheen is our first National Science Foundation (NSF) CAREER Award winner in over a decade, and Darner leads two Howard Hughes Medical Institute-funded efforts;
- Awards like those are a key part of why U.S. federal awards reclaimed the top spot with both the number and dollar amounts of awards in FY24 (43% of the number and 60% of the amount.
- Our effective recovered indirect cost rate reached 7%, a slight increase from FY23. We reinvested over $1 million into our scholars through ORGS, including through continued supplemental funding for university research grants (URGs), the main source of internal support for faculty research.
- Congressionally directed spending to the Mennonite College of Nursing helped with the building of the new MCN Nursing Simulation Center, which will enhance both research and education.
- The first cohort of awards for the Advancing Research and Creative Scholarship (ARCS) program were made. ARCS is a $3.2M, seven-year commitment from the Provost to advance interdisciplinary scholarship on campus. Successful interdisciplinary teams so far include an archaeological expedition to Italy, creation of a novel scientific imaging instrument, and changes in the scholarship and practice of mathematics education.
- Expansion of efforts in the Illinois Innovation Network and leadership in statewide innovation and scholarship efforts.
- Participation in helping secure ~$33.2 million in new expected external funding to projects for FY24 and beyond through 168 new awards. This is despite the wrinkle that no financial aid awards are recorded in FY24.
- Submission of 204 proposals through Research and Sponsored Programs asking for nearly $84M in external funds.
- Two more fantastic issues of the *Redbird Scholar* highlighting the work going on from our scholars.
- The hiring of two founding chairs of our College of Engineering, Dr. Nesrin Ozalp and Dr. VijayDevabhaktuni.
- And continued promotion and celebration of student scholarship on campus through the Office of Student Research.

We expect to continue to make improvements that benefit our researchers and students and continue to make a broad impact in the world. I look forward to working with our many partners to keep improving and innovating. Drop me a line if you want to join us on the adventure, and I'm happy to tell you more about the great work we have going on. Thanks for reading.

Craig C. McLauchlan
Associate Vice President for Research and Graduate Studies
Professor of Chemistry
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GRADUATE SCHOOL

The Graduate School has had a productive year, filled with opportunities for graduate students to showcase research and creative scholarship, develop professionally in writing and career/job placements, and the finalization of new curriculum. The signature events of the Three Minute Thesis (3MT) and University Research Symposium were highlights of the year, concluding with the Doctoral Recognition Lunch to recognize spring 2024 graduates. These events are an opportunity to recognize the hard work and dedication of our graduate students. We found ways to involve the community and corporate partners to participate in these events, whether it be as judges for 3MT or talking to students at their research poster.

New staff

Alek McMath was hired as a marketing associate, with primary responsibilities in social media, branding, and perspective student recruitment.

New programs

The Master of Science in physics, STEM MBA, and online sport management sequence were finalized. Certificates were finalized in sport coaching and leadership and health and wellness coaching.

GradBird Appreciation Week

GradBird Appreciation Week was held April 7-12, 2024. Events included trivia night, ice skating, solar eclipse watching, and a visit with therapy dogs.

Student recruitment

Graduate School tuition scholarships were implemented for students beginning Fall 2024. A one-time award of $2,000 was offered by programs to prospective students who received no other funding support.

Writing assistance

The graduate writing fellows program continued, with two fellows offering one-on-one writing support. Over 100 appointments each semester were logged. A postdoctoral fellow will be hired to lead the program and further expand writing support.

Thesis and dissertation workshops were organized in a three-part series in partnership with Milner Library.

We believe our graduate programs are some of the best in the state and across the country. If you're an alum, prospective student, campus partner, or friend of the University with a story to tell about a graduate student experience, we'd enjoy hearing from you. This university is a special place and the Graduate School strives to cultivate positive interactions with students, faculty, and staff.

Noelle Selkow, Ph.D., ATC
Director
Graduate School
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2024 University Research Symposium

On April 12, 2024, we had more than 424 graduate and undergraduate students participate in the University Research Symposium. Students presented research in the form of printed and electronic posters.

Students interacted with attendees, describing the gap in literature, purpose of the study, how data was collected, and what the results mean.

Attendees included faculty, staff, students, administrators, the general public, and community partners.

The addition of invited community and industry partners was new this year and led to various internship opportunities for some students.

The University Research Symposium remains a highlight of the year, allowing students to showcase their hard work, collaboration and newfound knowledge.

Biology student wins Three Minute Thesis competition for research on decoding cancer puzzle

By Kevin Bersett

This year's Three Minute Thesis competition saved the best for last in the view of the judges. The 10th and final presenter, Sumaiya Hasan, stepped onto the stage at the Normal Theater and delivered a 155-second distillation of her master's research. Shortly thereafter, she received the top prize for her presentation, *Decoding Protein Localization to Unravel Diseases*.

Hasan had the audience imagine a cell as a puzzle and each protein as a puzzle piece as an illuminating way to explain her research using fruit flies to explore the molecular mechanisms possibly linked to cancer.

Sumaiya Hasan accepts the first-place award at the Three Minute Thesis competition from Dr. Ani Yazedjian, *right,* and Dr. Noelle Selkow, *left*.

"My research is about and revealing the exact reason behind the cancer and also opens up the potential direction for cancer therapeutics. So next time when you think about the puzzle, remember my research where I am putting together all the pieces to unlock the secret of life itself," Hasan said in conclusion.

Hasan competed against fellow graduate students February 29, 2024 before an enthusiastic crowd, which included Acting Provost Dr. Ani Yazedjian, college deans, department chairs, mentors, friends, and family who filled the historic theater in Uptown Normal with cheers and howls following each presentation.

Hasan earned $750 for first place and qualified into the Midwestern Association of Graduate Schools' Three Minute Thesis contest in April. Her presentation concluded an enjoyable and intellectually stimulating 45 minutes as the students covered topics from rural education to heart failure while competing to determine who could best explain their research to a general audience in 180 seconds or less with the aid of a single static slide.

"It's been a great event," said Dr. Noelle Selkow, director

Marley Knowles, of the Department of Agriculture, presents "Pennycress Meal Utilization in Chicken Feed."

of the Graduate School. "It's great to have the community and ISU support to have a full theater and support our students, and it's really just a great day to highlight our student and mentor achievements."

Hasan was inspired to enter this year's contest after watching her School of Biological Sciences colleague Sadia Sultan win last year's edition. Hasan is the fourth biology student to win the event in its eight-year history. She credited her mentor, Dr. Kevin Edwards, with helping her prepare and the competition for giving her the opportunity to learn how to talk to non-biologists about her complicated research .

Maisha Tahsin Orthy, of the Department of Psychology, presents "Creating Possibilities for Behavior in Stepping-stone Paths."

Todd Dugan, of the Department of Educational Administration and Foundations, presents "Reimagining Rural Readiness: Examining Challenges of Rural Working-Class in Education."

Jayden Lawrence, of the Department of Agriculture, presents "Student Stress in an Animal Science Study Abroad."

"I can now explain to them what I'm working on," said Hasan, of Bangladesh.

Breanne Evans, a master's student in the Creative Technologies Program, won $500 for placing second and another $750 for taking home the People's Choice award for her presentation, *Reconnecting to Play: Exploring Jean Piaget's development stages of play through interactive art*. In her presentation, Evans noted the importance of play for children's cognitive development and to keep adults in the present and improve their long-term problem-solving.

"My research found that as they engage in the sensory excavation zone imagination, adults can experience the stress-relieving benefits that play can bring. So whether it's their art or another source, find a way to reintroduce play into your lives and let your imagination run wild," Evans said in her presentation's conclusion.

Aminat Abdulsalam, of the Department of Geography, Geology, and the Environment, presents "Saturated Riparian Buffer: Remedial Strategy to Enhance Sustainable Agriculture by Improving Water Quality."

Evans is conducting her study for a capstone class, which involves creating an art project to explore her research question, with mentor Dr. Kristin Carlson.

"The process of the Three Minute Thesis helped me to narrow down the research that I had been doing to make it a bit more easy to explain to other people and also helping me find new avenues and ways that I can direct my research as well," said Evans, of Bloomington-Normal. "It's really interesting—the audition that I went in with and then the final product are very different. My thesis committee was able to really steer me into what would be good to add, what would be good to take out, and how to best go about memorizing the speech."

Presenters were judged on communication, delivery, and organization by a four-member panel comprising Dr. John Baur, professor emeritus of chemistry, Illinois State University; Rohen Agarwal, senior manufacturing process engineer, Rivian; Dr. John Vozenilek, chief medical officer and vice president for innovation and digital health, OSF HealthCare System; and Dr. Diane Wolf '89 '92, M.S. '95, Ed.D. '15, educator and student advocate. Dr. Craig C. McLauchlan, associate vice president for Research and Graduate Studies, served as master of ceremonies.

The Graduate School organizes the University's competition—similar academic competitions are held worldwide and originated at the University of Queensland in Australia—to showcase the wide range of research conducted by master's and doctoral students at Illinois State. This year's participants represented the Department of Geography, Geology and the Environment, Department of Psychology, School of Biological Sciences, and School of Communication in the College of Arts and Sciences; the Department of Agriculture and School of Kinesiology and Recreation in the College of Applied Science and Technology; the Mennonite College of Nursing; the Creative Technologies Program in the Wonsook Kim College of Fine Arts; and the Department of Educational Administration and Foundations in the College of Education.

"This event highlights students learning about research," Selkow said. "It's not an end-all-be-all experiment or study that they're doing, but they're learning the skills and really how they can continue to apply those concepts in thinking as they graduate from here and be lifelong learners."

AWARDS

Outstanding University Researcher

The Outstanding University Researcher Award recognizes faculty members for excellence in research. Candidates for this award must be nominated by their college dean and must be previous recipients of their respective Outstanding College Research Award.

Marilyn Prasun

Dr. Marilyn Prasun began her nursing career as a licensed practical nurse and continued her education, completing her Ph.D. at the University of Illinois Chicago. She is the Carle BroMenn Medical Center Endowed Professor, Mennonite College of Nursing at Illinois State University, where she works closely with graduate nursing students completing their terminal degree and nurses at Carle BroMenn to facilitate improved patient outcomes and research.

Prasun has served as primary investigator and co-investigator on multiple research studies regarding heart failure (HF), atrial fibrillation, biomarkers, symptom management, and quality of life. She has published in multiple journals and presented nationally and internationally. She recently completed two studies examining the impact of COVID-19 on nurses' decision-making in HF management and patient outcomes in cardiac rehabilitation. In addition, she completed a funded study examining the provider's assignment of the New York Heart Association (NYHA) classification.. She is currently the primary investigator of a funded multi-site clinical trial examining NYHA classification.

She received the American Heart Association Martha N. Hill New Investigator of the Year Award for her dissertation research in 2002 and was inducted as a fellow. She is a charter member and past president of the American Association of Heart Failure Nurses (AAHFN). She currently serves as the chair of the HF Patient Foundation and leads the HF committee of the International Global Heart Hub (GHH). She has been recognized by AAHFN, the Illinois Science and Technology Coalition (ISTC), and the Heart Failure Society of America for her research contributions and excellence in nursing that improve outcomes of patients with HF.

Ben Sadd

Dr. Ben Sadd is a professor in the School of Biological Sciences, after joining in 2013. He received his MSc from the University of Sheffield, U.K., in 2004 and his Ph.D. in 2008 from the ETH Zurich, Switzerland. Subsequently, he was a post-doctoral researcher at the ETH, a Junior Fellow at the Institute for Advanced Studies, Berlin, Germany, and, returning to the ETH, a senior researcher. Sadd is an evolutionary ecologist with a particular fascination with host-microbe interactions, immunity, and reproduction.

He focuses on insects as model systems, studying bumble bee immunity, health, and disease, and decorated cricket immunity and reproductive investment. He has published 70 peer-reviewed papers, receiving over 5,000 citations. Sadd has received funding from the U.S. Department of Agriculture, the National Science Foundation, the National Institutes of Health, and the U.S. Fish and Wildlife Service. In addition, Sadd is a strong EDI advocate, and he coordinates the annual Charles Morris STEM Social and has recently been part of two Howard Hughes Medical Institute awards to increase inclusivity in our STEM programs. Sadd and his group also believe that broad communication of science is critical, and regularly takes part in outreach events, including with local schools and conservation organizations.

Eric Wesselmann

Dr. Eric Wesselmann is a professor in the Department of Psychology. He has published research on social inclusion and exclusion, sexual harassment, social stigma, and the psychology of religion and spirituality. He has published in various psychology and interdisciplinary journals, including *Aggressive Behavior, Journal of Experimental Social Psychology,* and *Psychological Science*. Wesselmann has co-edited special issues in the *Journal of Social Psychology, Journal of Prevention & Intervention in the Community,* and *Self & Identity*.

Wesselmann's research has been recognized both nationally and internationally by academics, practitioners, and popular press. The Association for Psychological Science recognized him with a Rising Star designation in 2015. He has served as a grant reviewer for the U.S. National Science

Foundation, as well as for funding organizations in Canada, England, Germany, and Poland. His research has been cited in public policy documents both in the U.S. and across the globe, including Australia, Canada, Germany, Finland, the Netherlands, the Philippines, Turkey, and the United Nations. He has been interviewed by media outlets in the U.S. as well as Canada, England, and France.

He also has research interests in the interface of psychology, fandom, and popular culture, having published related work in the journals *Teaching of Psychology* and *Journal of Fandom Studies*. He has contributed chapters to 10 volumes of the *Popular Culture Psychology* series (e.g., Spider-Man psychology, *Stranger Things* psychology, Wonder Woman psychology). Wesselmann regularly discusses the overlap between psychology and popular culture topics at conventions locally and nationally. He has contributed to several podcasts for WGLT *Psych Geeks,* co-curates an ongoing film series for The Normal theater called FilmCULTure, and has a YouTube channel (Digital Golgotha Productions) where he hosts discussions on the dynamics of popular culture and psychology with scholars, creators, and actors.

Research Initiative Award

The Research Initiative Award recognizes new faculty members (within their first five years) who have initiated a promising research agenda early in their academic careers.

Martin Engelke, School of Biological Sciences

Rosangela Follmann, School of Information Technology

Melissa Heil, Department of Geography, Geology, and the Environment

Michael Hendricks, Department of Politics and Government

Natalie Shaheen, Department of Special Education

Andrew Ventimiglia, School of Communication

Creative Activity Initiative Award

The Creative Activity Initiative Award recognizes faculty who have initiated promising creative activities early in their careers. Creative contributions include, but are not limited to painting, sculpture, film, drama, musical composition, choreography of a dance, poetry, a novel, creative nonfiction, and creative media programming.

Jason Reblando, Wonsook Kim School of Art

2024 Million Dollar Club inductees

The Million Dollar Club was established in 1990 by President Thomas Wallace and Provost David Strand "to recognize grant/contract productivity by members of the ISU community." For a list of previous inductees, visit the ISU Research page at Research.IllinoisState.edu/about/awards-recognition/million-club

Olcay Akman, Department of Mathematics

Kelli Appel, College of Education

Susil Baral, Department of Chemistry

Sheri Bettis, Department of Educational Administration and Foundations

Mindy Ely, Department of Special Education

Amy Hurd, Office of the Provost

Miranda Lin, School of Teaching and Learning

Mark Olson, School of Social Work

Edward Ramos, Facilities Planning

Kathryn Sheridan, School of Social Work

Jennifer Smith, School of Teaching and Learning

Lisa Tranel, Department of Geography, Geology, and the Environment

Keenan Wimbley, II, University College

Pamela Cooper, Career Services

Cross-Disciplinary Team Research Award

The Cross-Disciplinary Team Research Award recognizes exemplary collaborative research conducted by multiple investigators from different disciplines. This award recognizes research teams of two or more investigators for their nationally and internationally visible research of high quality that contributes to multiple professions/disciplines.

David Kopsell

Dr. David Kopsell, professor of horticulture, Department of Agriculture, holds a B.S. from Illinois State University and M.S. and Ph.D. degrees in horticulture from the University of Georgia. His other professional positions include extension vegetable specialist with the University of New Hampshire, private crop consultation in the global sweet onion industry, and assistant professor of horticulture at UW-Platteville. Kopsell has taught 17 different courses and has received over 20 teaching awards, including the 2019 NARRU Distinguished Educator and the 2015 American Society for Horticultural Science's (ASHS) Outstanding Undergraduate Educator Awards. He has served as the ASHS Education Division vice

president on its executive board, on numerous society committees, and was elected Fellow of the Society in 2022. He has received $2.4 million in career funding, published 45 research articles, five book chapters, 1 provisional patent, and given over 150 presentations. According to Google Scholar, his h-index is 25, his i10-index is 35, and he has over 2,200 career citations. He sits on the editorial boards of the three journals in his discipline of plant nutrition and specialty crops. He is the co-author of the first and second editions of the electronic textbook titled *Horticulture: Principles, Practices, and Career Opportunities*.

L.C. Yang

Dr. Liangcheng Yang is an associate professor of environmental health and sustainability in the Department of Health Sciences. He received his master's degree from the University

of Tennessee, Knoxville in 2009 and his Ph.D. from the University of Illinois at Urbana-Champaign in 2013. After graduation, he worked as a postdoc researcher at Ohio State University for about 10 months and then joined Illinois State University as an assistant professor in August 2014. Yang's primary research focus is air quality and anaerobic digestion, where he specializes in livestock ammonia emission control using biofiltration methods, community air quality research in environmental justice areas, and anaerobic digestion waste management technology that converts organic waste into bioenergy. As of December 2023, he has secured approximately $2 million of research funding from multiple funding agencies, including the U.S. Department of Agriculture and the U.S. Environmental Protection Agency. He has published 44 peer-reviewed journal articles. According to Google Scholar, his work has been cited over 3,100 times.

Dr. Jeremy Driskell named University Professor

The Office of the Provost announced Dr. Jeremy Driskell has been named a University Professor. Driskell is professor of analytical chemistry at Illinois State University. He has over 20 years of experience in developing point-of-need analytical devices with specific expertise in the area of surface-enhanced Raman spectroscopy (SERS). Professor Driskell's research program aims to demonstrate the potential impact of SERS-based detection applied to point-of-care diagnostic testing and on-scene forensic analysis by investigating the mechanism of SERS enhancement to design optimized SERS substrates. During the development of these applications, substantial effort is placed on gaining insight into the interactions of proteins with gold nanoparticles (AuNPs) to maximize the stability and activity of the protein-AuNP conjugate. These fundamental investigations are imperative to establish feasibility, determine limitations, and broadly facilitate rational design of AuNP-based biosensors.

Professor Driskell has a distinguished record of productivity, having procured more than $2.4 million in external funding to support his research, from agencies that include the Department of Defense, the National Science Foundation, the National Institute for Justice, and the National Institutes of Health. He and his group have published 53 peer-reviewed

works, he has given 33 invited scientific talks, and his students have presented 39 posters at national meetings. As an independent investigator, Professor Driskell was selected for a 2013 Department of Defense-Defense Threat Reduction Agency (DOD-DTRA) Young Investigator Award and featured as a 2015 "Emerging Investigator in Analytical Sciences" by Analytical Methods and a 2016 "Emerging Investigator in Analytical Sciences" by Analyst. In 2018 and 2019, Driskell was recognized by the Analyst as an Outstanding Reviewer, a distinction only awarded to 13 and 10 reviewers in the international scientific community, respectively. Since 2011, Prof. Driskell has mentored 28 undergraduate and 17 M.S. graduate students in his research lab, with many graduating to pursue graduate degrees from prestigious institutions, including the University of Illinois Urbana-Champaign, UIC, Georgia Tech, and Notre Dame.

Dr. Lisa Szczepura named Distinguished Professor

The Office of the Provost is pleased to announce that Dr. Lisa Szczepura has been named Distinguished Professor at Illinois State University.

Szczepura joined Illinois State University in 1997 as assistant professor in the Department of Chemistry and achieved full professor in 2009. She has been a fellow at the Radcliffe Institute for Advanced Study at Harvard University and has received numerous research awards on campus including Outstanding University Researcher in 2012, and she was named University Professor in 2020.

Since arriving at Illinois State, Szczepura has received considerable national recognition for her scholarly achievements. Her research focuses on developing synthetic methodologies for the design of unique metal clusters with novel physical properties that are well-suited for a range of applications such as imaging, battery materials, and catalysis. She has over 50 publications (most of which include student co-authors) in nationally and internationally ranked journals, and she and her students have presented over 150 papers at conferences. In addition, she has secured $2.3 million in external funding for her work from prestigious organizations such as the National Science Foundation (NSF), the Research Corporation for Science Advancement (RCSA), and the American Chemical Society (ACS) Petroleum Research Fund.

Szczepura is an accomplished teacher and has received several teaching awards including the Outstanding University teacher Award in 2009. She has served as research adviser for over 50 undergraduates, and as thesis advisor for over 20 graduate (M.S.) students in her laboratory. Many students working in her lab have received national awards, including two Goldwater Scholars in 2023.

Throughout her career, Szczepura has leveraged funds to improve the success rate of all students in STEM. In addition, she has been proactive in developing educational initiatives aimed at improving the persistence of underrepresented students in STEM. The first of these programs was the 2008-09 Enrichment Workshop Program (EWP). Through funded programs like the EWP, Szczepura has been able to mentor and provide stipends to an additional 65 undergraduate students, and she was instrumental in the founding of the Charles Morris STEM Social.

Szczepura has also been actively engaged in serving the department, college, and university. In addition, she has been invited by the National Science Foundation to serve on multiple grant review panels, is currently serving on the NSF Committee of Visitors, and has served on a variety of committees at the ACS, underscoring her commitment to service in the discipline.

Advancing Research and Creative Scholarship (ARCS) program

The Advancing Research and Creative Scholarship (ARCS) program saw its first cohort begin their awards in FY24. Modeled after similar programs around the country, ARCS seeks to encourage interdisciplinary research teams to address "big, bold scholarly themes" and to collaborate to solve some of the world's most complicated problems. In spring of Fiscal Year 2023 (FY23), faculty-led teams submitted 23 proposals for ARCS grants through a competitive application process. In the summer, ARCS announced its inaugural awards. Three projects received Track I grants of up to $200,000 over two years for fully developed plans involving a robust project. These projects were funded by the Office of the Provost as part of a $3.2 million commitment to the program. Six other teams received Track II awards of $5,000 for one year to support capacity building for nascent teams, funded by the Office of Research and Graduate Studies. These grants serve as internal seed funding with the expectation that the recipients will eventually transition to external support.

During FY24, the ARCS teams have already seen significant success with group creation and outcomes. As of this writing, only Track I teams have been required to turn in progress reports so far, but two National Science Foundation grant proposals have already been submitted (approximately $1.5 million requested) and at least eight conference presentations have been made based on ARCS-supported work. The call for the second cohort or ARCS teams is expected in FY25.

- Over $3 million was requested in the initial call for the program.

- At least 79 unique investigators from 31 unique units are represented in applications, and at least 21 investigators were on more than one proposal.
- Fourteen of 16 track I proposals crossed colleges.

ARCS 2023-24 award winners

Track I

Northwest Bolsena Archaeological Project—Lea Cline (Wonsook Kim School of Art), Kathryn Jasper (History), John Kostelnick (Geography, Geology, and the Environment), Abigail Chipps Stone (Sociology and Anthropology), and Jonathan Thayne (Geography, Geology, and the Environment)

The Utilizing Number to Initiate Fraction Inquiry (UNIFI) for Students with Learning Disabilities Pilot Project—Beth MacDonald (Teaching and Learning), Allison Kroesch (Special Education), and Jessica Hunt (North Carolina State)

Development of an apical TIRF-illumination super-resolution microscope for cell—Uttam Manna (Physics), Martin Engelke (Biological Sciences), and Jun-Hyun Kim (Chemistry)

Track II

Center for Inclusive Intergenerational Environments—Elke Altenburger (Family and Consumer Sciences), Gabriela Fonseca Pereira (Family and Consumer Sciences), Luke T. Russell (Family and Consumer Sciences, and Chang Su-Russell (Family and Consumer Sciences) -

SafeNAV–A Technology-Enable Navigation Solution for Visually Impaired Pedestrians—Isaac Chang (Technology), Elahe Javadi (Information Technology), Jianwai Lai (Information Technology), Matthew Turnberg (Tech Solutions), Jen Bethmann (Tech Solutions), and Tammie Keney (Student Access and Accomodation Services)

Underrepresented STEM–intending Students in Calculus Courses: Phase I of the Envisioning a More Equitable System of Calculus Project—Julien Corven (Mathematics), Rebekka Darner (Center for Mathematics, Science, and Technology), Emily Deal (Mathematics), and Alicia Erwin (Mathematics)- Experiences and Agency of Historically

Potential value of brazzein-yeast as a livestock feed additive: assessment of efficacy and safety—Jennifer Earing (Agriculture) and Marjorie A. Jones (Chemistry)

Use of Satellite Remote Sensor Data to Evaluate Residential Inequality—William Lewis (Information Technology), Elahe Javadi (Information Technology), Rebekka Darner (Center for Mathematics, Science, and Technology), Alec Foster (Geography, Geology, and the Environment), Dimitrios Nikolaou (Economics), and Daniel Kpienbaareh (Geography, Geology, and the Environment)

Methamphetamine, Opioids & Fentanyl in Rural Illinois: An Ethnographic Exploration of Current and Emerging Issues—Kate Sheridan (Social Work) and Ralph Weisheit (Criminal Justice)

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Illinois Innovation Network

Illinois State University is one of 15 member hubs of the Illinois Innovation Network (IIN). ORGS currently plays a leading role in ISU's participation in the IIN. The IIN is a network based at public universities that was created in 2019 to "ensure Illinois' role in the 21st century knowledge-based economy." The vision of IIN is to drive inclusive and integrated research, innovation, and economic development across Illinois. This is accomplished through collaboration, capacity-building, and integrated systems in education, research, and innovation by connecting people, organizations, and resources. Illinois State has participated in the IIN since 2019. Illinois State University provides leadership for the Bloomington-Normal Innovation Hub which includes Heartland Community College.

FY24 marked another year of increases in activity. Dr. Harriett Steinbach was hired as the director of innovation and strategic partnerships. This role, in part, provides leadership and coordination for all the hub's activities and participation in the state network. Illinois State has increased its involvement in the IIN through intentional and strategic participation in the network's committees and subcommittees.

Illinois State also participated in emergent conversations related to micro-electronics, advancing smart logistics, and advancement of quantum computing in the Midwest. The Illinois Center for Specialized Professional Support is a subgrantee and provides leadership in the Climate and Equitable Jobs Act efforts in Illinois.

Dr. John Sedbrook, in the School of Biological Sciences, was recognized as an Innovator to Know by the IIN in April 2024. Dr. Valerie Wright, Mennonite College of Nursing, is currently participating in the Chicago-based 1871 business incubator to further develop her card game, *Collaborate* that teaches nursing students interprofessional collaboration; this membership is made possible by the IIN.

This year, campus and community stakeholders participated in a comprehensive strategic planning process to reimagine what the hub should be. The result is a plan with three strategic directions: social sustainability, environmental sustainability, and economic sustainability. This approach harnesses the talents and existing efforts at Illinois State University, Heartland Community College, and in Bloomington-Normal and allows us to play an active and central role in the area's economic development. This can only be done in the spirit of collaboration and connection, which inspires possibility and action. The plan was developed through various processes including campus and community focus groups and a stakeholder feedback survey. The finalized plan is anticipated to be publicly available early in the calendar year 2025.

This plan provides clarity on the best use for the $3 million appropriation allocated to the hub. In FY25, we will continue to pursue the development of a business incubator. In addition, we will catalogue makerspaces and equipment on campus to further support innovation and entrepreneurial activities.

Through our participation in the IIN, we were a grantee on the FY24 Broadband Regional Engagement for Adoption + Digital Equity (READY) initiative where we provide leadership for the North Central economic region comprised of 10 counties (DeWitt, Fulton, Livingston, Marshall, Mason, McLean, Peoria, Stark, Tazewell, and Woodford). The initiative supports digital equity through skills training and device acquisition. We partnered with Heartland Community College to provide digital skills training and distribute free laptops to over 70 people. The program is expanding for greater reach and impact in FY25.

IIN Committee Representatives

IIN Council
Craig McLauchlan, Research and Graduate Studies

IIN Executive Committee
Craig McLauchlan

Education & Workforce Development

Rebekka Darner, Center for Mathematics, Science, and Technology

Curt Rendall, Heartland Community College

Aimée Julian, Illinois Center for Specialized Professional Support

Experiential Learning & Apprenticeships

Natalie Alexander, Career Services

Curt Rendall

Community Colleges
Curt Rendall

Digital Learning Environments
Anthony Piña, Center for Integrated Professional Development

Corporate Engagement
Harriett Steinbach, Research and Graduate Studies

Advocacy & Public Policy
Brad Franke

Social Innovation
Paige Buschman, Center for Civic Engagement

Entrepreneurship
Christa Platt, Multicultural Center

Michael Straza, Straza Consulting

Research & Collaboration
Craig McLauchlan

Conference
Craig McLauchlan, Harriett Steinbach

Research and Sponsored Programs
Jason Wagoner, Research and Sponsored Projects

Senior Research Officers
Craig McLauchlan

ORGS RESEARCH CENTERS

Center for Mathematics, Science, and Technology (CeMaST)

Over the 2023-24 academic year, the Center for Mathematics, Science, and Technology (CeMaST) filled our new space in the Professional Development Annex with STEM education initiatives and outreach to students and educators both on campus and in the Bloomington-Normal community. We received a Howard Hughes Medical Institute (HHMI)-funded Driving Change grant in November 2023, which has led to professional development opportunities for faculty related to equity, inclusion, diversity, and anti-racism. This grant will also support the Science IS-U Scholars program, which will take its first cohort in fall 2025. This work compliments our continued work with the ISU STEM Ambassadors program in which undergraduate students identify how the introductory STEM experience can be made more equitable and conduct participatory action research as they become change agents in their STEM fields. The Inclusive Excellence STEM Fellowship accepted its first cohort of five STEM faculty in fall 2023. These faculty are participating in professional development based on the renowned Dr. Saundra McGuire's work on teaching students to be successful. We also continued to co-lead STEM Alliance with University College support the STEM DEI Taskforce; and co-host, along with the Office of Sustainability, the Green Screen film series at the Normal Theater. We also continued to host the Illinois Summer Research Academy, attended by high school students, and the High School Research Symposium, at which 75 students presented their research. We continued to support STEM teachers with the Midwest Noyce Conference, held in St. Louis, and we are currently organizing the next annual conference to happen again in St. Louis, as it is a great central location that allows for easy attendance.

With our location change on campus, we have opened the STEM Hub, which will be the heart of our outreach efforts and our STEM student support programming. Our STEM Hub has amplified our community partnerships with the Normal Public Library, Western Avenue Community Center, Bloomington School District 87, and the YWCA, reaching over 130 local youth through summer camps and afterschool programs. The STEM Hub also enabled a new collaboration with Metcalf School science teachers and State Farm, in which students engineered rooftops, applying at least one of the United Nations Sustainable Development Goals that would resist hail damage. Students built their rooftop demos in the STEM Hub,

Metcalf students at the State Farm Technology Research and Lab

Students built their rooftop demos in the STEM Hub, and then we all visited the State Farm Technology Research and Lab to test their designs.

and then we all visited the State Farm Technology Research and Innovation Lab to test their designs. This partnership demonstrates the importance of our STEM Hub in fostering integrated STEM learning opportunities, igniting a passion for STEM among young people, and potentially recruiting local STEM minds into our STEM degree programs. We are so excited about the potential that the STEM Hub holds for both the Bloomington-Normal community and Illinois State in the future.

As we move into this next year, we look forward to continuing to impact STEM education on Illinois State's campus and beyond. Through the beginning of our Science IS-U program, our continued work with the STEM Ambassadors, a new Inclusive Excellence STEM Fellows cohort, and continued community outreach, we are enabling STEM students of all ages to engage in integrated STEM learning experiences and become excited for their STEM futures.

Center for Collaborative Studies in Mathematical Biology (CCSMB)

During Fiscal Year 2024, CCSMB sponsored the 17th annual International Symposium on Biomathematics and Ecology Education and Research (BEER). The meeting was hosted at Virginia Commonwealth University, Richmond, Virginia. The next BEER symposium will take place on November 8-10, 2024, and will be hosted by Harvey Mudd College in Claremont, California. BEER symposia always include a special session for undergraduate students to disseminate their research results or progress reports of ongoing projects that were initiated during the previous year's Cross-Institutional Undergraduate Research Experience (CURE) workshops. The CURE workshops teach students how to conduct research, starting with the inception of a project and going through the typical states of conducting research: collaboration, investigation, analysis, technical writing, publication, and presentation. CCSMB, through the Intercollegiate Biomathematics Alliance, has also sponsored and supported the 2024 Midwest Mathematical Biology Conference (MMBC), which was held at UW-La Crosse in May 2024. MMBC is hosted annually by UW-La Crosse and Illinois State on alternating years. It is a small, friendly, and productive regional conference.

Office of Student Research

Over FY24, the Office of Student Research (OSR) funded 22 undergraduate students to pursue independent research under a faculty mentor. These FIREbird grant awardees received up to $3,000 to work on projects with faculty from across the campus including Agriculture; Biological Sciences; Chemistry; Economics; Geography, Geology and the Environment; History, Nursing; and Technology. In addition to their research projects, these students completed six hours of "entering research" training in May and presented their research in a Show-and-Tell Symposium in August. An additional 25 graduate and undergraduate students were awarded FEEDER grants (up to $500) for research materials, participant incentives, and supplies.

OSR's most requested funding program over the past year was the Pinion Travel Grant. Named for a bird's flight feathers, the Pinion grant provides up to $300 that students can use to present their work at a conference, symposium, or juried

Image of Research winner *Under the Surface* by Kiana Itschner Washington, a Biological Sciences undergraduate

Public exhibition and reception at University Galleries' fifth Annual Image of Research Competition featured seven undergraduate and 14 graduate student finalists.

exhibition. Over 100 students applied for and received Pinion grants—a testament to our students' scholarly and creative contributions.

OSR was delighted again to have nominated successful candidates for the Barry G. Goldwater Scholarship, a nationally prestigious award for students in the natural sciences, mathematics, and engineering. Robert Sevik, a junior in physics studying under Dr. Uttam Manna, was one of 438 students nationally to receive the award. Amelia Korveziroska, one of last year's nominees and now a junior at the University of Illinois at Urbana-Champaign as part of Illinois State's physics/engineering dual degree program, was also named a 2024 scholar.

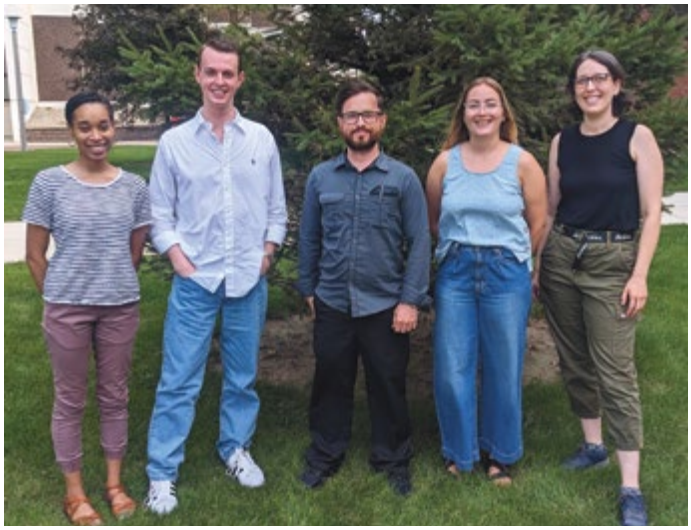
OSR's fifth annual Image of Research Competition featured seven undergraduate and 14 graduate student finalists. At the public exhibition and reception at University Galleries, eight students received awards and honorable mentions for photographs, confocal microscopic images, or digital images related to their research.

OSR continues to work with campus partners to advance, support, and highlight the excellent work of our student researchers and faculty mentors. Finding new ways to engage diverse students in research and creative scholarship campus-wide remains our priority. This past year, funding from a 2024 Provost Initiative Enhancement grant allowed us to support faculty to develop Course-based Undergraduate Research Experiences (CUREs). In this pilot program, three faculty were named CURE Fellows for their course-based projects involving early career students: Autumn West (English), Shelby Putt (Sociology and Anthropology) and David Malone (Geography, Geology, and the Environment). We look forward to learning from their experiences at the 2025 Teaching and Learning Symposium.

Stevenson Center for Community and Economic Development

The Stevenson Center for Community and Economic Development had an eventful 2023-24 academic year. The Center welcomed five graduate students to campus in fall 2023. Although the cohort was smaller than previous years, the quality of the students remained exceptional. Two Returned Peace Corps Volunteers joined the cohort after serving in Ethiopia and Vanuatu. Two of the students came to us following service in AmeriCorps VISTA and City Year programs. One of the students pioneered a new model for the Stevenson center whereby his employer, Chestnut Health Systems, sponsored him by hosting him as a first-year AmeriCorps participant as well as a second-year placement site. The center is hopeful that other local organizations may be interested in sponsoring their employees who are looking to pursue graduate education.

The students who joined the Stevenson Center in fall 2022 also began their second-year placements during the 2023-24 academic year. Placements were with organizations that included the Housing Assistance Council (HAC), Edu Futuro, the Community Opportunity Alliance, the Illinois Sentencing Policy Advisory Council (SPAC), National Alliance on Mental Illness (NAMI) Illinois, and BN Welcoming. One of



Five new Applied Community and Economic Development (ACED) students

Jin Lee, WKSA, presents at World Water Day 2024.

these students served in their position as a full-time AmeriCorps member, continuing the Stevenson Center's yearslong partnership with Western Illinois University to benefit communities in Illinois through AmeriCorps service.

Faculty and staff affiliated with the center continue to pursue community-based research, including a new grant funded by the Environmental Protection Agency (EPA) and led by the Ecology Action Center. The project will work towards developing a climate change resilience plan for McLean County, especially focused on environmental justice priority areas.

Finally, the Stevenson Center transitioned to a new director. After 20 years of service, Dr. Frank Beck returned full-time to the Sociology faculty. Dr. Beck oversaw immense success and growth of the Center during his tenure, and he worked tirelessly to the very end to make sure the center was well-positioned moving forward. John Kostelnick was named as the new director in May 2024 and has seamlessly continued to demonstrate the dedication and passion for service emulated by Beck over the previous two decades.

Overall, the Stevenson Center is optimistic for the future. Eight students were accepted into the fall 2024 cohort, and the center is moving forward with a Master in Public Health degree option to be launched for the fall 2025 admission cycle.

Center for a Sustainable Water Future

World Water Day is observed annually on March 22 as a United Nations observance day to raise awareness of global water issues and advance global efforts to promote the sustainable management of water resources and realize the human right to water and sanitation.

To mark the 2024 World Water Day, the Center for a Sustainable Water Future facilitated a two-woman exhibition and an artists' talk at Milner Library. The exhibition, which opened on February 19 and closed on March 24, featured works by Illinois State University Assistant Professor Ruth K. Burke and Professor Jin Lee. Burke is an interdisciplinary artist with an art practice that examines cultural practices relating to animal-human relationships, primarily in the context of contemporary agriculture. Lee's work relates to water as it exists within her personal, lived landscape. The two artists participated in a panel discussion/artists' talk on March 19, 2024, from 5-6:30 p.m. in Milner Library surrounding the themes dealt with in the exhibition.

Nathania Rubin, the exhibit curator, is a visual artist originally from New York City. She has shown hand-drawn animations, drawings, and other works in over 20 countries. Rubin is an pssociate professor of painting and drawing at the Wonsook Kim School of Art.

Lee's work deals with the subjective experiences of landscape, often surrounding bodies of water. It plays off of a deep art tradition of landscape as spectacle, leisure, and a space for reflection. These disparate approaches to the subject of water—and topics related to water—differ in such a way that the center was successful in creating a space for a vibrant artistic dialogue between the two. Nathania Rubin, who has previously curated an exhibition for the center at Schroeder Hall, worked with Burke and Lee to develop a cohesive exhibition that examines ethical frameworks for water and its use, as well as our poetic experience of water as individuals within a landscape. This cross-examination of the artists' work addressed the questions: What are the ethics of landscape and what are the subjectivities related to agricultural practice?

There was a total of about 50 faculty, staff, and students in attendance for the artists' panel discussion on March 19, 2024. The exhibit and programming were hosted by the Center for a Sustainable Water Future in collaboration with Milner Library and with generous support from the Alice and Fannie Fell Trust.

FEATURED RESEARCH

Drs. Lea Cline, *left,* and Kathryn Jasper at Valle Gianni in May 2021. (Photo/Dr. Sinclair Bell, Northern Illinois University)

Building up by digging deep

Faculty partner to break international ground at Italian archaeological dig

An archaeological site in Central Italy dating back more than 2,500 years is a special place for two Illinois State University researchers. For the past three years, associate professor of History Kathryn Jasper and professor of Art History Lea Cline have been leading the Northwest Bolsena Archaeological Project at Valle Gianni.

The excavation is the culmination of an interdisciplinary collaboration initiated more than a decade ago that enriches the duo's respective fields, empowers students, and elevates Illinois State University's research profile. This is the first Illinois State-led excavation in Italy and the only one currently led by an institution of higher education in Illinois.

Drs. Cline and Jasper began working at the site, which is located two hours north of Rome near the medieval town of Gradoli, in 2018. They secured an Italian federal excavation permit for 2020-22 and a renewal through 2025. The arduous permitting process required the researchers to write the application in Italian and took months to prepare while they communicated regularly with both the town of Gradoli and the archaeological superintendency.

"We were very worried about getting a permit. It's complicated and competitive," Cline said. "It's one thing to get the first permit, but they have since given us a three-year renewal. This shows we have done well and they trust us. It is a mark of success for us."

"We found what we thought was just an elaborate fountain, but what we thought was a single monument turned out to be only one part of a more complex site."

Illinois State University and the professors' respective colleges have rewarded and provided funding to Cline and

Illinois State student Stephen Iannuzzi holds a just-excavated Roman pane glass window fragment during the summer 2023 Valle Gianni Field School. (Photo/ Dr. Katie Rask, Ohio State University). *Right,* this North African lamp dating to about the sixth century A.D. was discovered in the excavation of the fountain in the summer of 2023. (Photo by Anna Serotta)

Jasper for their work on this project. In 2020, Cline was named the Wonsook Kim College of Fine Arts' inaugural Ken Holder Endowed Professor of Art. The College of Arts and Sciences recognized the project with the Interdisciplinary Award in 2020 and Jasper with the Shaw Teaching Fellowship in 2021 and a Faculty Research Award in 2022.

Last year, their research team was among the initial recipients of the University's Advancing Research and Creative Scholarship (ARCS) program. Their project received a two-year, nearly $200,000 award.

"The ARCS is a significant investment in the collaborative, interdisciplinary research that ISU faculty are doing, and we are so thrilled to be among the first recipients," Cline said. "The award has given our project the opportunity to expand our research team, to buy advanced tools, and to engage in collaborations with partners both in the U.S. and in Italy."

"Archaeology is very much a team sport," Cline said. "We rely on various experts and colleagues to analyze a huge amount of material, all with the goal of making sense of this unknown Roman site."

"We were both committed to students studying abroad and wanted to lead a dig someday overseas," Jasper said.

They eventually established a four-week session for students in Orvieto, a community dating to before the Roman era located between Florence and Rome. The dream of overseeing an excavation in Italy was within their reach because both had gained recognition for their academic accomplishments as scholars of Roman and medieval Italy, and owing to their facility in Italian and their experience living and working in Italy.

Cline and Jasper each studied in Italy as Fulbright Fellows, in 2006 and 2008, respectively. Cline did hers while completing her doctorate in art history at the University of Texas in Austin.

A trip to Florence and Rome during Italy's Jubilee Year in 2000 convinced Cline she wanted to focus her graduate study on Roman art and architecture. Participating in a dig in Italy while a graduate student sealed her decision. "I became passionate about making history physical both for myself and for my students," she said.

Jasper has been drawn to Roman and medieval Italy since she worked on her first excavation in Tuscany as an undergraduate. She earned a doctorate in history and medieval studies at the University of California-Berkeley, and has worked on archaeological survey and excavation in Arizona and Italy.

Jasper began her career in archaeology before moving into history. "History has something that archaeology doesn't, in that historians tell stories. I embraced that," she said. She also engaged in an intense study of Latin that spanned years and resulted in her gaining an international reputation for her expertise in paleography, which is deciphering ancient writing systems.

Both Cline and Jasper have published extensively in their respective fields and are certain their ongoing archaeological work will have an impact. "At the very least, our methodology is important," said Cline. She envisions publications and presentations on various aspects of the international dig that are exhausting and complicated yet more rewarding than either scholar could have envisioned when they first discussed their mutual ambition to fulfill every archaeologist's dream.

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Mapping to go a different direction: Illinois State geographer plots to plan a brighter future

By Susan Marquardt Blystone

Geography Professor John Kostelnick has used his expertise in geographic information system (GIS) mapping to examine a range of issues, from the spread of religion in a U.S. region during the 1800s to the modern-day question of how expanding broadband service could improve crop production.

He has also tackled complicated global issues such as the mapping of abandoned minefields, all while teaching undergraduates to use high-tech mapping tools. His students have undertaken equally challenging studies, including an analysis of U.S. military casualties during Operation Enduring Freedom in Afghanistan.

The accolades Dr. Kostelnick has garnered and the initiatives he has undertaken cement his reputation as an outstanding scholar and teacher who excels in using the science of geography to analyze complicated societal problems. And yet, he can still relate to the average person who wonders how anybody can do more in the realm of maps, other than using them to get from point A to point B. That very exercise as a child sparked a curiosity that turned into a professional passion.

"On family trips, I would be in the back seat following along with the map. That's what started my fascination and love for maps," said Kostelnick, who is as grateful as anyone who has ever tried to refold a map for the convenience of pulling up directions on a mobile device. And he completely understands why such advances have created the misperception that there is little left to be done in his field.

"Haven't we already mapped the world?" He asks the question that is on the minds of many, displaying his humor and understanding of the puzzlement surrounding GIS mapping.

"Geographers show meaning or purpose on maps," Kostelnick said. "GIS is data-driven and allows us to complete a spatial analysis." Creating such a map involves using GIS, the Global Positioning System (GPS), cartography, geovisualization, and remote sensing.

With these tools, a layered map that emphasizes patterns and relationships in a geographic context can be created. "We can digitize and animate maps that come alive, creating so many visual possibilities," said Kostelnick. He is intrigued by the power of GIS to look at complex questions such as what populations will be affected by rising sea levels, where access to public transportation is inadequate within an urban community, and what locations are best for shelters during global disasters.

"GIS mapping is behind the scenes and impacting us in so many ways. The technology is used to help us understand the world and create forecast models needed for smart planning that leads to informed decisions," Kostelnick said.

Such findings reinforce to Kostelnick's students the value of their degree, as they are equipped to improve lives by changing communities. He teaches a range of courses at Illinois State including cartography, advanced GIS, maps and geographic reasoning, and human geography. He blends research with learning, including students in work that focuses on practical application and often results in co-authored publications.

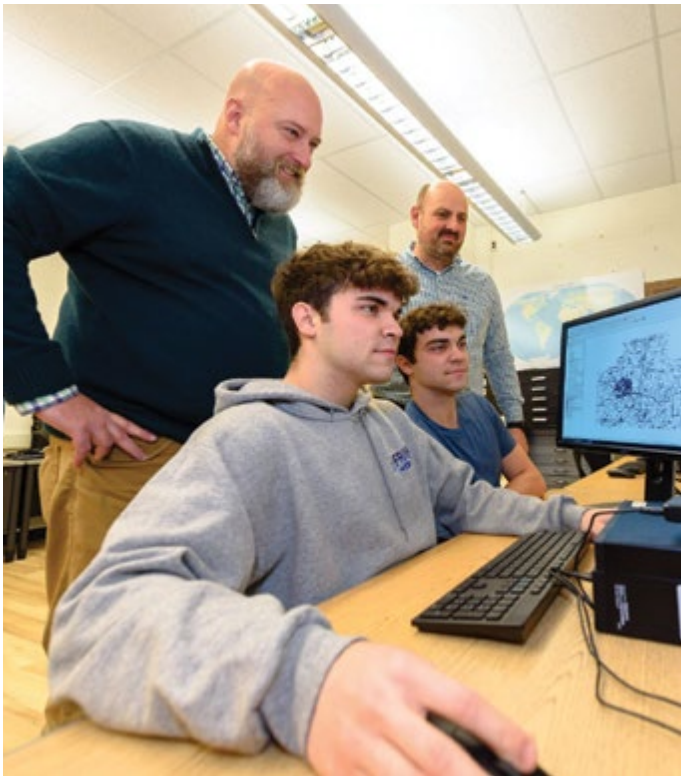
A favorite class for Kostelnick is the Geography of Chicago course that engages students in a thematic study of the city. Topics have included industrialization, demographic shifts, and environmental issues. A highlight of the course is a trip to Chicago during spring break for students to participate in fieldwork.

"I teach to make students aware that we are global citizens and help them see how they can use the discipline of geography to make the world better," Kostelnick said. "There are many challenges in the world today, from climate change to food insecurity and land conservation. Many of these issues have a geographical dimension. Maps are a central component to gaining the understanding needed to solve a problem. GIS allows us to start with a premise and build an analysis that answers 'what if' questions."

Such inquiry has motivated Kostelnick since his undergraduate days, which he spent at Iowa State University earning a history degree. He completed a master's degree at the University of Nebraska-Lincoln, where he specialized in GIS, cartography, and remote sensing. His thesis was a study of how Catholic and Methodist churches spread along the Iowa frontier from 1833 to 1891.

Kostelnick has risen to the level of tenured professor and been named an outstanding university teacher. He was chosen last year as a Researcher to Know by the Illinois Science and Technology Coalition. A leader in state, national, and international geographic and cartographic association work through the years, Kostelnick also serves as director of Illinois State's Institute for Geospatial Analysis and Mapping (GEOMAP).

GEOMAP exists to support research, education, and outreach initiatives that allow for collaboration across disciplines and involve students partnering with faculty to examine an issue. Projects have included developing a web-based mapping system for use by emergency managers in Illinois and visualizing global sea level rise due to climate change.



(Clockwise from top left) Professors Jonathan Thayn and John Kostelnick observe their students research assistants Luke and Jake Brasen at work on Project Broadband Breakthrough.

"Here today … for tomorrow" is the GEOMAP motto. It also succinctly describes the perspective Kostelnick brings to each class and every scholarly endeavor. "I want my research to help people," he said.

He will next focus on how global refugee situations are mapped, with the goal of revealing how these individuals can be better served. There is an urgent need for such a study, as the United Nations estimates there were 27.1 million refugees as of 2021. Kostelnick will use a sabbatical that began with the fall semester to take on what he calls "a global problem that sparks my curiosity."

There is a sense of satisfaction and amazement as Kostelnick reflects on the fact he is still driven by the same inquisitiveness that was ignited during his childhood on family adventures. "From a kid in the back seat looking at an atlas, I never realized where maps would take me," he said.

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Psychology professor explores how we remember, how we forget, and how we forget to remember

Bed. Dream. Blanket. Rest.

Those words flash across a computer screen in front of a student research participant in a room not much larger than a closet. The screen goes blank, and after a brief pause or a distracting task such as a math problem, the research participant is asked a question: Was sleep one of the words on that list?

It's a simple experiment yet one that sheds light on the inner workings of human memory. If a research participant responds affirmatively—indicating "sleep" indeed was one of the words from the sequence—it's a prime example of false memory.

Dr. Dawn M. McBride, professor of psychology, has been teaching and researching human memory for decades. Her interests include false memory, prospective memory, task order decisions, and facial recognition. She's a widely published scholar who has presented her work around the world.

McBride arrived at Illinois State 25 years ago from Southern California to continue her scholarship on human memory that began when her interest was piqued in an undergraduate cognitive psychology course.

"I was hooked from Day One of the class," McBride said. "I thought, 'This is what I want to do.'"

You're remembering it wrong.

Two tiny and sparsely furnished rooms in DeGarmo Hall's basement serve as McBride's Human Memory Lab. It's a modest setting for conducting experiments using the Deese-Roediger-McDermott (DRM) paradigm, a complicated sounding name for a not-so-complicated procedure.

The DRM paradigm involves the presentation of related words and requires subjects to recall words from that list.

Dr. Dawn McBride

Experiment participants can falsely recognize related words not on the list—referred to as "critical lures"—at rates of 50% or higher, demonstrating both the frequency of false memories and how quickly they can be created.

"Our memory is not perfect. In fact, we have false memories all the time," McBride said. "Our memory helps us fill in pieces that might be missing based on association of things that are related."

McBride uses her office as an example. After visiting the space, someone is likely to recall several items present. But it's also likely they will name an item that wasn't there based on their association of items commonly present in a professor's office.

False memory occurs in the delay between experiencing something and having to recall it. Most false memories don't affect us. But some do.

"False memories can affect things in a big way if you've witnessed a crime or been in an argument with someone who remembers things differently," McBride said. "There are implications for everyday life."

Why did I come in here?

Ever find yourself staring blankly at the contents of a refrigerator wondering why you left the couch? McBride has too.

But while most simply try to remember what brought us there, McBride wants to understand how our memory has failed us.

"Prospective memory is the kind of memory we use every day to remember to do things, and the busier we get, the harder that gets," she explained. "We don't intend to forget what we have to do in the future, but sometimes other cognitive processes take our attention away."

Such distractions can come from any human sense. They could be as innocuous as catching a glimpse of a clock or hearing raindrops on a roof above.

"One of my biggest interests in memory is forgetting," McBride said. "What happens when our attention gets shifted to something else? But what then helps us remember the thing we have to do later on?"

To better understand prospective memory, McBride and her student researchers have explored how delays affect prospective memory and examined the differences between time- and event-based memory cues.

A lasting memory

When McBride arrived on Illinois State's campus, she proposed a course focused on memory. She's led sections of PSY 368: Human Memory ever since. A handful of students from that class end up in McBride's lab. Several former student researchers have gone on to teach and lead their own research teams. Dr. Chris Wahlheim '04, M.S. '06, is one. He's an associate professor of psychology at the University of North Carolina Greensboro.

"She was always patient, but firm when I needed it. She was honest and direct, and that's what I needed at the time," Wahlheim said. "Her influence is really what got me into psychology as a career. It's a life I never would have dreamed of, and she was the foundation for it."

Wahlheim admires McBride's steadfast commitment to student success. He said its sadly uncommon in the highly competitive research community. "It's commendable that in a profession where people often focus on themselves in order to move their careers forward, she's been able to do that while also bringing along another generation of scholars," he said.

McBride's impact is indeed reaching another generation. One of Wahlheim's first Ph.D. students, who recently earned a faculty position at Millikin University, presented at Illinois State last spring. McBride was in attendance.

"She's sort of my academic granddaughter," McBride said, smiling.

McBride is highly respected in memory research circles. A doctoral candidate at Brandeis University, Elizabeth Marsh '20, M.S. '22, has experienced it. "I was just at a conference presenting a poster from work in her lab, and it was unbelievable how many people stopped just because they saw her name on it," Marsh said.

"Working one-on-one with students has always been one of the best parts of the job," McBride said. "Students seem to get an awful lot more excited about being part of the research process than sitting in a lecture."

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Paving a greener future

Redbird scholars use recycled materials to reduce construction's environmental impact

By John Moody

Engineers are among the world's great problem-solvers. Dr. Pranshoo Solanki, a professor of technology and a civil engineer by training, is trying to find creative solutions for a complex problem with worldwide implications.

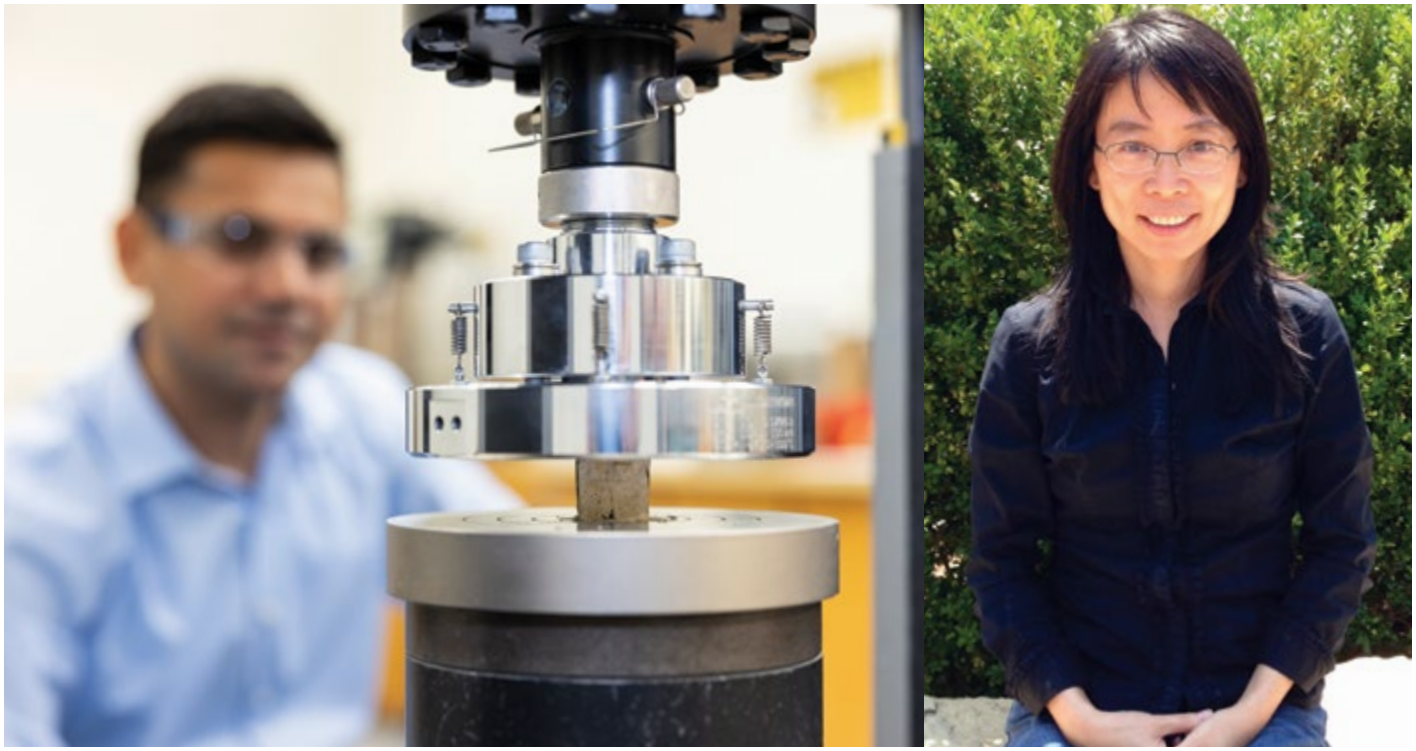
Since arriving at Illinois State in 2011, Solanki has been looking for new ways to use waste materials and industrial byproducts to achieve a higher degree of sustainability in construction materials. He has investigated using glass, plastic, fly ash residue from coal-burning power plants, tires, blast furnace slag from steel mills, rock quarry byproduct, and lake- and river-dredged sediment. His research with dredged materials has received funding from the National Oceanic and Atmospheric Administration, and his recycled glass research has been supported by the Environmental Protection Agency.

"My research theme is innovative construction materials and methodologies that can be used for building a sustainable infrastructure," Solanki said. "Sustainable construction brings many benefits to our society, environment, and economy. It's a research topic that is of national and international importance as growing demand and limited natural resources are increasing interest in sustainable construction materials and methods."

One important way Solanki is seeking to make road construction materials more sustainable is by reducing the amount of cement used in concrete. Producing cement requires burning fossil fuels and a chemical reaction that releases carbon dioxide.

"To make concrete you need cement, which is the chemical binder, and sand, stone, and water," Solanki said. "Cement manufacturing emits 8% of the planet's carbon dioxide, which makes it a major contributor to worldwide greenhouse emissions. We are looking for alternatives to cement as well as sand."

The Illinois Department of Transportation—which has also funded Solanki's research—allows 25% of cement to be replaced with fly ash.



Among the many tools in Dr. Pranshoo Solanki's lab is a hydraulic press—known as a Universal Testing Machine—which he uses to test recycled roadway material to determine if it's strong enough for building roads and highways. *Right,* Dr. Guang Jin.

"Up to 25% fly ash substitution, and you gain strength, and the concrete will be better," he said. "Chemically, fly ash is not consistent from power plant to power plant. Also, thermal power plants are being closed, so there's a limited supply of fly ash, so we are looking for an alternative."

Cement is also expensive to make; therefore, using alternative materials could save money. For example, Solanki is using recycled glass to create a geopolymer concrete composed of activator solution made using recycled glass and industrial byproducts such as fly ash and slag. He has made it completely without cement, and his testing shows promising results, but challenges remain.

"One problem is that you need very high temperatures, and you can't cure it in ambient air," he said. "Now we are trying to make it at room temperature, in ambient air conditions, and we are getting strength equal to concrete. But we need to test it for long-term durability and see how it behaves in a freeze-thaw cycle."

Solanki frequently collaborates with Dr. Guang Jin, a professor of environmental health and sustainability at Illinois State. When Jin and Solanki work together, their respective roles are well defined: Jin works on the chemistry of the material while Solanki works on the mechanical performance of the material. Jin formulates a chemical using the recycled glass that Solanki uses to create geopolymer concrete specimens for testing.

Bloomington-Normal has a single-stream material recovery facility (MRF) that collects a lot of glass, which Solanki uses. That is almost a perfect match for the researchers, except that the local company barely breaks even financially on the glass portion of the business.

"Recycling glass sounds simple," Jin said. "You melt it down and remake it into glass, but it's not that simple."

The recycled glass stream carries a lot of contaminants like small rocks, shredded papers, plastic debris, and labels that need to be removed. The glass must also be separated by color at a sorting facility before being remade into glass of various grades and colors. Those processes are costly, as is shipping the heavy glass to a Chicago recycler.

"The local MRF wants to stop accepting glass," Jin said. "I'm looking for a market for it, so that the facility keeps taking it for recycling."

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Matthew Tunberg holds one of the devices he built to predict weather patterns in isolated areas.

Weatherman

Graduate student builds wireless network to improve extreme weather forecasting

By Kevin Bersett

TV meteorologists catch a lot of grief for faulty forecasts. Instead of grousing on his couch, Matthew Tunberg ’20, M.S. ’22, created a tool to help these prognosticators make more accurate predictions of weather patterns.

For his master’s thesis in information systems and networks, Tunberg created a wireless mesh network of sensors, known as Internet of Things (IoT) devices, to collect weather data. He developed the low-cost network (about $500 to build) to detect changes in the weather during extreme events, like tornadoes.

“The Internet of Things is essentially a collection of small, cheap devices that work together to give us a lot more data points to make interpretations of our environment,” said Tunberg, a native of Woodstock, Illinois.

Illinois meteorologists rely mostly on information fed by two radars located in the southern and northern parts of the state, Tunberg said. His network would help cover more remote areas.

“With radar, you only have one data source. You don’t have a radar system in every single town in Illinois,” Tunberg said. “So if you are in Central Illinois or even farther away from both systems, your weather data is not going to be as accurate, because the farther out they are, the less accurate

In front are the devices Matthew Tunberg built to predict weather patterns, and behind are the covers created by Milner Library's 3D printing services to protect them.

your predictions are and less frequent they update because they operate by going in a circular motion so that they cover their areas.

"The analogy I use when I explain what I'm doing to my parents is that you wouldn't use one light bulb to light your entire house. So what I'm doing is something that's completely different than radar, and I don't see it as something that's going to replace it. I see it is an enhancement."

The goal of this project was to construct a geographical map using the IoT devices and their sensor information. From there, he could interpret the data to identify where the conditions for a tornado or another major weather event could occur.

Tunberg first thought of his weather-mapping concept during his sophomore year in Illinois State's School of Information Technology, where he also obtained a bachelor's degree in systems development. He worked on the project last year and saw it as a way to bridge his passions for technology and meteorology.

"I always had a fascination for meteorology when I was younger, and I took a couple of meteorology classes when I was in undergrad," Tunberg said. "I thought if we use the power of IoT to give meteorologists more data, that would really make their predictions more accurate."

Building the system

Tunberg created a functional design of the mesh network by August 2022 and deployed the devices last fall at a friend's farm. He adapted existing devices that were equipped with Global Positioning System (GPS) sensors, antennae, and batteries, and added a sensor that collected the humidity, atmospheric pressure, and temperature levels.

The devices use a wireless technology called low-powered wide-area network (LoRa) to communicate with each other on a sub-gigahertz frequency. The network has a broad range and built-in resiliency, especially compared with IoT systems reliant on Wi-Fi or cell towers, which can be knocked out during extreme weather or overload when there is a heavy amount of emergency calls.

"I'm not lost if one of my devices goes haywire and gets blown up by a tornado," Tunberg said. "With these, since they work on a lower frequency and they're also dependent on each other and not one cell tower, they're able to have that resiliency and repair ability of their own network. That way I can still recover my data and also give that to meteorologists for the severe weather alerts."

Tunberg enclosed his devices in storage boxes built for free by Milner Library's 3D printing services. "They're completely vented around so heat doesn't get trapped in there. They are designed so that way the wind, the pressure, the temperature easily go into the devices without letting water get in."

Tunberg's biggest challenge with the project was developing a software backbone that would enable the devices to communicate data between themselves and to a host device for analysis. He ended up repurposing the open source software Meshtastic to send data that could be retransmitted into his servers. There was one problem.

"Essentially they had this way of transmitting the data as small as possible," he said. "They cram the data into these small envelopes, and I had to find a way for my server to translate them into something that is human readable because they made it so small."

To help with the data compression analysis, Tunberg called on a friend who works as a software engineer and used the University's cloud services. Throughout the project, Tunberg also received help from the School of Information Technology. The unit covered the cost of the equipment, and his thesis advisors—Drs. James Wolf, Jihad Qaddour, Elahe Javadi, and Sumesh Philip—guided him throughout the project.

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Inspector trail

Math student creates AI-powered program for U.S. Army Engineer Research and Development Center

By John Twork

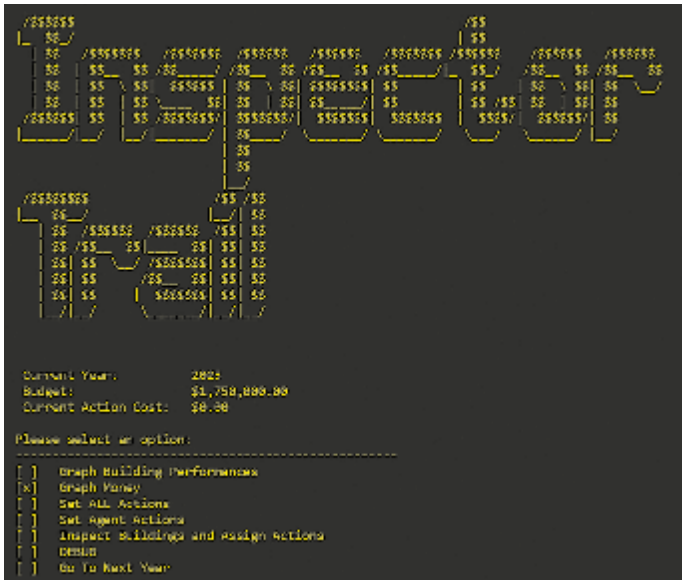
In *Inspector Trail*, Wittrock '24 is training an artificial intelligence (AI) agent—the game's "player"—to make data-informed maintenance recommendations for more than 200,000 U.S. Department of Defense (DoD) buildings across the globe. The real-world challenge facing the agent: how to most effectively invest taxpayer money in 2.2 billion square feet of DoD facilities.

"In the game, the agent is shown a bunch of data about components in a building and its inspection data, and it gets to choose a maintenance action: no maintenance, reduced maintenance, full maintenance, or complete modernization," said Wittrock.

"To have the computer agent become really good at playing the game, the idea is, you now have a computer agent that can look at buildings and make good maintenance action recommendations."

Wittrock developed *Inspector Trail* while working as an undergraduate intern during summer 2023 for the U.S. Army Engineer Research and Development Center's (ERDC) Construction Engineering Research Laboratory (CERL), which is charged with developing technologies to effectively and efficiently maintain DoD facilities.

Wittrock was named CERL's 2023 Research Assistant of the Year for his exceptional contributions. He also received the Department of Mathematics Outstanding Senior Award and earned the DoD Science, Mathematics, and Research for Transformation (SMART) Scholarship. Wittrock is now a graduate student in Illinois State University's five-year accelerated sequence in mathematics program.



Joseph Wittrock developed *Inspector Trail* to help optimize building maintenance plans for the Department of Defense.

"The thing that stood out about Joseph was his work ethic, his ingenuity, and his creativity to come up with *Inspector Trail*, a unique approach to solving this really large optimization problem," said Matt Walters, CERL's Sustainment Management System Technical Center of Expertise (SMS-TCX) chief. "The core capability of *Inspector Trail* is a tool for what we're trying to accomplish at CERL, and the by-product is a creative way to demonstrate our process to somebody who's not a data scientist. It's a framework for launching into a more production-level capability in the future."

Wittrock also contributed to a project exploring the use of building automation sensor data to provide real-time equipment diagnostics and metrics. The goal is to identify minor issues with building components before they become major problems.

"We want to use sensors and machine learning on these components, whether they're detecting the voltage, temperature, or airflow—things like that—depending on the system," Wittrock said. He presented his work on the main stage at the National Academies of Science Auditorium during the Sustainment Management System (SMS) Summit in Washington, D.C., in summer 2023.

Applying his abstract math skills to optimize DoD building maintenance was admittedly not on Wittrock's radar until he met with two CERL representatives during the 2023 University Research Symposium. They were impressed by Wittrock's project "Training a Physically Simulated Virtual Spider," in which Wittrock and his research partner Dan Beyer trained a digital spider to complete various tasks using deep reinforcement learning.

"The idea is that we want to train an agent or a robot to do a task the same way we train a human—through a reward/penalty system," said Dr. Mehdi Karimi, an assistant professor of mathematics at Illinois State who served as the project's faculty mentor. "They did really good work, and it's a very hot topic with a lot of applications, which is why this project stood out at the symposium."

Joseph Wittrock's *Inspector Trail* is training a an artificial intelligence (AI) agent to make data-informed maintenance recommendations for more than 200,000 Department of Defense buildings across the globe.

Shortly after the symposium, CERL hired Wittrock and classmate Bob Skudnig as summer interns. They joined students from Purdue University and Carnegie Mellon University on CERL's engineering team. Walters said it's the first time they've recruited math majors—but it won't be the last.

"We were generally looking for engineering, computer science, or data analytics students," Walters said. "But the work that they had both presented on stood out as something that was analogous enough that we could see the fit and were impressed by the work they had done. Now, mathematicians will be a part of our recruitment moving forward after seeing the capability and different ideas that they were able to bring to the table."

An Education Partnership Agreement (EPA) between Illinois State and CERL signed in early 2023 has paved the way for more collaborative opportunities in the future, according to Dr. Craig C. McLauchlan, associate vice president for Research and Graduate Studies at Illinois State.

"With our brand new College of Engineering, we're looking for partners where we can place our students and opportunities to collaborate on projects," McLauchlan said. "This partnership for us is an entry point to strengthen research opportunities for our students and faculty."

McLauchlan said Wittrock's experience with CERL epitomizes the journey that Illinois State is equipped to provide students. Wittrock's undergraduate research in the Department of Mathematics led to funding, through a FIREbird (Faculty-mentored Independent Research Experiences) grant from the Office of Student Research, which enabled him to develop his research, present at the Graduate School-organized Research Symposium, and land an internship with CERL through the University's educational partnership.

Scan this QR code to learn more, and read the full article in *Redbird Scholar*.

Two Illinois State University students win 2024 Goldwater Scholarships

The Barry Goldwater Scholarship and Excellence in Education Foundation provides opportunities for outstanding U.S. students with excellent academic records and demonstrated potential for research careers in the natural sciences, mathematics, and engineering. It was established by Congress in 1986 to serve as a living memorial to honor the lifetime work of Senator Barry Goldwater, who served his country for 56 years as a soldier and statesman, including 30 years in the U.S. Senate.

Nationally, 438 students were chosen from the 1,353 nominees to receive the $7,500 award.

Amelia Korveziroska

Amelia Korveziroska is in the mechanical science and engineering program at the University of Illinois at Urbana-Champaign (UIUC), as part of Illinois State's physics/engineering dual bachelor's degree program.

Originally from Prilep, North Macedonia, Korveziroska transferred from Illinois State, where she began her research experience in nanoparticle fabrication. She participated in two NSF-sponsored research experiences for undergraduates: one in solar physics at the Harvard-Smithsonian Center of Astrophysics and a second at the Illinois Materials Research Science and Engineering Center. She is currently studying at Nagoya University in Japan, which has a partnership with the Japan Aerospace Exploration Agency. Her career goals include pursuing a doctorate in mechanical engineering with a research focus in applied physics relating to space equipment.

Amelia Korveziroska is currently studying at Nagoya University in Japan.

"Receiving the Goldwater Scholarship demonstrates to me that, even if I encounter initial setbacks, I have the capability to pursue and achieve my goals with the help of my community and my own grit," Korveziroska said.

Robert Sevik (right) presents at the University Research Symposium.

Robert Sevik

Robert Sevik is from Oak Lawn, and is majoring in physics at Illinois State. He is currently conducting research with Dr. Uttam Manna and recently participated in the University Research Symposium, presenting research on optical anapoles in spherical titanium dioxide nanoparticles.

Sevik is a member of the Phi Sigma Pi National Honor Fraternity, Delta Eta Chapter, where he was elected chapter secretary for the upcoming year. He also served as risk management chair and brother at large. He also was treasurer of the Physics Club. Sevik serves as a teaching assistant and tutor for PHY 102 and PHY 105.

"I applied for the Goldwater Scholarship because I saw it as an external golden stamp of approval on my capability as a researcher," Sevik said. "The scholarship emphasizes a researcher's two most important qualities—writing scientific texts and communicating clearly and effectively. I believe receiving the Goldwater Scholarship indicated that I am on track to develop those skills well."

Dr. Natalie Shaheen wins $1.5 million NSF CAREER grant

By Aubrey Henson

Dr. Natalie L. Shaheen, assistant professor in the Department of Special Education (SED) is the recipient of a National Science Foundation (NSF) CAREER grant of just over $1.5 million. The five-year grant will address the inequities in science education for blind and low-vision (BLV) students. The NSF CAREER grant is a prestigious grant that is awarded to pre-tenure faculty who show potential to excel and become leaders in their field.

Shaheen's grant is the largest grant to a single faculty member in SED in 25 years.

"The NSF is concerned about equity in STEM education," said Shaheen. "This project is aimed at increasing the long-term accessibility of high school science classes, particularly when technology is used. We know from both research and legal actions that many technologies used in K-12 classrooms are not accessible to blind and low-vision students, and it appears the barriers may be most significant in STEM classes."

Dr. Natalie L. Shaheen and two students engage in an in-class conversation.

The project will explore what high school teachers of blind students and high school science teachers know about constructing born-accessible (i.e., proactively accessible) classes where technology is used. In a born accessible science class, all of the technology and teaching approaches are accessible from the start. That way if a BLV student chooses to take the class they do not have to wait for access, or worse be excluded from most of the learning.

"As a blind teen with STEM aptitudes, I was dissuaded from pursuing additional STEM coursework after a very inaccessible high school chemistry class," Shaheen said. "Today, over two decades later, blind and low-vision teens face similarly inaccessible science classes, even though we know how to make science classes accessible."

In addition to the research, the project will create learning opportunities for in-service and preservice teachers to learn how to construct born-accessible science classes where technology is used. Shaheen and her team will create a case library using data from Shaheen's previous qualitative research and subsequently develop modules for preservice teachers at Illinois State and later open educational resources that will be available around the world for university professors and school district professional development coordinators to use.

The NSF grant provides funding for Shaheen to build a team of younger scholars, from postdoctoral fellows to undergraduate research assistants, whom she will mentor. "I have benefited from tremendous mentorship throughout my career, and I'm excited to share what I've learned with the next generation of scholars," Shaheen said.

Shaheen shared that Director of the Center for Mathematics, Science, and Technology Dr. Bekky Darner has been one of her mentors. "Dr. Darner has had a significant impact on my scholarship since I arrived at ISU as a new faculty member," said Shaheen. "Bekky has continued to mentor me through the NSF CAREER grant writing process and provided invaluable insight that led to a funded proposal. I am deeply grateful for her mentorship and support."

Through this grant, Shaheen and her team will work toward a more equitable education system in which BLV students have access to STEM education and careers.

"Blind and low-vision people are used to navigating a world that isn't built for them and therefore have exceptional problem-solving skills, the type of skills that make great scientists," said Shaheen. "But right now blind and low-vision students rarely get to put their problem-solving skills to work in a lab. Through this grant, and my broader work, I'm trying to do my part to change the unjust status quo."

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Submissions and Awards

by College and Department/School

Fiscal Year 2024

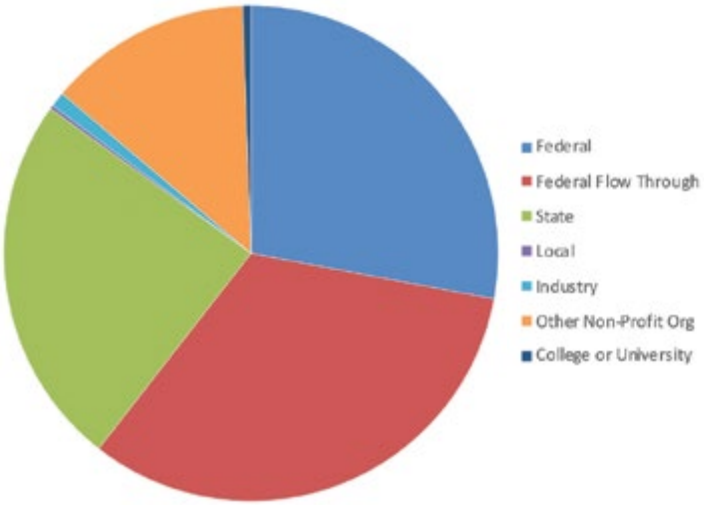
	Number of submissions	Amount requested	Number of new awards	Total expected amount awarded
College of Applied Science and Technology				
Agriculture	6	$233,473	16	$414,904
College of Applied Science and Technology	1	$5,000	1	$5,000
Criminal Justice Sciences	1	$41,283	0	$0
Family and Consumer Sciences	1	$127,642	0	$0
Health Sciences	5	$1,184,829	5	$562,200
Information Technology	8	$2,670,382	2	$611,587
Kinesiology and Recreation	5	$1,210,144	3	$4,400
Technology	9	$1,220,005	3	$315,209
College of Applied Science and Technology total	**36**	**$6,692,758**	**30**	**$1,913,300**
College of Arts and Sciences				
Biological Sciences	23	$16,604,844	15	$4,189,354
Chemistry	13	$3,359,689	7	$1,083,561
College of Arts and Sciences	0	$0	1	$5,795
Communication Sciences and Disorders	3	$75,523	2	$65,942
Communication	2	$111,668	0	$0
English	6	$277,862	4	$87,500
Geography, Geology and the Environment	7	$950,668	8	$90,619
Languages, Literature and Cultures	1	$9,954	0	$0
Mathematics	7	$398,485	4	$630,428
Physics	8	$2,510,830	4	$411,317
Politics and Government	1	$39,959	0	$0
Psychology	6	$5,474,298	6	$658,668
Social Work	10	$6,494,316	5	$748,687
Sociology and Anthropology	0	$0	1	$93,289
WGLT radio station	8	$354,530	6	$212,657
College of Arts and Sciences total	**95**	**$36,662,626**	**63**	**$8,277,817**
College of Business				
Department of Management	0	$0	1	$0
Katie School of Insurance and Risk Management	1	$29,701	2	$29,701
Marketing	1	$152,384	1	$0
College of Business total	**2**	**$182,085**	**4**	**$29,701**
College of Education				
College of Education	5	$4,032,069	5	$1,238,340
Educational Administration and Foundations	21	$8,284,876	17	$6,266,626
Illinois Tutoring Initiative	2	$4,040,000	4	$6,982,000

School of Teaching and Learning	3	$403,733	2	$187,398
Special Education	2	$2,173,627	6	$1,949,781
University High School	1	$850	2	$100,933
College of Education total	**34**	**$18,935,155**	**36**	**$16,725,078**
Wonsook Kim College of Fine Arts				
Music	6	$26,323	1	$1,900
Theatre and Dance	5	$121,521	2	$7,900
University Galleries	1	$9,600	2	$39,600
Wonsook Kim College of Fine Arts	1	$10,000,000	1	$12,069
Wonsook Kim School of Art	2	$61,748	2	$61,748
Wonsook Kim College of Fine Arts total	**15**	**$10,219,192**	**8**	**$123,217**
Mennonite College of Nursing				
Associate Dean for Mennonite College of Nursing	5	$955,002	6	$150,842
Mennonite College of Nursing	4	$34,998	4	$2,030,000
Mennonite College of Nursing total	**9**	**$990,000**	**10**	**$2,180,842**
Milner Library				
Milner Library	0	$0	2	$0
Milner Library total	**0**	**$0**	**2**	**$0**
University and Administration*				
AVP for Enrollment Management	1	$94,700	1	$94,700
AVP for Research and Graduate Studies	1	$75,000	2	$75,000
Career Services	1	$50,000	1	$50,000
Center for Mathematics, Science, and Technology	2	$1,430,268	2	$2,500,000
Center for Collaborative Studies in Mathematical Biology	1	$1,512	2	$45,104
Center for a Sustainable Water Future	1	$299,894	0	$0
Financial Aid	1	$8,040,000	0	$0
Graduate School	1	$147,500	1	$147,500
Stevenson Center	3	$114,620	6	$470,813
Student Counseling Services	0	$0	1	$238,494
University College	0	$0	1	$321,835
University Police Department	3	$171,255	1	$18,600
University and Administration total	**15**	**$10,424,749**	**18**	**$3,962,046**
Grand Total	**204**	**$83,924,480**	**168**	**$33,182,300**

*Nonacademic offices within the vice president for Academic Affairs and Provost, vice president for Finance and Planning, and vice president for Student Affairs.

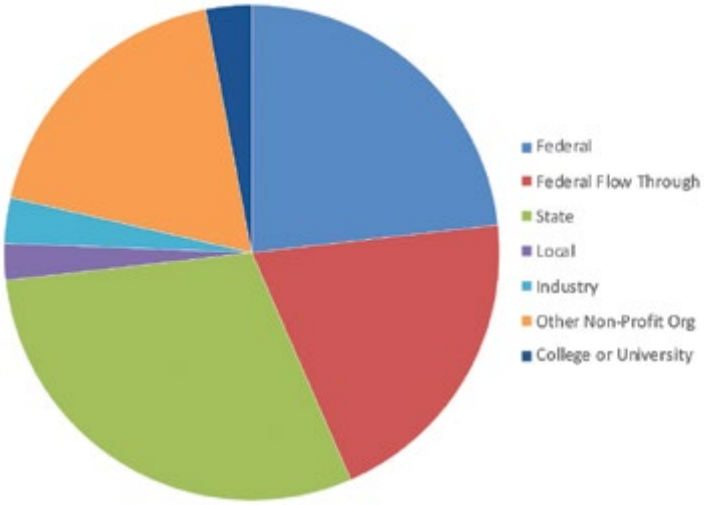
FY24 awards

Projected amount ($)



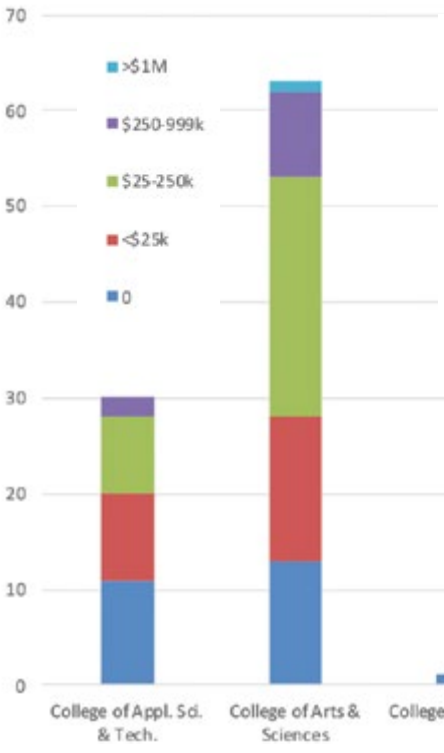
Federal	9,272,084
Federal Flow Through	10,823,331
State	8,089,962
Local	77,418
Industry	325,209
Other Non-Profit Org	4,416,639
College or University	177,654
Grand Total	**33,182,300**

Number of awards

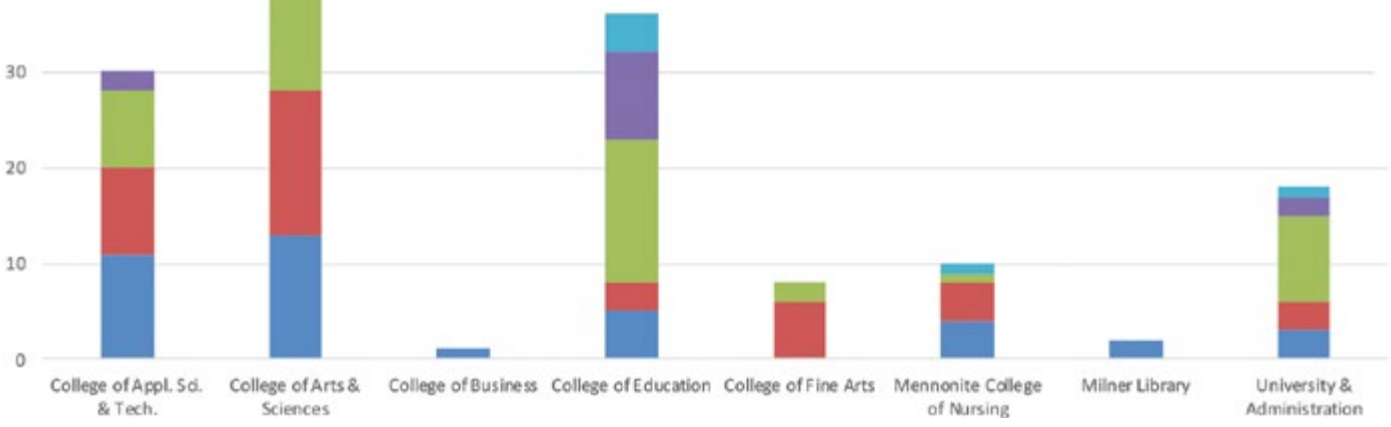


Federal	39
Federal Flow Through	34
State	50
Local	4
Industry	5
Other Non-Profit Org	31
College or University	5
Grand Total	**168**

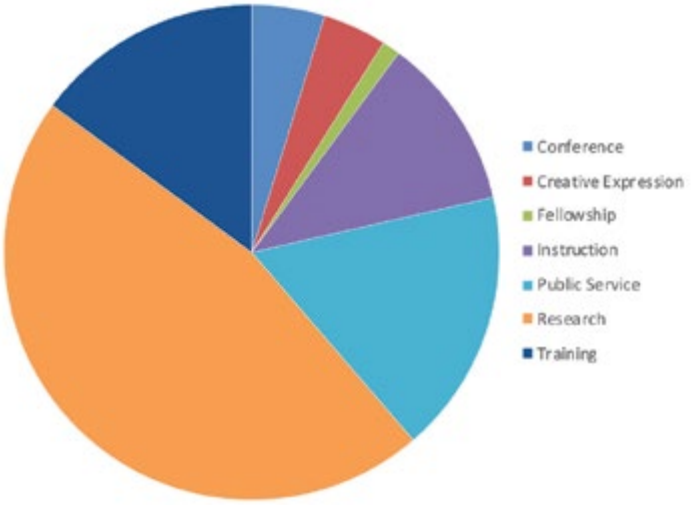
Number of awards by size



	0	<$25k	$25-250k	$250-999k	>$1M	Total
College of Appl. Sci. & Tech.	11	9	8	2		30
College of Arts & Sciences	13	15	25	9	1	63
College of Business	1					1
College of Education	5	3	15	9	4	36
Wonsook Kim College of Fine Arts		6	2			8
Mennonite College of Nursing	4	4	1		1	10
Milner Library	2					2
University & Administration	3	3	9	2	1	18
Grand Total	**39**	**40**	**60**	**22**	**7**	**168**

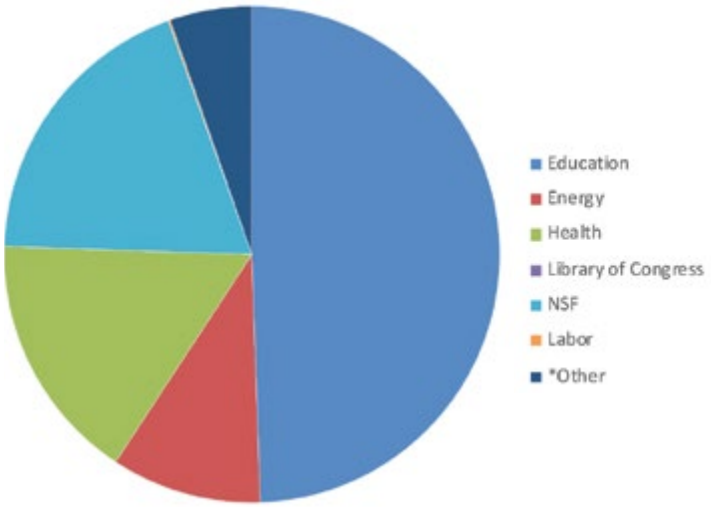


Award by activity type



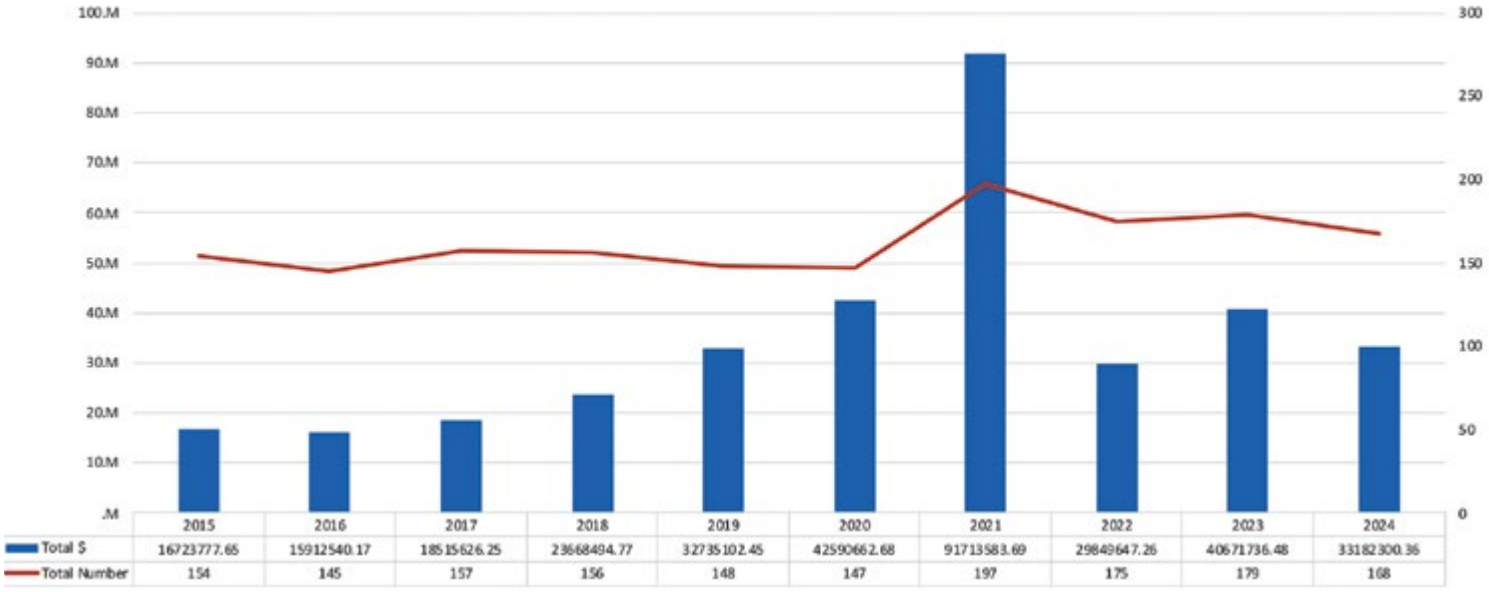
Conference	8
Creative Expression	7
Fellowship	2
Instruction	19
Public Service	29
Research	78
Training	25
Grand Total	**168**

Projected federal awards by agency

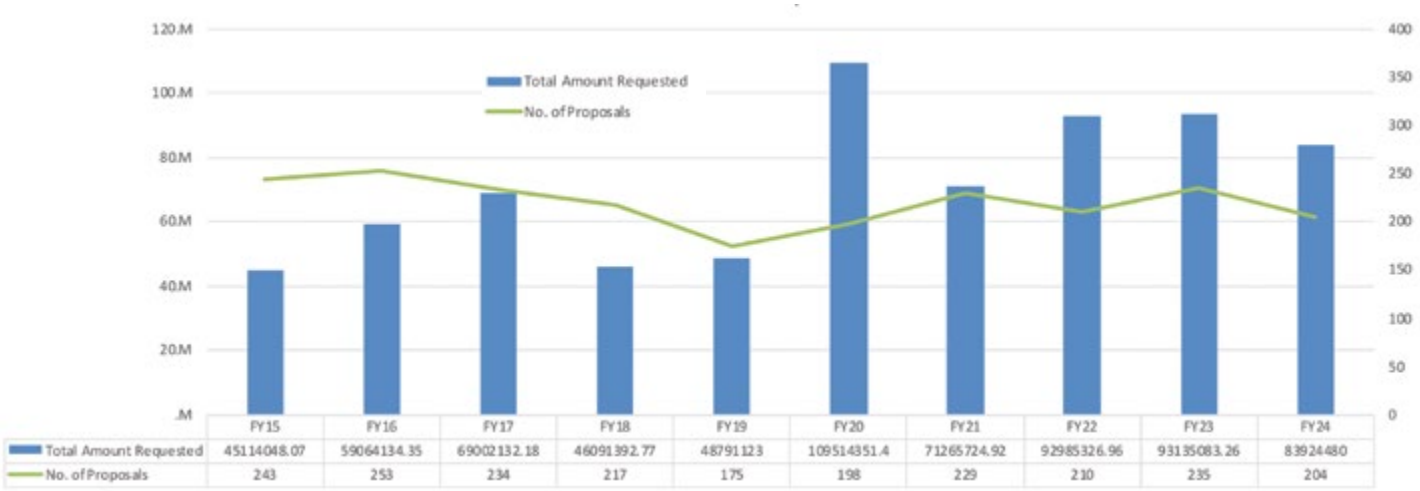


Education	9,941,347
Energy	1,968,091
Health	3,264,549
Library of Congress	0
NSF	3,821,053
Labor	24,999
*Other	1,075,374
Grand Total	**20,095,416**

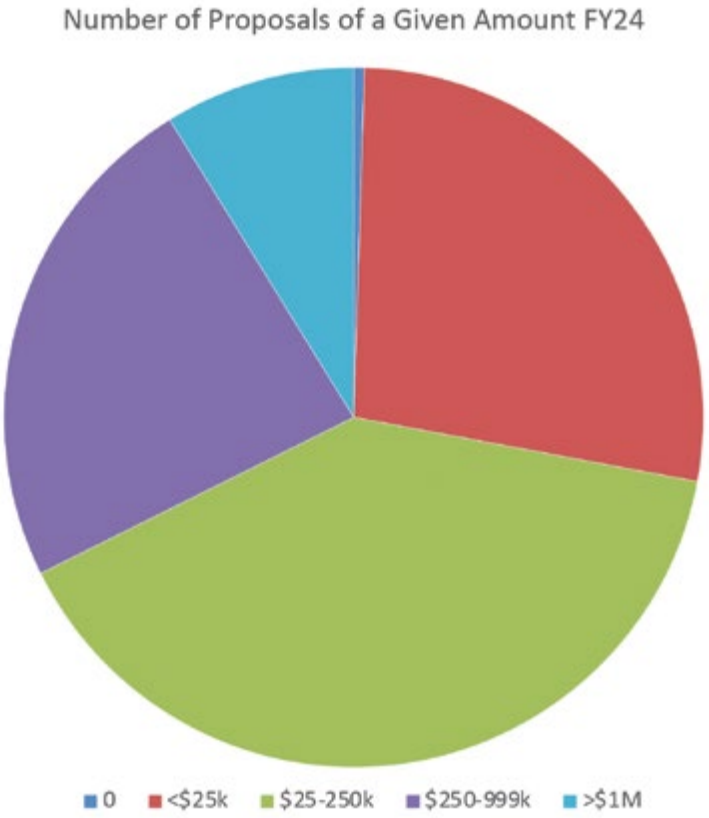
Awards at a glance



Proposals



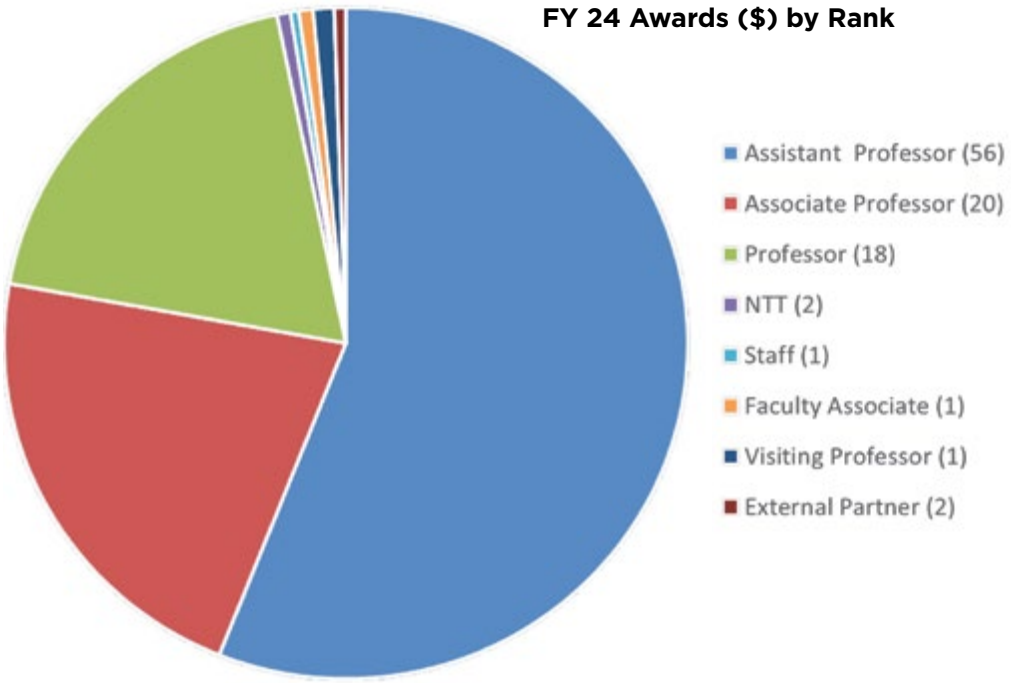
	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Total Amount Requested	45114048.07	59064134.35	69002132.18	46091392.77	48791123	109514351.4	71265724.92	92985326.96	93135083.26	83924480
No. of Proposals	243	253	234	217	175	198	229	210	235	204



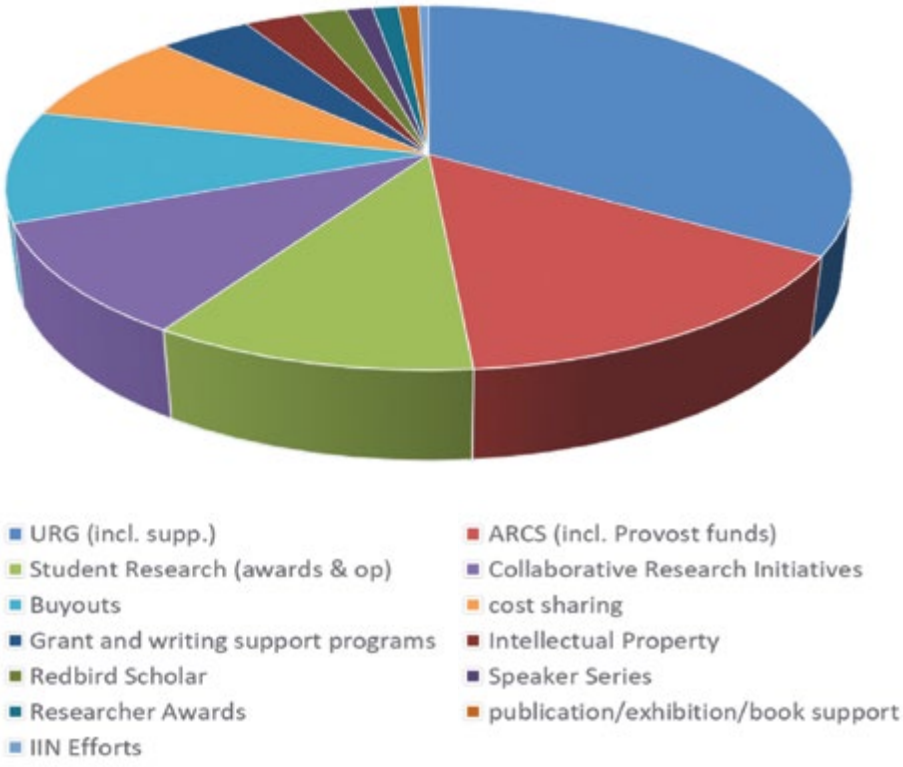
Proposals

- 56 from $25-999k
- 81 $25-250K
- 48 $250-999K
- 18 over $1M
- 204 submitted in FY24

University Research Grants (URGs)



ORGS investments



Investment

URG includes support
$357,656

ARCS (includes Provost funds)
$156,500

Student Research (awards and operations)
$110,304

Collaborative research initiatives
$105,568

Buyouts
$104,810

Cost sharing
$88,147

Grant and writing support programs
$44,977

Intellectual property
$27,750

Redbird Scholar
$22,003

Speaker aeries
$12,871

Researcher awards
$12,500

Publication/exhibition/book support
$9,969

IIN efforts
$4,880

7

FY24 awards of at least $1 million

34

total (32 unique) faculty supported through book subvention and publication/ exhibition support funds

21

patents actively held (2 new)

5,323

Web of Science listed publications since 2014

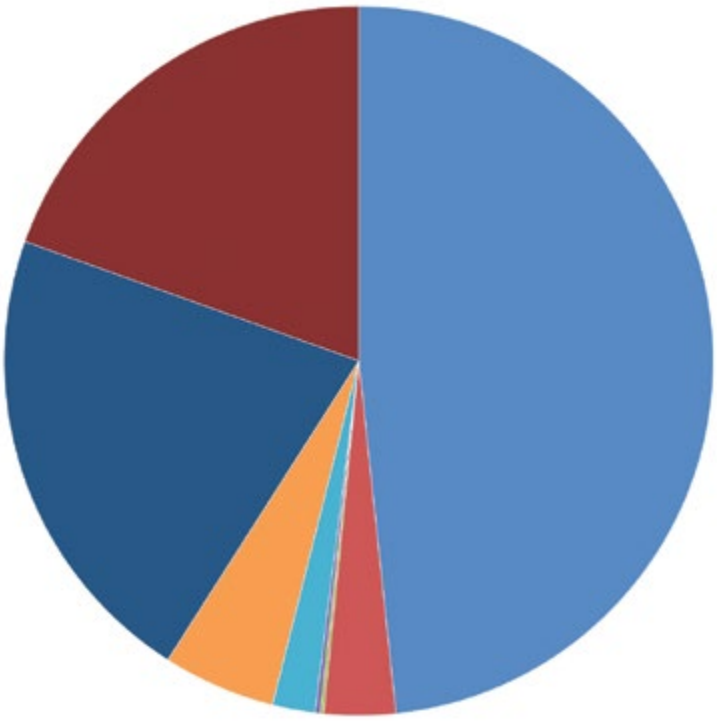
232K ft^2

designated research space

1,730

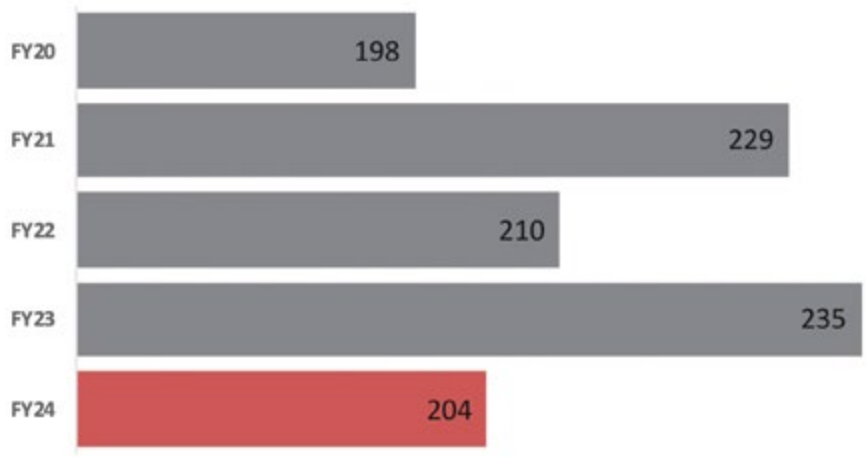
works posted to ISU ReD

Expenditure percentages

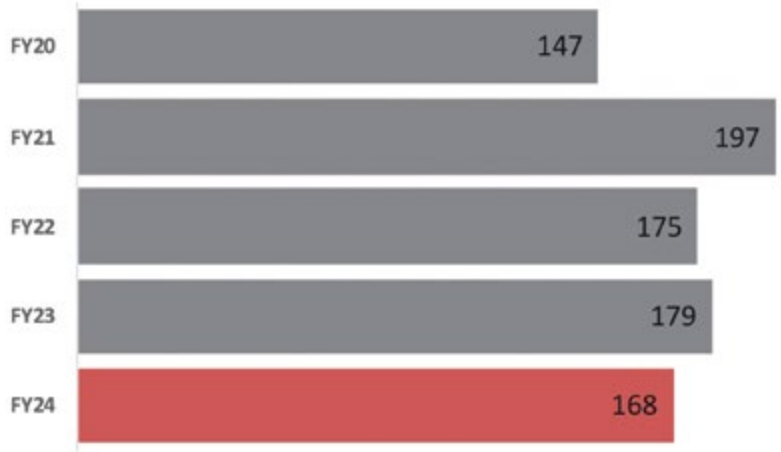


College of Education	$18,133,406
College of Applied Science and Technology	$1,220,770
Wonsook Kim College of Fine Arts	$63,403
College of Business	$83,475
Milner Library	$732,009
Mennonite College of Nursing	$1,927,282
College of Arts and Sciences	$8,033,187
University and Administration	$7,331,041
Grand Total	$37,524,577

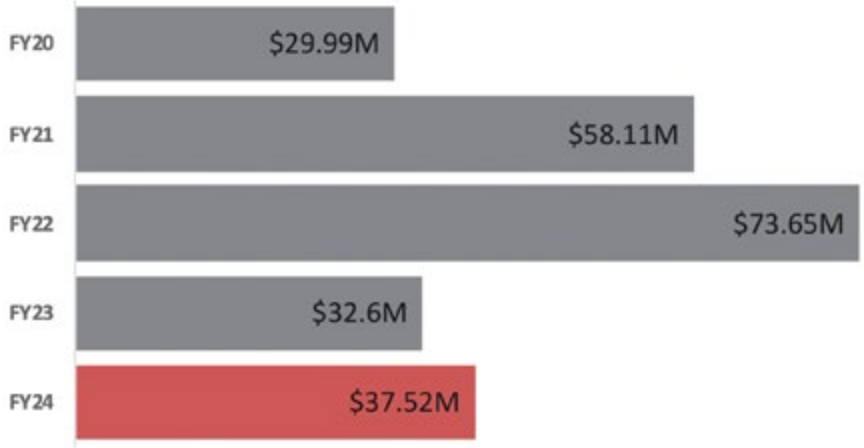
Proposals



Awards



Expenditures



3
new intellectual property disclosures

1
active tech license (15+ patents)

Writing events

10
events held on Fourth Fridays in FY24

21
faculty attended a three-day writing retreat

154
unique attendees, representing Milner Library and all six academic colleges

29
departments/schools represented

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