

RESEARCH

AND

GRADUATE STUDIES

ANNUAL REPORT FISCAL YEAR 2023



**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

Departments:

Research and Sponsored Programs

Jason Wagoner, Senior Director

Research Ethics and Compliance

Kathy Spence, Director

Graduate School

Dr. Noelle Selkow, Director

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. Frank Beck, Director

Message from the associate vice president

A university is always adapting and changing, and fiscal year 2023 (FY23) was no different for Illinois State University and the Office of Research and Graduate Studies. As a university, we have diversified our scholarship portfolio in both type and scale. We have worked 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 continue to believe that research and scholarship are a public good, which make an impact on our community both locally and all around the world. Both internal and external sources of funding make substantial contributions to the advancement of student and faculty scholarly activities, student experiential learning, and university outreach. 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.). This annual 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. I am also including activities from all across campus to highlight a broader view of our scholarship accomplishments at Illinois State University.



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

- continued supplemental funding for university research grants (URGs), the main source of internal support for faculty research;
- development of the Advancing Research and Creative Scholarship (ARCS) program, a \$3.2 million, seven-year commitment from the provost to advance interdisciplinary scholarship on campus;
- participation in helping secure approximately \$31.6 million in new expected external funding to projects for FY23 and beyond;
- submission of 236 proposals through Research and Sponsored Programs and 159 awards;
- the first post-COVID, in-person Three Minute Thesis (3MT) competition in front of a packed crowd in the Normal Theater;
- an increased investment in Read and Publish agreements, book subventions, exhibition costs, and Article Process Charges all across campus to help scholars;
- signed research agreements with several community entities, including OSF HealthCare;
- the first substantial revenue from an intellectual property license in the past decade;
- two more fantastic issues of the *Redbird Scholar* highlighting the work going on from our scholars;
- the hiring of the founding dean of our College of Engineering, Dr. Tom Keyser;
- the success of our scholars in Illinois Innovation Network activities, including with studying rural broadband to improve access in McLean County and beyond;
- continued promotion and celebration of student scholarship on campus through the Office of Student Research; adding more grant programs, extending programs to include graduate students, and continuing an Image of Research competition.

On a personal note, I had a great time being a part of the FIFA World Cup events in FY23. I co-hosted watch parties for the men's competition and organized a lecture series on topics related to the World Cup. I also enjoyed watching the women's World Cup. It was a wonderful opportunity to bring together my love for soccer, students, and scholarship.

We have exciting plans for FY24. Our new university strategic plan will focus on graduate studies and scholarship. We will search for a new president and start our ARCS program and partnerships with OSF HealthCare in earnest. In the new year, expect large awards, new chairs, and faculty searches in the College of Engineering. Our scholars will continue to improve and innovate with our partners to make a difference in the world. 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 finalized a new strategic plan for 2023-28. After gathering feedback from several stakeholders, 10 themes were identified, and goals created to carry through the next five years. We had a productive year, expanding professional development, and increasing marketing and recruitment outreach to programs. There were also a few setbacks with staff turnover and slightly decreased enrollment, but these have provided opportunities to assess where we are, identify where advancements can be made, and reevaluate how to serve graduate students and programs.



New programs

We are excited to announce a new, proposed Master in Physics program. We will begin actively recruiting students for fall 2024 after approval by IBHE.

Enrollment Growth

We strive to recruit a diverse, well-balanced graduate student body by working with programs on holistic admission practices and understanding the admission to enrollment cycle. We strive to increase enrollment from year to year.

Writing Assistance

We continue to offer writing support for graduate students with a writing fellows program. This cross collaboration with the Barbara and Larry Efaw Center for Educator Excellence will train three outstanding graduate students to serve as fellows in the program.

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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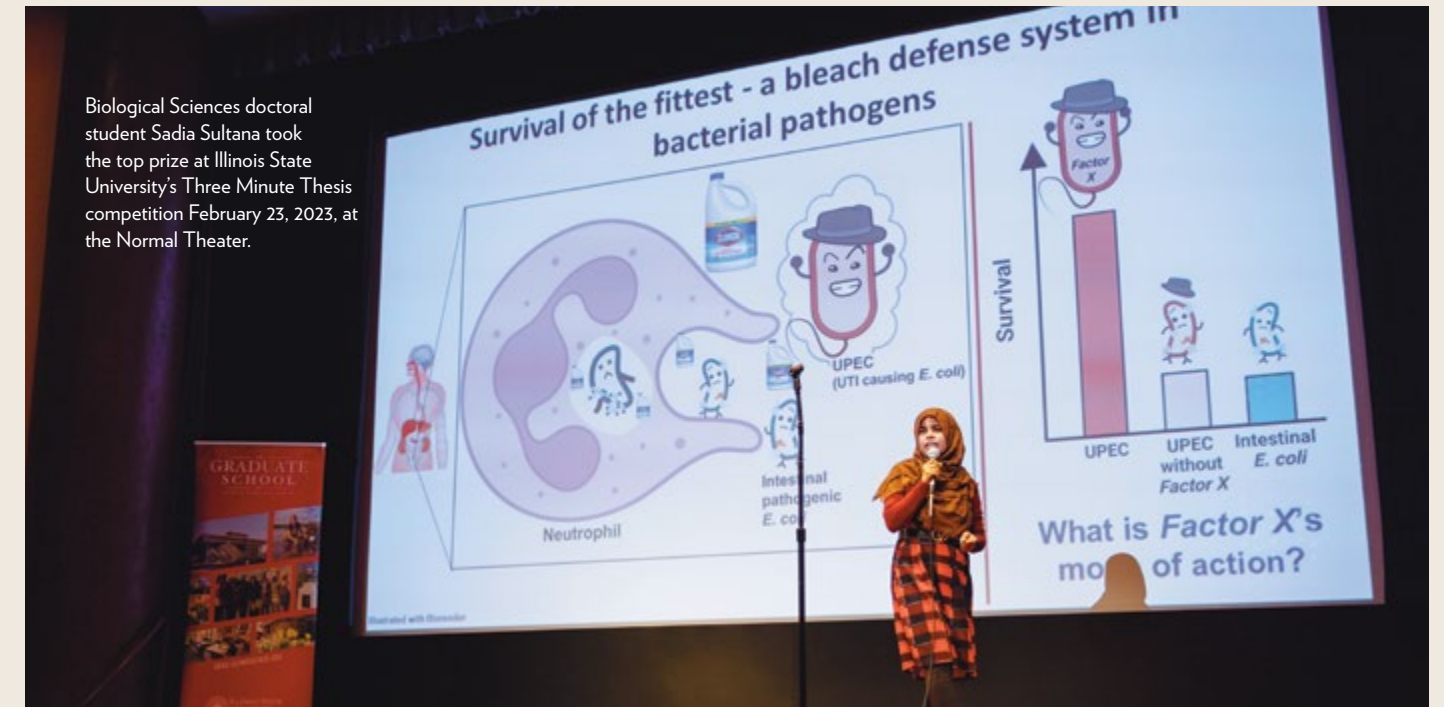
2023 University Research Symposium

On April 14, 2023, more than 460 graduate and undergraduate students participated in the University Research Symposium, presenting research and creative scholarship 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.

Here are a few highlights from the last year:

- **New staff:** We hired a new assistant director of marketing and recruitment who will also oversee domestic graduate admissions. We also hired a new communications associate to develop communication plans, oversee social media, and share the stories of graduate students and programs.
- **Student events:** We hosted our first GradBird Appreciation Week in April, which included bowling and movie nights, stress relief workshops, and swag and grab events.
- **New programs:** There were three new approved graduate programs, including a new STEM MBA, Business Analytics, and Master of Public Health.
- **Student recruitment:** We've expanded our reach for student recruitment, working with a firm to advertise our graduate programs across the state.
- **Campus partners:** We continue to partner with campus units to enhance our students' experience.
- **Virtual Career Center:** We partnered with Graduate Career Success, providing two platforms specifically for graduate students: Beyond Graduate School and Beyond the Professoriate.

We have a number of goals in 2023 and our guiding principle always goes back to: How can we best advocate for graduate students?



Three Minute Thesis (3MT)

Biological Sciences doctoral student Sadia Sultana wins Three Minute Thesis competition

Sadia Sultana momentarily posed in a fighting stance, while delivering a verbal knockout punch during her award-winning presentation at Illinois State University's Three Minute Thesis competition.

"We have a very sophisticated immune system to fight invading pathogens. An important member of our immune system is neutrophil. So neutrophils are present in our blood searching for pathogens, and whenever they recognize the pathogen, they engulf the pathogen and kill it," Sultana said.

The doctoral student in the School of Biological Sciences was explaining how her research with Dr. Jan-Ulrik Dahl has found that uropathogenic *E. coli* (UPEC), a bacterial pathogen that is the leading cause of urinary tract infections, is significantly more resistant to humans' natural defense mechanisms than *E. coli* in the intestines.

"We all have bleach-producing factories in our bodies that protect us from invading pathogens. But some pathogens like UPEC have evolved a resistance and are able to evade our immune surveillance. Whereas research like mine is shedding light on this resistant mechanism and will eventually enable therapeutic options," Sultana concluded during her speech titled "Survival of the Fittest – A Bleach Defense System in Bacterial Pathogens."

The energetic and concise presentation of a complex biomedical topic earned Sultana first place in the event, which challenges graduate students to see who can best explain their research to a general audience in 180 seconds or less with the aid of only a single static slide.

"I don't have words right now to express (how I feel), but definitely thank you to everyone," Sultana said. "Thank you to the audience and my advisor (Dr. Dahl). He really guided me throughout this. He was like, 'You need to engage people. We need to let people know this is exciting.' Life sciences is exciting, and we need other people to know it so that the next generation is coming up in biological science research and doing this exciting job."

Sultana beat out 11 fellow graduate students—the largest field in the event's seven-year history—before an enthusiastic crowd, which included Interim President Aondover Tarhule and Acting Provost Dr. Ani Yazedjian, and filled the Normal Theater in Uptown Normal with cheers following each presentation. The top prize earned Sultana \$750 and qualification into the Midwestern Association of Graduate Schools' Three Minute Thesis contest.

School of Music student Nicholas Steffenhagen won second place and received \$500 for his presentation "Musical Mastery: How Students Become Professionals." School of Theatre and Dance student Sanhawich Meateanuwat earned \$750 for the People's Choice award. Meateanuwat presented a speech titled "From Eurocentric to Global: Flipping Canonical Western Texts to Create Global Conversations."

AWARDS

Outstanding University Researchers

The Outstanding University Researcher Award recognizes faculty whose research is acknowledged at the national or international level for its quality and contribution to the profession or discipline.

Kelly Laurson, School of Kinesiology and Recreation

Kelly R. Laurson earned his master's degree at Illinois State University in 2005, then re-joined Illinois State in 2008 after completing his doctoral work at Iowa State University. Laurson is currently a professor of exercise science in the School of Kinesiology and Recreation, where he teaches courses in exercise physiology, research methods, and statistics. His research training combines physical activity epidemiology with the study of childhood growth and maturation. These interests collectively focus on understanding how physical activity and physical fitness in childhood are associated with chronic diseases, and how these factors might prevent outcomes like metabolic syndrome, cardiovascular diseases, and osteoporosis into adulthood. Much of this research centers on evaluating and designing criterion-referenced standards to promote healthy targets of aerobic and musculoskeletal fitness across the pediatric age range. These standards are widely used to provide health-based feedback to youth, parents, and practitioners in the U.S. and abroad.

Eric Peterson, Department of Geography, Geology, and the Environment

Eric Peterson is a professor of hydrogeology and the graduate coordinator for the Hydrogeology Master of Science program at Illinois State University. He earned a B.S. in earth science and mathematics (1995) and an M.A. in mathematics (1997) from the University of South Dakota, an M.S. in geology from the University of Arkansas (1998), and a Ph.D. from the University of Missouri (2002). From 2012-15 he served as interim chair for the Department of Geography, Geology, and the Environment. He has advised 53 theses and served on the thesis committees of 54 students. His research interests center on the interaction of surface water and groundwater. More specifically, he has worked in karst systems to examine

how flow controls formation and in glaciated areas of the Midwest where agriculture and urbanization are impacting both surface water and groundwater. He served as secretary-treasurer of the Hydrogeology Division of the Geological Society of America and has served the Illinois Groundwater Association in numerous capacities, including chair and secretary. Eric is a Geological Society of America Fellow. In 2018, Eric was named a university professor.

Wolfgang Stein, School of Biological Sciences

Wolfgang Stein was born in Germany and conducted his graduate research in the lab of Dr. Ulrich Baessler. He received his Ph.D. in biology from the University of Kaiserslautern in 1998. From 1998-99, he was a postdoctoral fellow in the biological cybernetics laboratory of Dr. Hulk Cruse at the University of Bielefeld, before starting a postdoc with Dr. Michael Nusbaum at the University of Pennsylvania Medical School. Following this, Stein returned to Germany and joined the University of Ulm to start his own lab as a junior group leader. In 2012, Stein accepted an assistant professor position in the School of Biological Sciences at Illinois State University, where he received tenure in 2015 and was promoted to full professor of neurophysiology in 2019. In 2021, he was named senior fellow of the Alfried Krupp Institute for Advanced Science in Greifswald, Germany, where he spent one year conducting research at the Baltic Sea.

Stein's research interests concern the mechanisms by which nerve cells and brain circuits produce long-lasting and stable activity, and the processes that neuronal systems have evolved to make this activity robust against challenges that animals face in their everyday lives. The Stein lab uses electrophysiology, optical imaging, and molecular tools to investigate the cellular mechanisms that make neuronal activity stable. A current focus of the lab is the study of neuropeptides, a class of chemicals released in the brain that allow neurons in cold-blooded animals to withstand the temperature challenges imposed by climate change. Stein's NSF-funded research has received over \$1 million in grant support and resulted in over 30 peer-reviewed papers since his arrival at Illinois State. Almost all of these publications are with students and postdocs from his lab.

University Research Initiative Awards

The University Research Initiative Awards are presented to faculty who, within their first five years at Illinois State University, have initiated a promising research agenda early in their academic careers.

John Blakeman, Mennonite College of Nursing

Jan-Ulrik Dahl, School of Biological Sciences

Linsay DeMartino, Department of Educational Administration and Foundations

Laura Finan, Department of Psychology

Alec Foster, Department of Geography, Geology, and the Environment

Chang Su-Russell, Department of Family and Consumer Sciences

Outstanding University Creative Activity Award

This award is given for outstanding creative work. Creative contributions include but are not limited to the following: painting, sculpture, film, drama, musical composition, choreography of a dance, poetry, a novel, creative nonfiction, and creative media programming. The contribution(s) must have been recognized in the field as having national and/or international significance. This award is not designed to recognize a single major work, but consistent and sustained contributions to the profession, discipline, and field.

Roy Magnuson, School of Music

The music of Roy David Magnuson has been performed throughout the United States and Europe at venues such as the World Saxophone Congress, NASA, WASBE, CBDNA, the RED NOTE New Music Festival, and the Robb Composers' Symposium. Roy is an associate professor of composition and creative technologies at Illinois State University where he also coordinates university XR Develop as the co-director of XR @ ISU. He is the creator of the virtual reality composition software solsticeVR, and co-creator of the virtual reality conducting pedagogy RibbonsVR: Virtual Reality Assisted Conducting. Roy is a member of the American Society of Composers, Authors, and Performers (ASCAP), and his music is recorded on Albany Records, NAXOS, and Tonsehen Records.

Creative Activity Initiative Award

This award shall be given to recognize faculty members who have initiated promising creative productivity early in their academic careers. Creative contributions include but are not limited to the following: painting, sculpture, film, drama,

musical composition, choreography of a dance, poetry, a novel, creative nonfiction, and creative media programming.

Matt Caplan, Department of Physics

Kee-Yoon Nahm, School of Theatre and Dance

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 Illinois State community." For a list of previous inductees, visit the Illinois State Research page at Research.IllinoisState.edu/about/awards-recognition/million-club.

Deneca Avant, Office of the Provost

Alan Bates, School of Teaching and Learning

Shatoya Black, University College

Christina Borders, College of Education

Jin Jo, Department of Technology

R.C. McBride, School of Communication/WGLT

Allison Meyer, School of Teaching and Learning

Nichelle Michalak, Department of Special Education

Amelia Noel-Elkins, Office of the Provost

Noelle Selkow, Graduate School

Amy Smith, Education Administration and Foundations

Jeritt Williams, Center for Math, Science, and Technology

Distinguished Professors

Cheri Simonds, School of Communication

Simonds is committed to improved teaching at both personal and programmatic levels. She views students as active agents in the learning process rather than passive subjects. She has conducted numerous workshops on classroom communication variables such as teacher clarity, credibility, and immediacy.

She has published several textbooks and works in numerous journals related to introductory public speaking courses and instructional communication. She has presented many papers at national conventions and regional conferences. She has received three National Communication Association (NCA) Advancing the Discipline grants and recently received the Distinguished Faculty Award from the NCA. She has also



Dr. Cheri Simonds

produced several award-winning videos, samples of which are used in introductory communication courses across the nation.

Simonds received the Outstanding College Researcher Award in 2015-16, the Outstanding University Researcher Award in 2016-17, was selected as a College of Arts and Sciences Distinguished Lecturer (focused on discussion about designing general education curriculum with assessment in mind) for 2022-23, and was the inaugural recipient of the John Chizmar and Anthony Ostrosky Scholarship of Teaching and Learning Award in 2014.

Combining research with service, Simonds has served on many university and college committees including search committees, the General Education Committee, and the College Faculty Status Committee. She has served on the Teaching Effectiveness, Graduate Work-Team, and NTT Evaluation Team for most of her time at Illinois State. Google Scholar Metrics show over 4,000 citations for her works, with over 1,400 of those being since 2017.

Simonds received an undergraduate degree from Oklahoma State University, a master's degree from University of North Texas, and a doctoral degree from the University of Oklahoma.

Justin Vickers, School of Music

As a professor and artist teacher of voice, Dr. Vickers not only teaches, researches, and performs university service, but is a classically trained opera singer and a historical musicologist. A prolific researcher, he is a leading international authority on the music and life of the English composer Benjamin Britten. Last year, his six-month Fulbright scholarship to the United Kingdom included a residency in Aldeburgh, England, at Britten's former home, The Red House.

Since joining Illinois State University's School of Music in 2012, Vickers has risen through the ranks, becoming a full professor in 2021. His research and creative activity falls into seven areas: public performance, lecture-recitals, recording projects, musicological publications, archival research and analysis, edited anthology, and public lectures. He strives to bring each aspect into his classroom teaching.

Vickers is the author of numerous monographs, book chapters, and articles. He has delivered papers, lectures, and recitals around the world and has recorded countless projects, including world premiere songs. He has served on multiple college and university committees, including the College Faculty Status Committee, College Research Committee, Academic Senate, search committees, and as ombudsperson. He has also served on the board of directors for the Illinois Symphony Orchestra, the board



Dr. Justin Vickers

of the North American British Music Studies Association (NABMSA), and has completed the Multicultural Leadership Program (later joining its board). He was instrumental in bringing the NABMSA conference to campus twice.

In 2020, Vickers received the Wonsook Kim College of Fine Arts Outstanding Researcher Award, and in 2022 he received the University Outstanding Researcher Award. He has also won college and school awards in teaching and service.

University Professor

Alison Bailey, Department of Philosophy

The Office of the Provost announced Dr. Alison Bailey has been named university professor for Illinois State University. Bailey joined the Illinois State University faculty in 1993 as an interdisciplinary hire between the Department of Philosophy and what was then called the women's studies program. Now known as Women's, Gender, and Sexuality Studies, she has directed the program for almost 20 years.

Bailey is a nationally recognized scholar in her discipline, but she started out as a peace activist. "I never set out to teach philosophy," she said, "but I knew that I loved it. In hindsight, the moral and epistemic dimensions of my social justice activism have been at the heart of my scholarship for three decades."

Trained as a feminist philosopher, Bailey's scholarship engages questions at the intersections of philosophy of race, critical whiteness studies, and epistemic injustice. She has published two books, 10 invited book chapters, and numerous journal articles. She has co-edited two anthologies, guest-edited two special journal issues, and co-edited *The Feminist Philosophy Reader* (2008). She has given more than 50 conference presentations, including a recent author-meets-critics panel on her book at the American Philosophical Association meetings. According to Chris Horvath, her recent book, *The Weight of Whiteness: Feminist Meditations on Privilege, Race and Ignorance* (2021) has rapidly become recognized by scholars "as essential reading on the epistemologies of ignorance and white privilege." Bailey's recent research project on privilege and anesthesia continues the "weighty conversation" she began in the book.

Bailey has a reputation as a gifted and dedicated teacher and mentor. Her impact will be felt for many years as a significant number of her students have gone on to become university professors. She also continues to mentor many young faculty on campus.



Dr. Alison Bailey

OSF HealthCare, Illinois State launch initiative to transform health care

A newly formalized partnership between Illinois State University and OSF HealthCare will foster research, innovation, and economic development across Illinois. The Connected Communities Initiative (CCI) program will bring together clinicians, university faculty researchers, and students to focus on innovation in clinical and patient education, health care engineering, data science, and cybersecurity.

The program is a formalization of the partnership between these two anchor institutions in Bloomington-Normal and the broader OSF HealthCare system. Illinois State and OSF HealthCare are lead hub members of the Illinois Innovation Network (IIN).

The collaborative work in the Connected Communities Initiative has the potential to generate intellectual property that the two institutions can share and advance the IIN mission of driving inclusive and integrated research, innovation, and economic development across the state.

The agreement also provides a financial foundation for the work with both organizations providing \$500,000 each, to contribute a total of \$1 million annually for research and development of strategic solutions to improve health care delivery, and patient and provider experience.

"We believe expanding academic collaborations can help us create innovative solutions and new care models that provide more access, particularly to underserved populations," said CEO of OSF HealthCare Bob Sehring. "This partnership with Illinois State University will leverage the strengths of faculty and students and will create a pipeline of talent we hope to recruit and keep, including cybersecurity experts, health and simulation educators, informaticists, data scientists, biomedical engineers, and graduates in the creative arts who can help us with medical visualization for virtual, augmented, and mixed reality. This will also build on our long-standing clinical and educational partnership with Mennonite College of Nursing at ISU."

"Working with OSF HealthCare on the CCI Program reflects Illinois State's core values of Collaboration, Learning and Scholarship, and Civic Engagement," said Illinois State Interim President Aonover Tarhule. "This partnership will provide many opportunities for Illinois State faculty and students to work with our partners at OSF on a wide range of innovative projects that address real-world needs. This is truly an exciting project that will have wide-ranging benefits for all involved."

The partnership will initially build on Illinois State's expertise in education, health, cybersecurity, biomedical science, visualization, and process improvement. There will be opportunities for Illinois State's academic colleges to collaborate on projects with OSF Healthcare. The broad range

of faculty expertise and the engagement from the student body will lead to exciting new solutions to complex problems facing society.

"There is a long tradition of partnership between OSF and Illinois State, perhaps most clearly with students in clinical placements and in clinical situations," said Craig C. McLauchlan, Ph.D., Illinois State's associate vice president for Research and Graduate Studies. "The CCI expands



The signing of the Illinois State University and OSF Healthcare agreement. Clockwise from top left, Illinois State Associate Vice President for Research and Graduate Studies Craig C. McLauchlan; Vice President and Chief Medical Officer for OSF Innovation and Digital Health John Vozenilek, M.D.; CEO of OSF

that relationship in the area of research and provides an institutional framework that will allow us to build on already existing collaborations more easily. The partnership will provide students and persons in our community opportunities to contribute to innovation and growth that will benefit many."

OSF Healthcare and Illinois State University have a tradition of collaboration on research, including a recent project to improve low childhood vaccination rates.

Joint projects can include testing solutions in clinical spaces, such as OSF HealthCare St. Joseph Medical Center and medical offices. The efforts will take place both virtually and in-person in a variety of settings including ISU labs and computer centers, along with the Jump Simulation & Education Center in Peoria, a world-class building with labs focused on advanced imaging and modeling, blockchain, children's innovation, genomics and precision medicine, interprofessional education, neuro health, and STEAM.

OSF HealthCare and Illinois State University have expanded their partnership to develop innovative solutions using data to improve patient care and health outcomes. The collaboration is built upon successful models that OSF Healthcare has developed with other universities, including the University of Illinois Urbana-Champaign, University of Illinois-Chicago, and Bradley University.

ORGS RESEARCH CENTERS

Adlai Stevenson II Center for Community and Economic Development

Adlai Stevenson II Center for Community and Economic Development students partnered with The Immigration Project (TIP) in an assessment of the organization's mission impact. Surveys were constructed in Spanish, French, and English and administered to the patrons of TIP. Importantly, the students worked with TIP staff in designing the survey and analyzing the results. As sustainability is important to any community initiative, the students provided the surveys to TIP and also built other post-visit surveys that can be implemented to immediately measure outcomes.



ECO student Randall Dimmette-Schweigert, right

Over the 2022-23 academic year, students completed six capstone papers of use to their professional practice organizations. The research covered topics from community-based reentry programs for those in the criminal justice system, community-engaged approaches to civic education, inclusionary zoning in Illinois, and current housing conditions of farmworkers around the United States. For his approach to a psychoanalytic sociology, Dani Park sociology, was the College of Arts and Sciences (Social Sciences) nominee for the James L. Fisher Outstanding Thesis Award.

As we train undergraduate and graduate students in data management, the Stevenson Center has continued its work with McLean County's Criminal Justice Coordinating Council (CJCC). We track the jail population by severity of charge, race, and sex. We are concluding a large study of juveniles in the court system. The CJCC hopes we can identify patterns among juveniles and common precursors to adult involvement

with the courts; the goal is to lessen that involvement by interceding before someone is 18. The newest project is for the Behavioral Health Coordinating Council; we are analyzing data from those in the Frequent User System Engagement (FUSE) program, hoping to see that the wraparound services provided to those with mental health and behavioral health issues experience fewer negative outcomes.

Center for Mathematics, Science, and Technology

Over the past year, the Center for Mathematics, Science, and Technology (CeMaST) continued STEM education outreach with community partners, including the Western Avenue Community Center, Bloomington School District 87, and the YWCA, reaching over 130 local youth through summer camps and afterschool programs. Our STEM educator professional development over the last year included a three-part series with Dr. Bryan Dewsbury focusing on inclusive STEM teaching practices and serving nearly 20 STEM faculty and graduate students across campus. CeMaST also hosted the



ISRA group photo

Illinois Summer Research Academy, attended by 51 high school students, and the High School Research Symposium, at which 107 students presented their research. We continued to support STEM teachers with the Midwest Noyce Conference, held in Little Rock, Arkansas, and we are currently organizing the next annual conference to happen in St. Louis. A grant provided by Howard Hughes Medical Institute has also allowed for the start of a STEM ambassadors program in which undergraduate students learn how to become change agents in their STEM fields and evolve STEM disciplines toward more equitable and inclusive practices by conducting

participatory action research. This grant also funds a new Inclusive Excellence STEM Fellowship, which is a program to support STEM faculty in fostering equitable and inclusive STEM teaching practices at Illinois State.

Perhaps the biggest change around CeMaST is that we moved. No longer housed in the building formally called the Campus Religious Center, CeMaST is now on the other side of campus in the Professional Development Annex building, next to the Honor's Building on Main Street.

As we move into this next year, our work with the STEM Ambassadors, the Inclusive Excellence STEM Fellows, and summer camps continues, and with our new location, we hope to get our STEM Hub up and running so STEM students of all ages will be able to engage in integrated STEM learning experiences and become excited for their STEM futures.

Center for a Sustainable Water Future

The Center for a Sustainable Water Future hosted a Water Wednesdays series in fall semester 2022. The first speaker in the series was Elisabeth Reed, director of the Office of Sustainability, who discussed Illinois State's sustainability strategic plan. The second speaker was Dr. Nathan Kapoor, assistant professor of History, who gave a presentation titled "Self-Sufficiency and the Colonial Imaginary: New Zealand's Hydroelectricity and Colonialism." The third and final speaker was Dr. Eric Peterson, professor of Geology, who gave a presentation titled "Saturated Buffer Zones and Implications for Nutrient Management."

During spring semester 2023, the Center for a Sustainable



Zach Welcker presentation

Water Future hosted a program to mark World Water Day. The program featured a guest speaker, Zach Welcker, who is the legal director of For Love of Water (FLOW). Zach Welcker visited and spoke to GEO 103/POL 103 (Thirsty Society: An Interdisciplinary Examination of Water) on March 21. He also gave a public lecture in the evening on March 21 to an audience of 40-45 people. The public lecture, which was held in the Circus Room in the Bone Student Center, was titled "Tribal Sovereignty & Water: The Long View on Water Use and Management."

Together with the Office of Student Research, the Center for a Sustainable Water Future co-sponsored a FireBird Grant in summer 2023. The grant was awarded to Kiana Itschner-Washington of Peoria (School of Biological Sciences), to support her research project titled "Freshwater Soundscapes: Do fish howl at the moon?" with faculty mentors Dr. Bill Perry and Dr. Catherine O'Reilly.

The Center for a Sustainable Water Future offered POL/GEO 103 for general education and as the core class for the minor in water sustainability in spring 2023. The minor currently enrolls 18 students.

The Center for a Sustainable Water Future helped coordinate and submit three ARCS grant proposals in spring 2023. Each proposal involved faculty from different departments at Illinois State, and two of the three proposals involved community partners. The proposal titles are: "Mediating Flooding and Water Quality Impacts from Climate Change on Environmental Justice (EJ) Neighborhoods Through Green Infrastructure Retrofits"; "Cleaning Up the River Without Clearing out the Neighborhood: Floating Gardens in the Chicago River"; and "Development of Novel Cover Crops and End-use Applications Enable Economically and Environmentally Sustainable Systems."

Center for Collaborative Studies in Mathematical Biology

The Center for Collaborative Studies in Mathematical Biology (CCSMB) had a very active research year in 2023.

1) We have obtained a National Science Foundation (NSF) grant for over \$45,000 to support an international conference in biomathematics and ecology education and research. This is one of the biggest events in the world of biomathematics, sponsored by the Intercollegiate Biomathematics Alliance (IBA). IBA is a multi-university consortium that collaborates to advance research and education of biomathematics. Illinois State is the hub of IBA. The conference, fondly known as the BEER (Biomathematics and Ecology Education and Research) symposium, was hosted at Virginia Commonwealth University, Richmond, Virginia, November 3-5, 2023.

2) We hosted one of the largest undergraduate biomathematics research experience workshops at Illinois State from May-June 2023. The event, Cross-Institutional Undergraduate Research Experience (CURE), hosted over 30 students and faculty from a large spectrum of universities initiating and conducting research in biomathematics. The research results that CURE groups produce are presented at the BEER symposium.

3) Thanks to the collaboration between the Office of Student Research (OSR) and CCSMB, this year several students are attending the BEER symposium, showcasing the research they conducted at Illinois State.

4) A research journal, *Letters in Biomathematics*, sponsored by CCSMB and IBA, has published its 11th volume. The



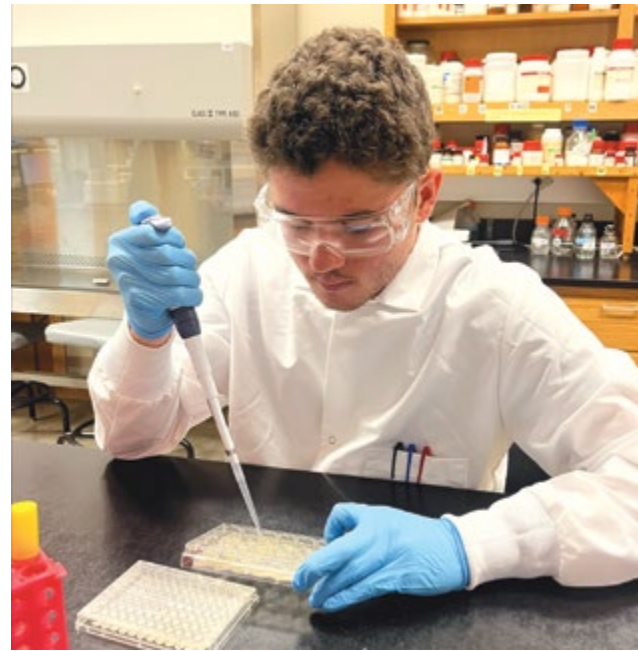
BEER conference attendees, *above*, and Cross-Institutional Undergraduate Research Experience (CURE) students, *below*

journal is indexed by all major indexing agencies and has an international reputation for being selective and publishing high quality articles.

5) Another biomathematics research journal specializing in student-oriented research in biomathematics, *SPORA*, is now 10 years old. *SPORA* is the only journal of its kind in the world and sponsored by CCSMB-IBA.

Office of Student Research

Grady Jacobson was a freshman biochemistry student when he received a \$3,000 FIREbird grant that allowed him to pay himself to do research over 10 weeks last summer. Under the mentorship of Dr. Jan Ulrik-Dahl, Jacobson worked with the lab team to examine the genetic variations in *Escherichia coli* (*E. coli*) bacteria that produced resistance to hypochlorous acid (HOCl), the active ingredient in bleach. Their research was published in the *Journal of Bacteriology*. Now a sophomore with a publication, Jacobson is set up to compete for the 2024 Barry Goldwater Scholarship, a nationally prestigious scholarship for juniors and seniors planning to pursue research careers in the natural sciences, mathematics, and engineering, which is coordinated through the Office of Student Research (OSR). If he wins, Jacobson will be following in the footsteps of his fellow biochemistry students, Katherine Helmink and Brianna (Sage) Lauper-Cook (faculty mentor Dr. Lisa Szczepura), two of 412 students nationwide



Grady Jacobson, recipient of the FIREbird grant

to win the 2023 award. For science students like Jacobson, Helmink, and Lauper-Cook, undergraduate research is a prerequisite for admission to graduate programs. However, research is not just for STEM majors, or for those who intend to pursue research careers.

Student research fosters competencies such as critical thinking, creativity, problem-solving, and intellectual independence that directly relate to career readiness in many fields. OSR defines research broadly to include scholarship and creative activity that seeks to contribute to knowledge. Our grantees come from departments across campus: art, agriculture, communications, math, nursing, special education, psychology, sociology, and theatre to name just a few. In FY23, 34 FIREbird grants provided undergraduate students from 17 different departments the chance to work closely with a faculty mentor on a research project. An additional 34 graduate and undergraduate students from 16 different departments won BirdFEEDER awards that provided up to \$500 each in support of their research projects. Because dissemination is key to all scholarship, OSR helped 57 students travel to regional, national, and international conferences to share their research findings through the FY23 Pinion grant program.

Beyond funding, OSR enables student research by helping students to locate research mentors and opportunities both on and off-campus. We provide co-curricular professional development for students, advocate for student research on campus committees, and highlight the excellent scholarship our student researchers and their faculty mentors accomplish through university media and the annual Image of Research competition.

FEATURED RESEARCH

Dr. Martin Engelke awarded \$1.6 million NIH grant for cell physiology studies

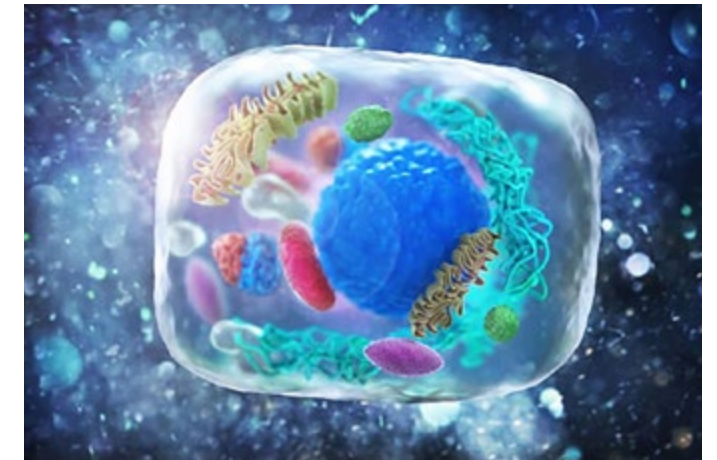
By Rachel Hatch

Dr. Martin Engelke has received a \$1,653,423 Maximizing Investigators' Research Award (MIRA) from the National Institutes of Health to advance studies on a cellular level.

The five-year grant will fund Engelke's student-centered research laboratory at Illinois State to explore mechanisms that regulate transport processes within cells, specifically inside a specialized organelle called the cilium.

Cilia, which is Latin for eyelash, act as microscopic, signal-receiving antennas of cells. "If cilia malfunction, problems can occur, such as polycystic kidney disease, blindness, obesity, and cancer," said Engelke, an assistant professor of biology at Illinois State. His lab specifically examines a motor protein called Kinesin-2 that acts like an engine powering the movement of cargo trains carrying things cells need. "When something is wrong with Kinesin-2, the cargo trains do not move, and cilia either are not formed or do not function properly," he said.

Engelke's lab looks at what happens when the transport powered by the molecular motor Kinesin-2 is impaired. He hopes students who join the work in his lab will discover how the activity of the Kinesin-2 "motor" is regulated to power this intricate transport process. "If understood, these insights can potentially inform the development of treatment strategies to



Illinois State University's Dr. Martin Engelke has received a \$1,653,423 Maximizing Investigators' Research Award (MIRA) from the National Institutes of Health to advance studies on a cellular level.

alleviate or even cure human diseases caused by malfunctioning transport in cilia," said Engelke.

The work is funded through the National Institute of General Medical Sciences (NIGMS) within the National Institutes of Health. NIGMS works toward an understanding of biological processes and lays the foundation for advances in disease diagnosis, treatment, and prevention.

"I am grateful to NIGMS for considering laboratories at universities with comparatively smaller research programs, like ISU, for MIRA awards," said Engelke. "This flexible and longer-term funding allows investigators to unfold their creativity and true passions."



DISCOVERIES IN THE DATA

High Performance Computing cluster powers cutting edge research

By John Twork

Illinois State University's High Performance Computing (HPC) cluster, launched in 2020 in Julian Hall, provides researchers a supercharged tool to efficiently analyze big data sets.

Assistant Professor of Physics Matt Caplan frequently uses the HPC for his research on astromaterials—the small yet remarkably dense solids that form inside dead stars many light years away from Earth. “I use big computer simulations to calculate the properties of very tiny bits of matter so that we can understand the properties of big things like the cores of stars, big bangs, and black holes,” Dr. Caplan said.

The HPC consists of 30 powerful, interconnected servers called nodes that process massive amounts of data simultaneously to perform complex calculations. What would take a standard computer years to compute can be processed by the HPC in a matter of weeks or months.

“In parallel computing, multiple brains are better than one,” said Dr. Rosie Hauck, executive director of the Office of Advanced Technology Support for Faculty. “All of the nodes are working together, which is why they're able to do these heavy computational problems in a shorter amount of time.”

For example, Caplan uses an HPC simulation to determine how helium nuclei particles change the radioactive

decay rates of thorium in white dwarf stars. He sets parameters—such as the size of the simulation, the temperature, the magnetic field strength, the number of nuclides, and the density of the matter—all from his Moulton Hall office computer.

“And then you just push a button, and it goes,” Caplan said.

HPC nodes process the data to Caplan's specifications utilizing a research code that he and his astrophysicist colleagues developed over the past several years.

“If you want to do a simulation, what you really have to do is a lot of math—and there's too much math for you to do by hand,” Caplan said. “It's calculating where particles are, where they're going, and how their interactions with every particle around them is going to change how they're moving.”

A weeklong simulation run through the HPC generates thousands of files containing columns of small white numbers stretched across the black background of Caplan's office computer.

“It's sort of like watching the matrix when the numbers are streaming down,” said Craig Jackson, director of Infrastructure Operations and Networking in the Office of Technology Solutions. “But, to Dr. Caplan, the numbers have meaning.”

Caplan plugs the data into a graph for analysis. In his

The High Performance Computing cluster's data processing power allows Dr. Matt Caplan to research the universe.



white dwarf simulation, a trendline illustrating the HPC's computations shows Caplan how close the helium gets to the thorium and how readily it can prevent the thorium from undergoing radioactive decay.

“Oftentimes, it's just turning tens of terabytes of data into one number or one line that can go in a paper so that someone else can use it in their calculations,” Caplan said. “The bulk of science is built like a jigsaw puzzle, and everyone is trying to make a piece that will fit with other people's pieces and let

“The HPC can analyze a lot of text. You could run an analysis of all of Shakespeare's work, for example.”

them place more pieces in the grand puzzle.”

Caplan is among more than 10 faculty members now utilizing Illinois State's HPC. Their research areas include chemistry, economics, geography and geology, information technology, mathematics, and physics. Hauck hopes to expand HPC usership to faculty in disciplines that perform qualitative research as well.

“The HPC can analyze a lot of text,” Hauck said. “You could run an analysis of all of Shakespeare's work, for example.”

Charles Edamala, Illinois State's chief information officer and associate vice president of Technology Solutions, said the HPC could also be used in multidisciplinary efforts to solve societal problems and envisions the HPC growing into a communitywide resource.

“This service opens the door for education scholars to work with fine arts faculty and mathematical researchers to, for example, model student success in low-income neighborhoods,” Edamala said. “It has the capability to develop large-scale epidemic simulations, to be part of a smart city grid, or to create aerodynamic vehicle models. The HPC has the potential to serve McLean County and its business community in diverse and innovative ways.”

Illinois State's HPC is a necessity for Caplan. Without it, he would have to apply for “node hours” at other institutions—a process that would reduce his time to conduct research.

“The difference between having this machine and not,” said Caplan, “is the difference between being able to do this research or not.”

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



Prolific College of Business researcher keeps close eye on India-based international businesses

By John Moody

Dr. Somnath Lahiri is considered one of the foremost scholars on his native India's business world.

Illinois State University is home to one of the most prolific researchers of India's business world. Dr. Somnath Lahiri, professor of strategy and international business in Illinois State University's College of Business, specializes in international business and management research, with a focus on emerging economies like India.

Last summer, the *Journal of Business Research*, a highly regarded academic publication, ranked Lahiri among the top five most prolific scholars of India-based international business and management research based on the number of publications produced in the previous nearly 50 years. Also included in this group was Lahiri's College of Business colleague, Dr. B. Elango, who has inspired and aided his frequent collaborator.

Dr. Ajay Samant, dean of Illinois State's College of Business, congratulated Lahiri on the recognition. "Since joining ISU, Dr. Somnath Lahiri has published his scholarship consistently in very well-known peer-reviewed journals in the fields of international business and organizational strategy. The

For the last 20 years, Lahiri has tracked foreign direct investment (FDI) directed by and to companies in India. Lahiri's research also focuses on outsourcing, cross-border acquisition of companies, and the internationalization of Indian family firms. He's noted that India has become a favorable destination for international companies to conduct business and earn profits.

While Lahiri devotes a lot of his time and energy to understanding and examining the international trajectory of Indian businesses, his work can be applied to companies based anywhere. He has found that due to globalization, even family businesses are learning they cannot confine their work exclusively to their home country.

"Family businesses are the backbone of most economies in the world," he said. "Our research shows that they need to go out and internationalize and expand their business to what we call host countries or foreign countries."

The stakes are high for families who own a business. They risk personal financial ruin if the firm is unsuccessful and po-

"Family businesses are the backbone of most economies in the world. Our research shows that they need to go out and internationalize and expand their business to what we call host countries or foreign countries."

Journal of Business Research is a top-tier business journal that is ranked 'A' in the journal quality list. This is a great accomplishment for Dr. Lahiri and makes his colleagues and me in the College of Business proud."

Lahiri, who was born and raised in India, explained why that country has been the focus of much of his research.

"I have a natural motivation to study about India and Indian businesses," he said. "We need to keep in mind that India is the center point of discussion not only because it is a very old country with a huge population but also because it has a long history of many small, mid-sized, and large companies that do business in India and in Asia, and more importantly, internationally. So, because of the growth potential of the country as a whole and the growth potential for the companies in India, there's been a lot of attention on this country for decades."

Besides peer-reviewed journal publications, Lahiri's scholarship includes contributing chapters to business books and presenting and serving as a panelist at conferences and meetings both in the United States and internationally, including India. He has received several University Research Grants to support his international business research.

tentially the future outlook of their families, since the founders usually desire to see their children and grandchildren keep the family in business and the business in the family. Lahiri's research shows that while these businesses are run in a fairly conservative, risk-averse style, they often do a good job of expanding internationally through exports and even FDI.

"We ask the big research question: 'Where do they want to internationalize?'" Lahiri said. "If you're a U.S. company, do you go to Mexico, maybe to England? Walmart first went to Mexico, a neighboring country, before expanding to other foreign countries. But we are finding that there is a tendency of Indian family businesses to take a big leap and conduct FDI in very dissimilar countries that are very far geographically."

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



Energy for a Sustainable Future Seminar Series

A cross-disciplinary team consisting of Dr. Matt Aldeman, associate professor of Technology, and Dr. Rebekka Darner, director of the Center for Mathematics, Science, and Technology and associate professor of biology education, hosted the 2022-23 Research Speaker Series. This series, which was sponsored by the Office of Research and Graduate Studies along with the Department of Technology, focused on sustainability and renewable energy.

The Energy for a Sustainable Future Seminar Series highlighted research taking place across multiple disciplines and institutions to create broad solutions to the complex societal problem of energy resilience. A total of nine speakers participated and were drawn from a diverse set of disciplines, including genetics, agriculture, renewable energy, and technology. This seminar series also provided insight into how climate change challenges can be addressed.

Approximately half of the series sessions were offered virtually. These four online sessions focused primarily on genetics and agriculture-related solutions to optimizing off-season pennycress (*Thlaspi arvense*), a high-yielding oilseed crop that holds the potential to yield up to 2 billion gallons of oil annually, thereby working toward USDA-NIFA's 25-year goal of 50 billion gallons of biofuels. The online speakers were Drs. Winthrop Phippen (Western Illinois University), Ratan Chopra (University of Minnesota), Andrea Gschwend (Ohio State University), and Dmitri A. Nusinow (Danforth Plant Science Center).

Five experts presented on sustainable and renewable energy on campus. Topics discussed included local economies' impact, recycling methods, Midwest's role in global clean energy trends, and corporate sustainability efforts. The presenters were Andy Cukurs, Bradley Klein, Dr. Jessica Durham Macholz, Todd Rusk, and Joby Carlson.

Nine sessions, with approximately 30 attendees each, brought together faculty and students to foster interdisciplinary connections, ideas, research, and partnerships within and beyond the University.

Illinois State receives \$780,000 grant as part of nationwide network to enhance inclusion, equity in STEM disciplines

Illinois State University is part of a nationwide group of institutions working to make STEM education more inclusive and equitable. The work is being supported by a large grant from the Howard Hughes Medical Institute's (HHMI) Inclusive Excellence program.

Illinois State, along with 14 other institutions, is part of an HHMI-facilitated learning community created to build institutional capacity for student belonging in the sciences, particularly among those who have been historically excluded from these disciplines. That learning community has been awarded over \$8 million to identify and pilot methods to foster institutional change toward more inclusive and equitable introductory STEM education. Illinois State's portion of the grant is \$780,000, about one-third of which the learning community has collectively decided to use to fund program evaluation. As an integral member of the community, Illinois State holds a responsibility to lead this aspect of the learning community's important work.

Through the remaining grant funding, researchers at Illinois State are piloting the STEM Ambassadors program and the Inclusive Excellence STEM Fellows program.

Students in the STEM Ambassadors program will be hired in the fall of 2023, when they enter Illinois State as first-year science majors. Their first two years as an ambassador will include structured reflection that documents elements of their experience that impact their sense of belonging at Illinois State as well as in their science major. During the following two years, STEM Ambassadors will propose and implement projects to improve equity and inclusion during the introductory science experience.

Through the Inclusive Excellence STEM Fellows program, STEM faculty members will examine the curriculum and delivery of introductory STEM courses through a diversity, equity, and antiracist lens, with the goal of increasing students' sense of belonging in their courses, departments/schools, and their chosen STEM discipline. STEM Fellows may work directly with STEM Ambassadors to better understand the introductory STEM experience at Illinois State and collaborate to foster a greater sense of belonging during this critical time in the science curriculum.

The HHMI Inclusive Excellence team at Illinois State includes Center for Mathematics, Science, and Technology co-directors Dr. Rebekka Darner and Dr. Ben Sadd; Dr. Sarah Boesdorfer, who will be a mentor of faculty members named STEM fellows; and Matthew Hagaman, who will mentor students who are hired as a STEM Ambassadors.

Other schools in the HHMI learning community are California State University-Stanislaus, Dalton State College, Fordham University, Franklin and Marshall College, Furman University, Gannon University, Haverford College, Middlebury College, Southern Illinois University-Edwardsville, SUNY Empire State College, Trinity University, Universidad Ana G. Méndez-Cupey, University of California-Riverside, and University of California-Santa Cruz.

2023-24 Advancing Research and Creative Scholarship (ARCS) award winners announced

In January 2023, the Office of Research and Graduate Studies (ORGS) announced a new program titled "Advancing Research and Creative Scholarship" (ARCS)." This program had the specific goal of creating a mechanism that encourages researchers and scholars at Illinois State University to collaborate in cross-disciplinary research teams to address big, bold scholarly themes. This type of research seeks to solve some of the world's most complicated problems, often termed "wicked problems."

Twenty-two teams applied for an award, with two different tracks: Track I for fully developed interdisciplinary collaboration plans, and Track II for capacity building. The external review panel selected three teams for Track I and six teams for Track II. Congratulations to all the awardees!

Track I winners

Lea Cline (Wonsook Kim School of Art): Northwest Bolsena Archaeological Project

Beth MacDonald (Teaching and Learning): The Utilizing Number to Initiate Fraction Inquiry (UNIFI) for Students with Learning Disabilities Pilot Project

Uttam Manna (Physics): Development of an apical TIRF-illumination super-resolution microscope for cell

Track II winners

Elke Altenburger (Family and Consumer Sciences): Center for Inclusive Intergenerational Environments

Isaac Chang (Technology): SafeNAV-A Technology-Enable Navigation Solution for Visually Impaired Pedestrians

Julien Corven (Mathematics): Experiences and Agency of Historically Underrepresented STEM-intending Students in Calculus Courses: Phase I of the Envisioning a More Equitable System of Calculus Project

Jennifer Earing (Agriculture): Potential value of brazzein-yeast as a livestock feed additive: assessment of efficacy and safety

William Lewis (Information Technology): Use of Satellite Remote Sensor Data to Evaluate Residential Inequality

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

ISU ReD

In FY23 (July 2022-June 2023), 2,635 works were posted to ISU ReD.

As of November 8, 2023, there are 14,688 total papers, 1,682,802 total downloads, and 335,589 downloads in the past 12 months.

Open Access Publishing Agreements

Illinois State's Milner Library has entered into several open access publishing agreements with scholarly publishers. These agreements have allowed ISU authors—students, faculty, and staff alike—to publish their work open access at no cost to them. Articles and chapters published open access are deposited to Illinois State ReD. As of November 2023, 24 articles have been published open access via these agreements; this is a considerable increase over 2022 (three articles), 2021 (one chapter), and 2020 (two chapters). We hope that as new agreements are added scholars will find that their preferred publishing venues are covered, and they can increase the impact and access of their research via open access publishing.

Some of the agreements Illinois State has entered are:

- ACM (Association for Computing Machinery) (2024-2026)
- ACS (American Chemical Society) (2024-2026)
- Annual Reviews (January 2023-December 2024)
- Cambridge University Press (January 2021-December 2023; January 2024-December 2026)
- Company of Biologists (January 2023-December 2025)
- IGI Global (July 2021-June 2022)
- Institute of Physics (January 2024 - December 2026)
- Microbiology Society (January 2024-December 2024)
- MIT Press (July 2023-June 2024)
- Sage Publications (January 2024-December 2026)
- Taylor & Francis (January 2023-December 2025)



Isaac Galewsky uses an augmented reality headset to work on his project in a lab in Turner Hall for the 2022 University Research Symposium.

FIREbird grant recipient advances augmented reality research

By John Moody

Thanks to the FIREBIRD Summer 2022 Research Grant Isaac Galewsky, then a sophomore, was able to pursue a research project with faculty mentor Dr. Sally Xie, a professor in the Department of Technology. The FIREbird (Fund for Independent Research Experience) grant program, formerly known as the Undergraduate Research Grant Program, provides up to \$3,000 for faculty-mentored, independent student research projects.

Galewsky's project, "Identification of Influencing Factors of Aging in Place Lifestyles," investigated how augmented reality systems can help prevent an aging-in-place (AIP) environment for elderly people.

"It was a ton of fun, and the grant gave me the funding to get access to headsets and software," Galewsky said. "The Firebird Grant really opened this up for me."

Rather than drawing a floorplan in AutoCAD, Galewsky used augmented reality (AR) headsets to create digital 3D

models that allow for changing the design of a room in a real-world way.

The AR headsets were used not only to design the space but also for visualizing to scale. There was another benefit as well.

"Our hope was to design a system where people could use the headsets to weigh in on the design of a space and have confidence in the design of their choosing," Galewsky said. "For example, what if we wanted to put the couch over there and actually do it by pinching it with your fingers and moving it? AR allows us to design the interior space by actually designing it."

Xie said Galewsky used holograms and data mining technologies to test the quality and accessibility requirements for AIP. He created a 3D virtual building model, realistic interior design, quantity estimate, and an examination of the Missing Middle housing crisis in the United States.

"Isaac did an amazing job with impressive outcomes from the research project," Xie said.

The identified factors that influence AIP lifestyles were presented to the advisory board meeting of Illinois State's construction management program in November 2022. Xie later presented the findings in a poster presentation at the 2023 Conference of the Associate Schools of Construction in Liverpool, England.

A Bloomington native, Galewsky's future plans include going to graduate school and eventually working in sustainable and renewable energy, as it relates to housing construction. His parents, both of whom pursued academic careers, are Sandra Lindberg '77, M.A. '79, and Dr. Samuel Galewsky.

Illinois Innovation Network

Illinois State University is one of 15 member hubs of the Illinois Innovation Network (IIN). The IIN is a network based at public universities that was formed in 2019 to "ensure Illinois' roles in the 21st century knowledge-based economy." The vision of IIN is to drive inclusive and integrated research, innovation, and economic development across Illinois. Its mission is to foster collaboration, increase capacity, and integrate systems in education, research, and innovation by connecting people, organizations, and resources. Illinois State was appropriated \$3 million of the \$500 million capital project, with the majority of the project going to support the formation of Discovery Partners Institute (DPI) in Chicago.

FY23 marked a tremendous uptick in the activities of the IIN. Because of the nature of the network and its activities, it leverages our activities in ways that make it difficult to label them as uniquely part of the IIN. We were active in the five working committees: Education and Workforce Development, Corporate Engagement, Research and Collaboration, Advocacy and Policy, and Entrepreneurship. As a campus, we have led the coordination of statewide efforts, including a successful broadband project for infrastructure and education, and hosting conversations with companies and students about increasing diversity in the workforce. As a network we've led national efforts to bring tech hubs, innovation engines, and a recently announced hydrogen hub to Illinois. We've done outreach with the Department of Innovation Technology at the state fair and sponsored an Innovators of the Year competition. The Illinois Board of Higher Education has sought to leverage the IIN as part of its goal of growth and economic development in its strategic plan, A Thriving Illinois. Our Center for Math, Science, and Technology has now moved to a new space that will allow our makerspace efforts and our curriculum to be offered on campus. We continue to be successful in our efforts to get IIN seed funding for scholars, with a successful applicant in the previous two cohorts. These partnerships and connections with other hubs helped us strengthen and formalize our partnership with OSF HealthCare in FY23 in order to pursue research through the Connected Communities Initiative. We look forward to much more progress in FY24!



Racing Redbirds: Sibling duo pushes 150 mph in Mustang dragster

By John Moody

For siblings Dominik and Danielle Post, driving fast—really fast—is a family tradition.

Their father, Mike, competed in drag racing for several years. Now he has his own high-performance shop in Hampshire where he works on Ford Mustangs exclusively. Dominik, 23, and Danielle, 19, both Illinois State University students, have spent time working at Dad’s shop. They don’t recall a time when cars and racing weren’t part of their lives.

It was natural for them to take up their father’s sport. Dominik started racing three years ago, and Danielle started two years ago. Dominik is a senior construction management major, and Danielle is a sophomore majoring in bilingual elementary education.

At recent events, their car has been flying down the track with a new decal on the side.

“I’m part of the Construction Management Student Association (CMSA), and at our barbecue, I had just come back from a win in Indy,” Dominik said. “A board member asked me about putting the construction management decal on the car.

“We had talked about it in class, so I was open to it. Then the Department of Technology sent the artwork over, and it really blossomed into what it is now.”

The Posts are from Woodstock and often pass by Bloomington-Normal on their way to races. A few weeks ago, they were heading to a race in Bowling Green, Kentucky, and offered to stop and show the car off to Randy Jacobs, instructional assistant professor in the Department of Technology, and his class.

“Randy said, ‘That’s cool, but it would be cooler if you could drive it in the Homecoming Parade,’” Dominik said. “Dad was for it, so the car will be behind the construction management float while Danielle will be marching with her sorority, Alpha Omicron Pi. The car will be pretty loud for the event.”

Drag racing involves starting from a dead stop and accelerating as fast as the car will go over a 1/4-mile track. The Posts have made the trip in less than 10 seconds. They love it.

“It’s true street racing against the clock,” Dominik said. “There’s no reaction time involved—you just go at the green light. It only lasts nine seconds, but it’s the best.”

“Going fast is very exhilarating, and before you know it,

it’s over,” Danielle said. “The scariest part is stopping.”

To be precise, Dominik’s fastest time is 9.4 seconds to go from 0-153 mph. Danielle has hit 140 mph in 9.7 seconds for her personal best.

The car that gets them across the finish line so fast is a 2011 Ford Mustang GT, which Dominik said is no different than the one built by the factory in 2011 and no different in body and frame than what you could buy used right now.

“We have not modified the frame or the body in any way,” he said. “The only thing that might be considered as a frame modification is the roll bar we installed. This simply stiffens and strengthens the frame for our safety.”

Power modifications to the car include: a supercharger, intake cams, exhaust work, and suspension work—all done at their father’s shop. Unlike a factory 2011 Ford Mustang GT, this is a very fast car.

The car runs on a fuel called MS 109 by VP Fuels that costs about \$22 dollars a gallon. Per race, the car typically burns about five gallons. Some quick math by Dominik puts the consumption rate at roughly 18 mpg, surprisingly good for a car that works this hard.

The Posts compete in events sponsored by two organizations: the National Muscle Car Association (NMCA) and the



The 2011 Ford Mustang GT that students Danielle and Dominik Post drive in drag racing events sports a construction management decal on the side.

National Mustang Racers Association (NMRA). It’s a family affair all summer as the Post parents and kids travel in a 30-foot RV pulling a Mustang dragster loaded on a 20-foot trailer. They race in St. Louis, Ohio, Michigan, Indiana, and Kentucky.

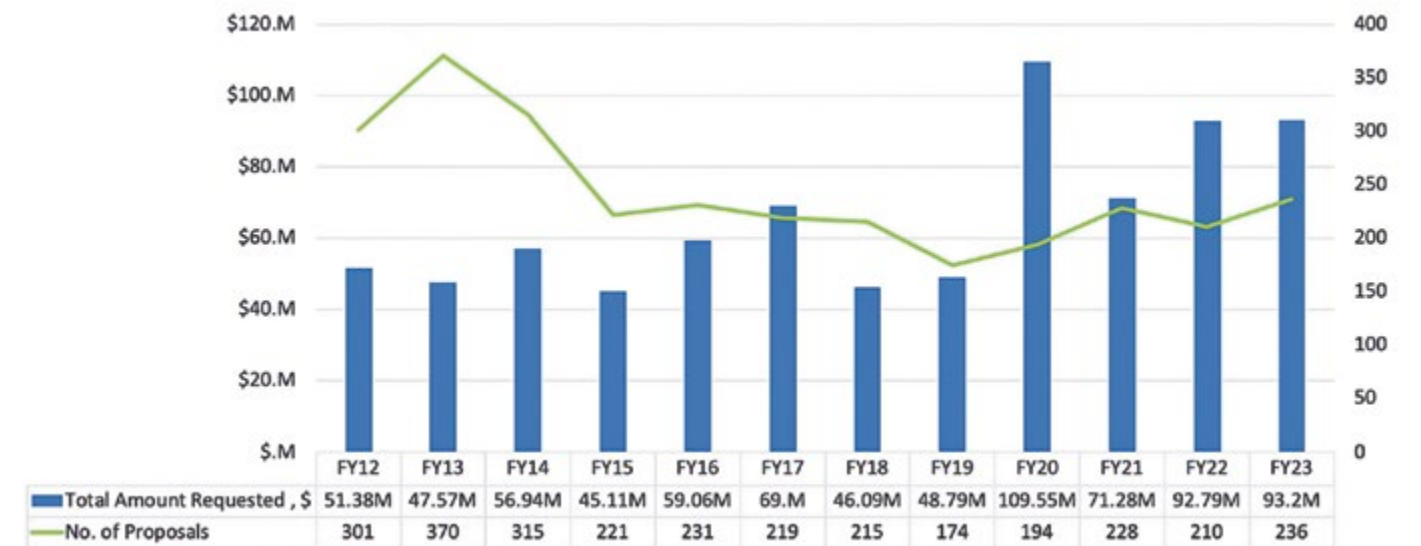
Their mother, Kim, gets nervous about the racing, both siblings said.

“Especially as we’ve gone faster,” Danielle said. “I get nervous, too, but I get a lot of instructions in texts from my dad and brother in between runs.”

For safety, in addition to a roll bar, the car is outfitted with a braking parachute for stopping. And the driver wears a full-body, fireproof race suit; a five-point harness through the legs with a lap belt and two shoulder straps; a full-face helmet; fire gloves; and a neck brace.

STATISTICS

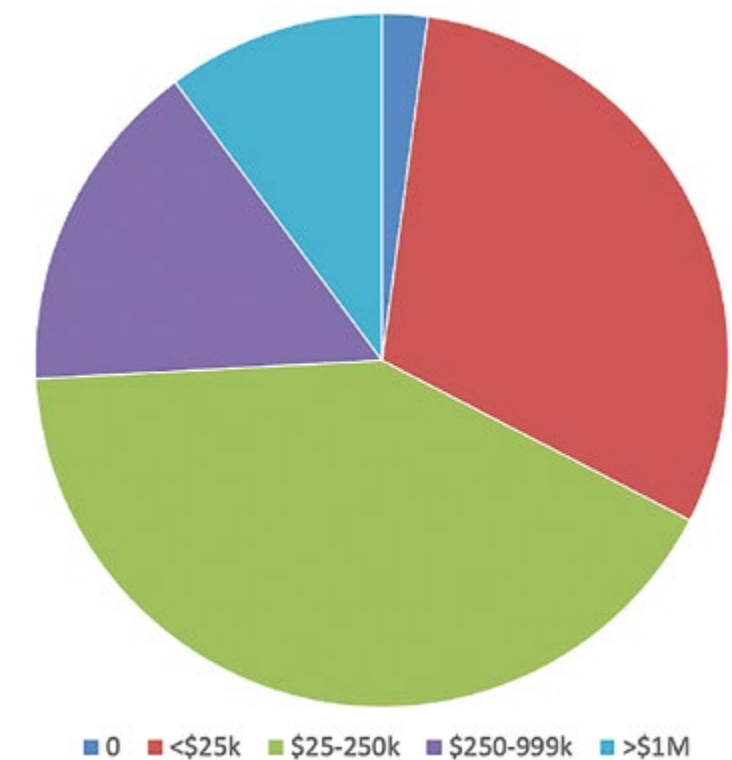
Proposals



Proposals

- 236 submitted in FY23
- 24 over \$1M
- 9 funded (not all in FY23)
- 135 from \$25-999k
- 98 \$25-250K
- 37 \$250-999K
- 121 (51%) funded (so far)
- 12 of 55 (22%) federal
- 50 of 64 (78%) state

Number of Proposals of a Given Amount FY23



Submissions and Awards

Fiscal Year 2023

by College and Department/School

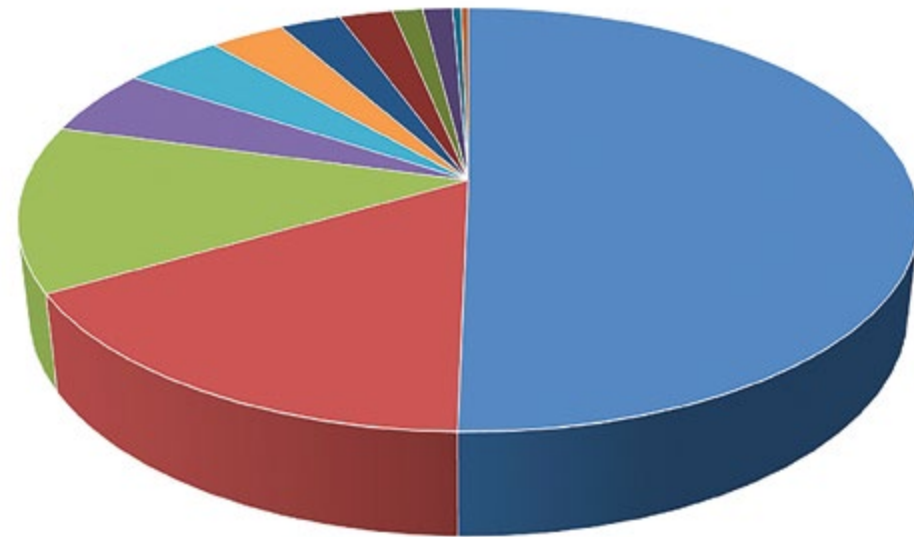
	No. of submissions	Amount requested	No. of new awards	Total expected amount awarded
College of Appl. Sci. & Tech.				
College of Applied Science and Technology	1	\$ 3,245	1	\$ 750
Agriculture	14	\$ 1,015,130	11	\$ 355,632
Criminal Justice Sciences	0	\$ 0	1	\$ 28,145
Family and Consumer Sciences	1	\$ 9,000	3	\$ 12,000
Health Sciences	6	\$ 3,623,970	2	\$ 117,599
Information Technology	7	\$ 943,995	4	\$ 179,985
Kinesiology and Recreation	4	\$ 40,426	4	\$ 36,026
Technology	7	\$ 839,890	5	\$ 167,846
College of Appl. Sci. and Tech. Total	40	\$ 6,475,656	31	\$ 897,983
College of Arts & Sciences				
College of Arts and Sciences	1	\$ 28,989	1	\$ 11,253
Biological Sciences	20	\$ 12,314,463	13	\$ 3,493,444
Chemistry	12	\$ 2,792,933	10	\$ 1,221,623
Communications, Sciences and Disorders	4	\$ 108,750	1	\$ 10,000
Communication	15	\$ 573,324	6	\$ 211,638
English	7	\$ 348,842	4	\$ 113,700
Geography, Geology and Environ.	6	\$ 141,334	6	\$ 239,712
History	1	\$ 76,464	2	\$ 115,463
Mathematics	7	\$ 1,234,467	5	\$ 163,464
Physics	1	\$ 599,857	3	\$ 307,633
Politics and Government	1	\$ 50,893	1	\$ 0
Psychology	7	\$ 2,742,007	4	\$ 1,076,073
Social Work	8	\$ 2,749,481	6	\$ 2,661,861
Sociology and Anthropology	1	\$ 93,290 0 \$ 0		
Womens and Gender Studies	1	\$ 500	1	\$ 500
College of Arts and Sciences Total	92	\$ 23,855,594	63	\$ 9,626,366
College of Business				
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	3	\$ 29,701
College of Education				
College of Education	5	\$ 12,647,919	1	\$ 142,045
Education, Administration and Foundations	17	\$ 5,348,814	16	\$ 4,199,714
Illinois Tutoring Initiative	4	\$ 11,521,800	6	\$ 5,477,539
Special Education	10	\$ 7,313,336	4	\$ 2,652,845

Teaching and Learning	11	\$ 2,713,821	4	\$ 802,753
University High School	1	\$ 850	1	\$ 891
College of Education Total	48	\$ 39,546,540	32	\$ 13,275,786
Wonsook Kim College of Fine Arts				
Wonsook Kim College of Fine Arts	1	\$ 8,559	0	\$ 0
Wonsook Kim School of Art	1	\$ 8,600	1	\$ 8,600
Music	4	\$ 13,817	5	\$ 13,000
Theatre	4	\$ 24,200	2	\$ 12,000
University Galleries	4	\$ 102,919	2	\$ 12,200
Wonsook Kim College of Fine Arts Total	14	\$ 158,095	10	\$ 45,800
Mennonite College of Nursing				
Associate Dean for MCN	12	\$ 1,817,459	0	\$ 0
Mennonite College of Nursing	3	\$ 6,657,862	10	\$ 1,256,562
Mennonite College of Nursing Total	15	\$ 8,475,321	10	\$ 1,256,562
Milner Library				
Milner Library	2	\$ 1,249,977	3	\$ 1,723,448
Milner Library Total	2	\$ 1,249,977	3	\$ 1,723,448
University & Administration				
AVP for Enrollment Management	1	\$ 84,100	1	\$ 84,100
AVP for Research and Graduate Studies	1	\$ 0	0	\$ 0
Career Services	1	\$ 50,000	1	\$ 50,000
CeMaST	4	\$ 3,477,177	6	\$ 841,094
Center for Coll Studies Math Biology	1	\$ 45,104	0	\$ 0
Emergency Management	0	\$ 0	1	\$ 65,121
Facilities Plan and Construction	1	\$ 2,000,000	0	\$ 0
Financial Aid	1	\$ 5,234,000	3	\$ 10,764,594
Graduate School	1	\$ 134,500	1	\$ 134,500
Internatl Studies and Programs	1	\$ 4,125	1	\$ 4,125
Office of Technology Solutions	0	\$ 0	1	\$ 25,000
Stevenson Center	9	\$ 1,851,940	9	\$ 1,504,176
Student Counseling Services	2	\$ 403,511	1	\$ 165,016
University College	0	\$ 0	1	\$ 309,457
University and Administration Total	23	\$ 13,284,457	26	\$ 13,947,183
Grand Total	236	\$93,227,725	178	\$40,802,830

*Non-academic offices within the vice president for Academic Affairs and Provost, vice president for Finance and Planning, and vice president for Student Affairs. Chart reflects numbers as of September 30, 2023

ORGS investments

- Over \$780k in support for Research and Creative Scholarship in FY23
- Additional support through personnel and the support from Colleges and Units

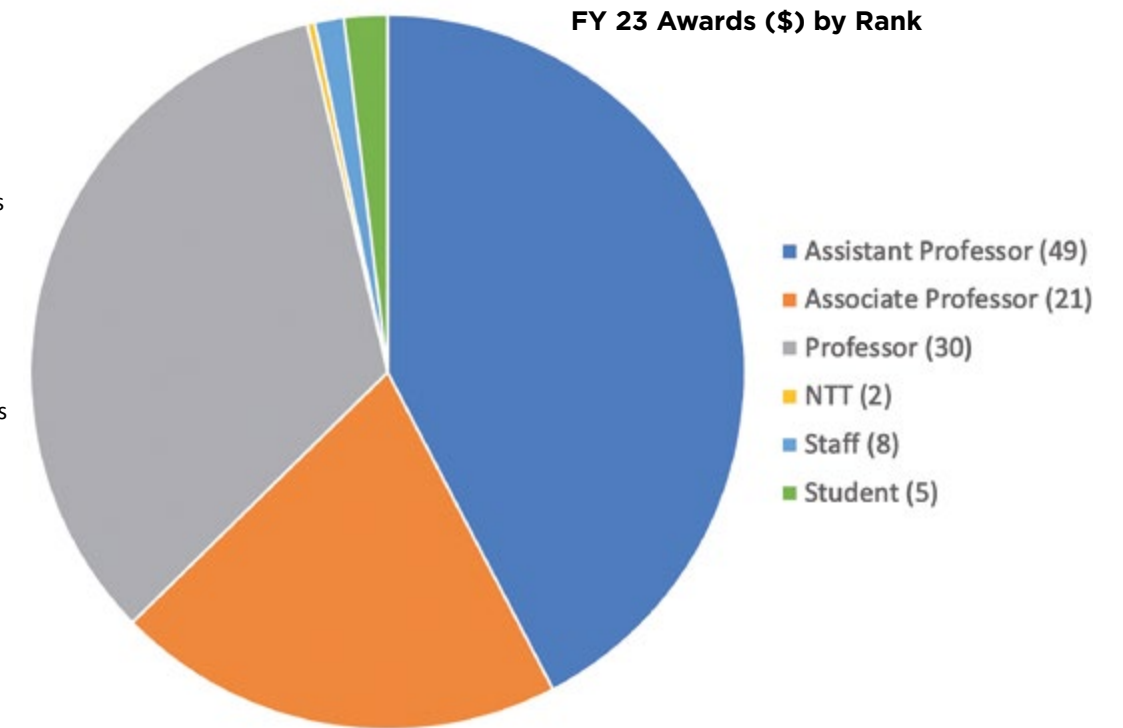


- URG (incl. supp.)
- OSR (awards & op)
- publication/exhibition/book support
- Collaborative Research Initiatives
- cost sharing
- DC Intern
- Buyouts
- Tech Transfer
- Grant and writing support programs
- Redbird Scholar
- Speaker Series
- IIN Efforts

Investment	Amount
URG (including supp.)	\$396,353
Buyouts	\$128,284
OSR (awards & op)	\$99,769
Tech Transfer	\$39,762
publication/exhibition/book support	\$33,883
Grant and writing support programs	\$25,321
Collaborative Research Initiatives	\$20,616
Redbird Scholar	\$18,126
cost sharing	\$10,217
Speaker Series	\$10,005
DC Intern	\$3,055
IIN Efforts	\$2,382

University Research Grants (URG)

- Over \$400k awarded in URG funding in FY23
- Some Colleges supplement further
- Funding for 115 investigators reported
- Most awards and \$ to Assistant Professors
- Funding acts as seed
 - External funding requests in many cases
 - Scholarly outputs expected in all



Writing support

23 faculty attended a three-day writing retreat at Lake Bloomington from three colleges and 11 departments/schools

11 events held on four Fridays in FY23

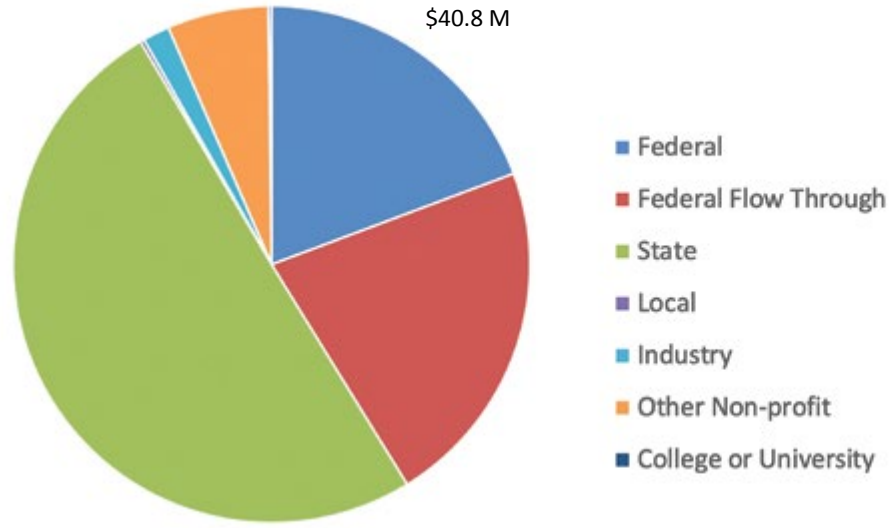
25 total (23 unique) faculty supported through book subvention and publication/exhibition support funds

138 unique attendees, representing Milner and all six academic colleges

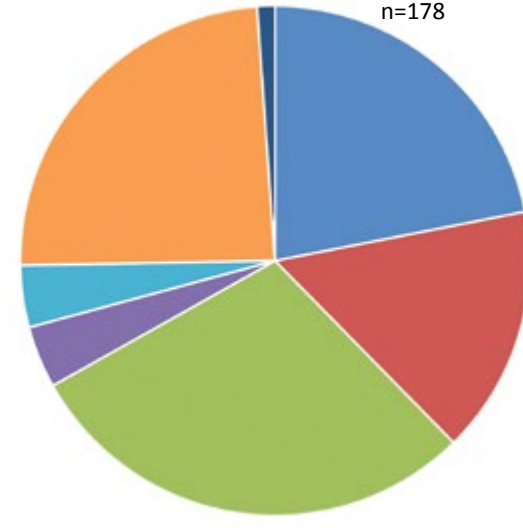
33 departments/schools represented

FY23 awards

Projected amount (\$)

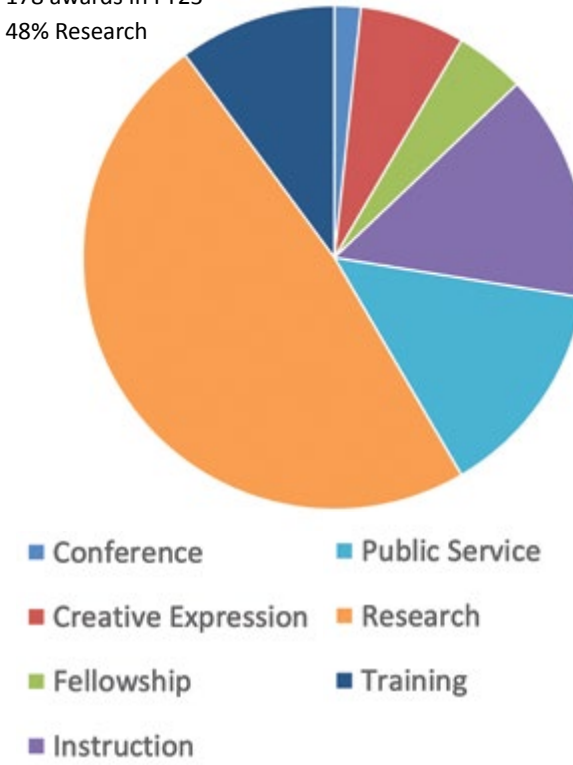


Number of awards



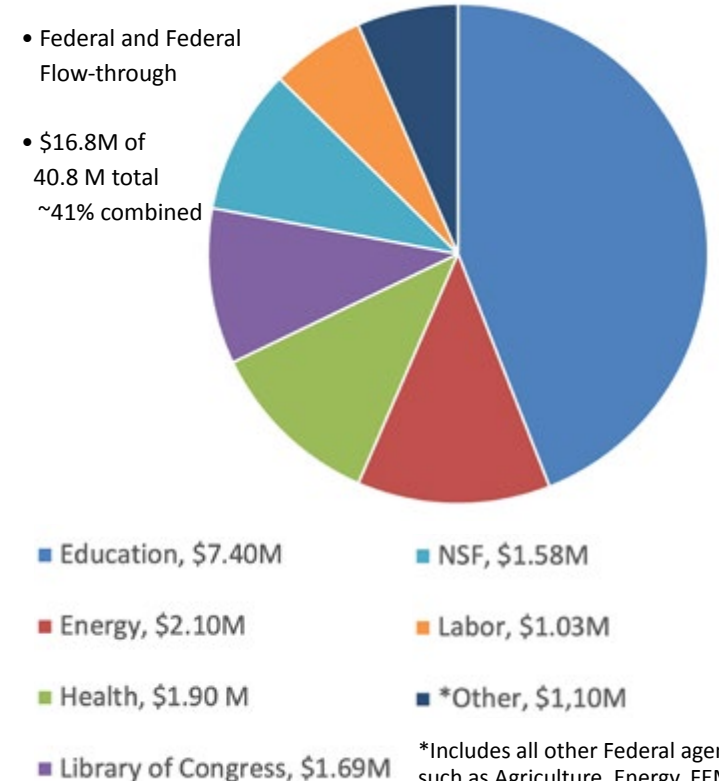
Award by activity type

- 178 awards in FY23
- 48% Research



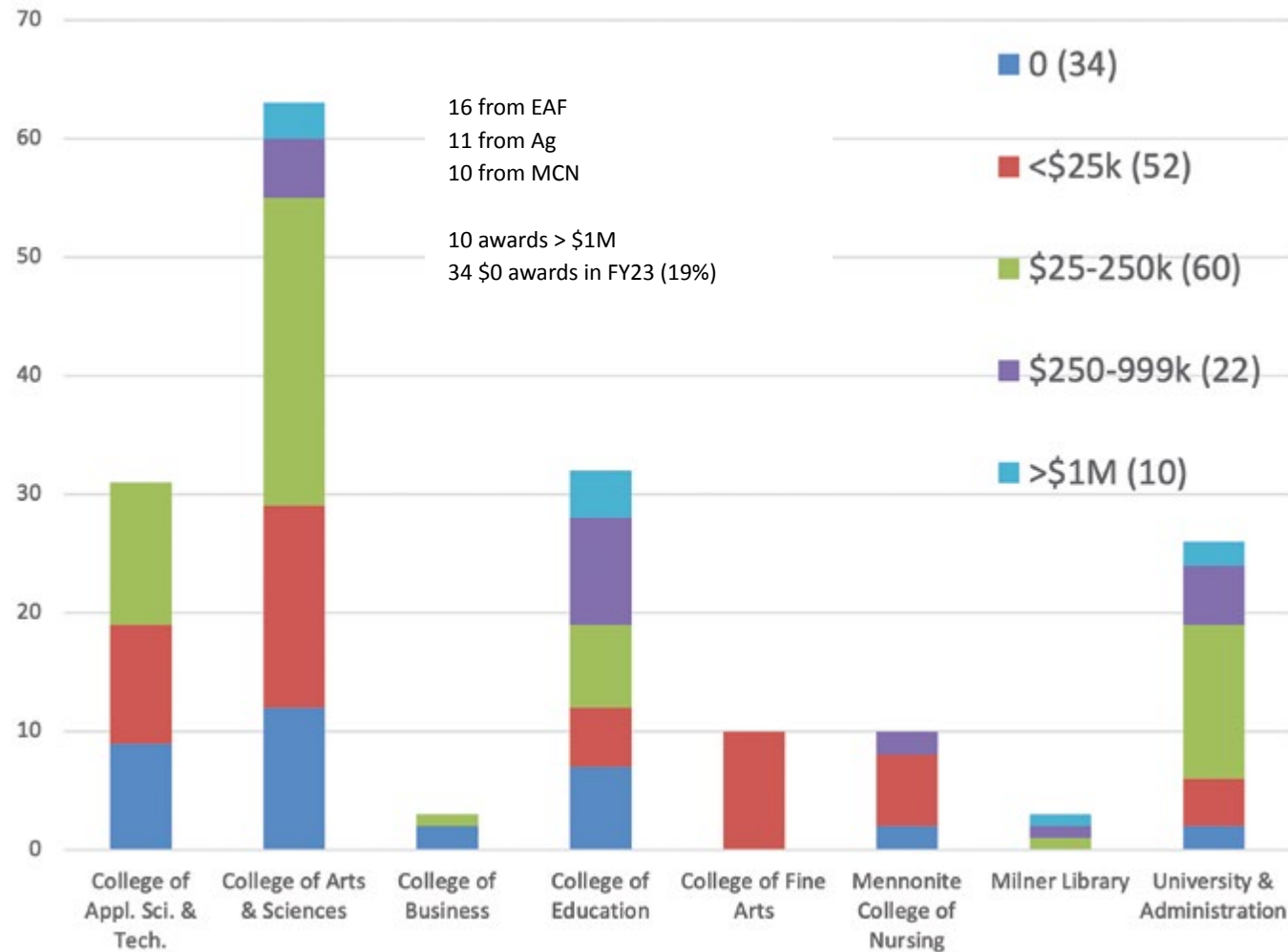
FY23 projected federal awards by agency

- Federal and Federal Flow-through
- \$16.8M of 40.8 M total (~41% combined)



*Includes all other Federal agencies such as Agriculture, Energy, FEMA, Fish & Wildlife, Geological Survey, National Park Service, National Security Agency, National Endowment for the Arts

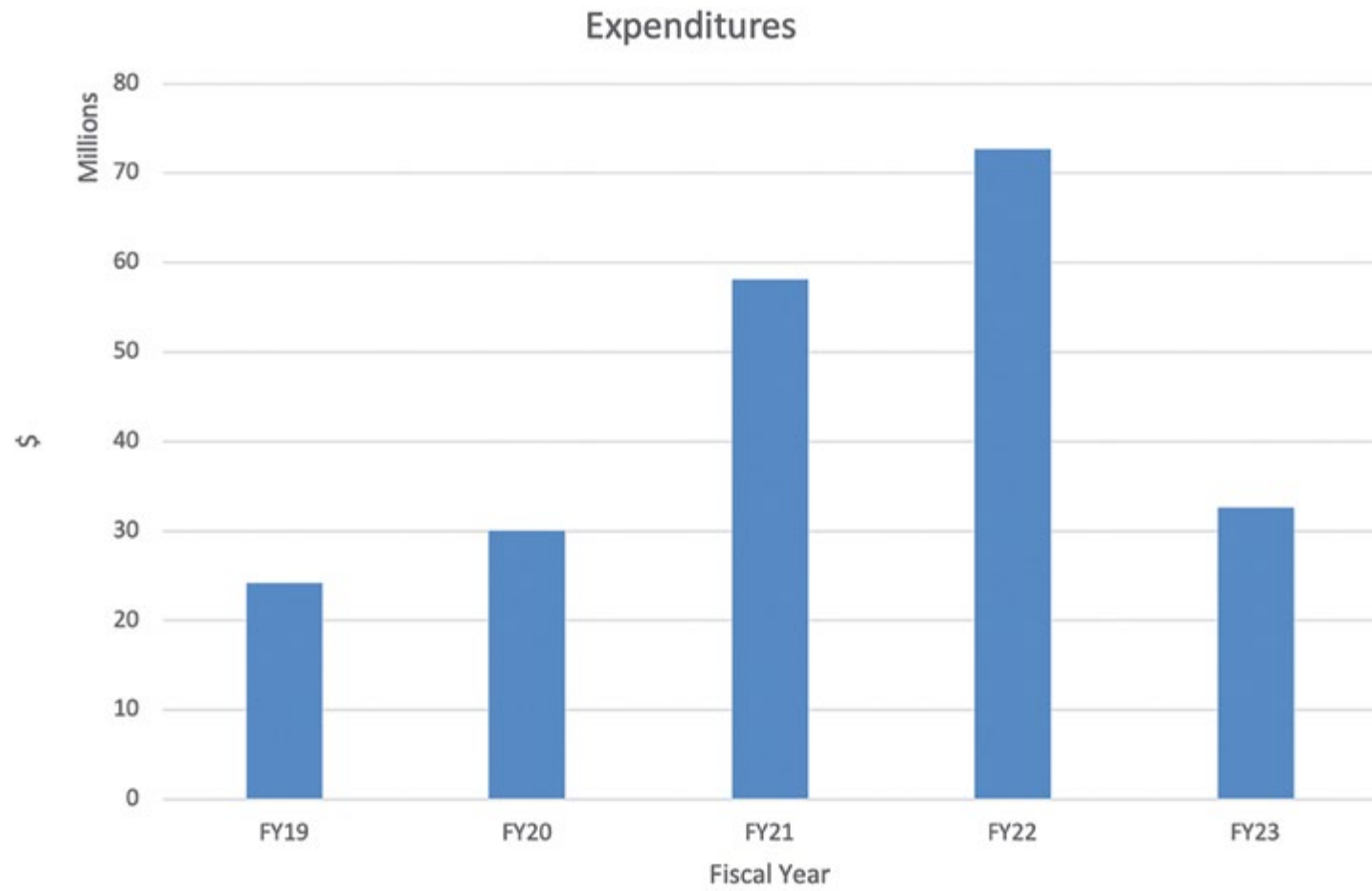
Number of awards by size



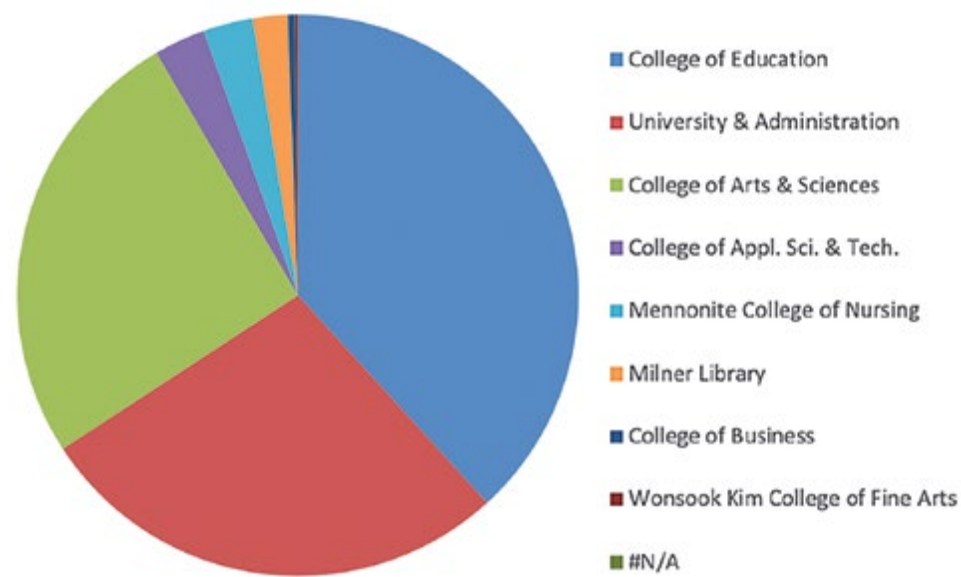
Awards at a glance



Restricted Expenditures



Expenditure Percentages



FY23 expenditures first in several years with no Emergency Relief Funding

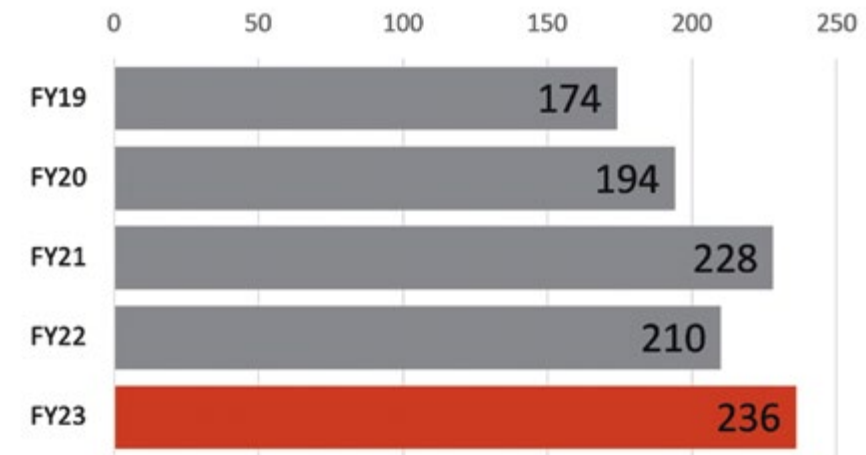
Colleges

- Education spent \$12.47M
- \$8.41M for CAS.

Departments

- 5 units over \$1M
- EAF spent \$4.90M
- BSC with \$4.13M
- SED with \$1.47M
- TCH with \$1.13M
- CHE with \$1.04M

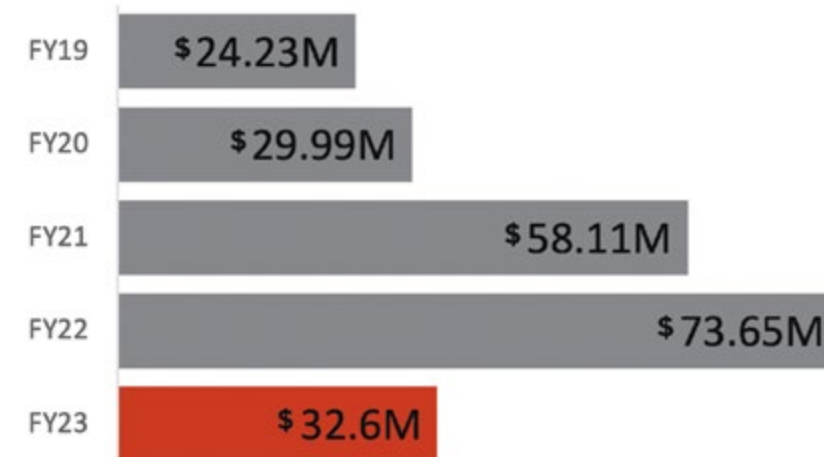
Proposals



Awards



Expenditures



7
FY23 awards of at least \$1 million



4
new intellectual property disclosures



1
active tech license (15+ patents)



19
Patents actively held (two new in FY23)



5,219
Web of Science listed publications since 2014



2,635 ft²
designated research space



207K
works posted to ISU ReD



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