



Advancing Kansas
innovation together



Andy White/KU Marketing

On the cover:

On the cover: University of Kansas engineer Elaina Sutley describes her research in the Structural Testing Laboratory.

Photo by: Max Jiang



2021 Constant Ave.
University of Kansas
Lawrence, KS 66047

nsfepscor@ku.edu

EDITOR
Claudia Bode

DESIGN AND LAYOUT
Chris Millspaugh Design

Belinda Sturm
Director

Doug Byers
Assistant Director

Claudia Bode
Education and Outreach Director

Cynthia Walker
Financial Program Manager

Alej Martinez
Program Coordinator

Valeria Solis
Communications Student Assistant

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Letter from the Director



For more than three decades, the Kansas NSF EPSCoR Office has strengthened research capacity across the state by aligning federal investments with priorities established by the Kansas Board of Regents, the Kansas Department of Commerce, and the Kansas State Science & Technology Plan. Our charge is clear: elevate research excellence, expand competitiveness, and translate discovery into economic growth and improved quality of life for Kansans.

The results are measurable. Since 2006, NSF EPSCoR investments have generated a 2.3-to-1 return on investment for Kansas. Today, Kansas is leveraging \$45.1 million across 13 active NSF EPSCoR awards to transform academic innovation into economic engines. These investments include the Track-1 project, **Adaptive and Resilient Infrastructures driven by Social Equity (ARISE)**, and multiple Focused EPSCoR Collaborations and Research Fellows awards.

Now in its fourth year, ARISE has catalyzed cross-institutional partnerships, expanded research infrastructure, supported faculty and student development, and strengthened pathways from discovery to application. We are building resilient infrastructure systems, supporting junior faculty through First Awards and seed grants, engaging undergraduate researchers, and fostering partnerships across public universities, community colleges, industry, and communities statewide.

These investments do more than produce publications and grants. They cultivate talent pipelines, strengthen rural and urban resilience, accelerate data science capacity, and position Kansas institutions to compete successfully for major federal research opportunities.

As NSF transitions to new E-CORE and E-RISE investment mechanisms, our Kansas NSF EPSCoR office is proactively preparing for this next phase. We have convened statewide stakeholders to identify priority research areas, strengthen cross-institutional collaboration, and build competitive teams capable of securing these next-generation investments.

We stand ready to assist institutions developing large, multi-institutional proposals. Our office provides strategic coordination, partnership development, and administrative infrastructure to enhance competitiveness and maximize statewide impact.

Ad Astra per Aspera reflects our shared commitment to advancing Kansas through resilience, innovation, and collaboration. Sustained research growth requires partnership, and we welcome continued collaboration to ensure Kansas remains competitive in the evolving national research landscape.

Belinda Sturm
Director



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WHY KANSAS?

The U.S. National Science Foundation's **Established Program to Stimulate Competitive Research (EPSCoR)** ensures federal research funding is distributed geographically nationwide. By targeting states that receive less than 0.75% of the total NSF budget—including Kansas—EPSCoR levels the playing field. These investments build a self-sustaining ecosystem that anchors research to state economic priorities, driving both innovation and prosperity.

EPSCoR RESEARCH DRIVES ECONOMIC DEVELOPMENT IN KANSAS

Kansas is currently leveraging **\$45.1 million** across 13 active NSF EPSCoR awards to turn academic innovation into economic engines. All projects build on university strengths for economic development, as outlined in the Kansas Science & Technology plan. They also link to target industries for the state's talent pipeline.

Strategic Investments in Action



Statewide Impact

The flagship **RII Track-1** initiative known as ARISE, led by KU engineer **Belinda Sturm** with K-State and WSU collaborators, reaches every congressional district in Kansas to build resilient water, energy, and transportation infrastructure.



National Collaboration

Nine projects bridge the gap between Kansas scientists and researchers across the country. For example, K-State engineer **Vaishali Sharda** leveraged her Focused EPSCoR Collaboration (FEC) with Nebraska and South Dakota to win a prestigious NSF CAREER award, continuing her goal of helping crop producers better sustain water resources.

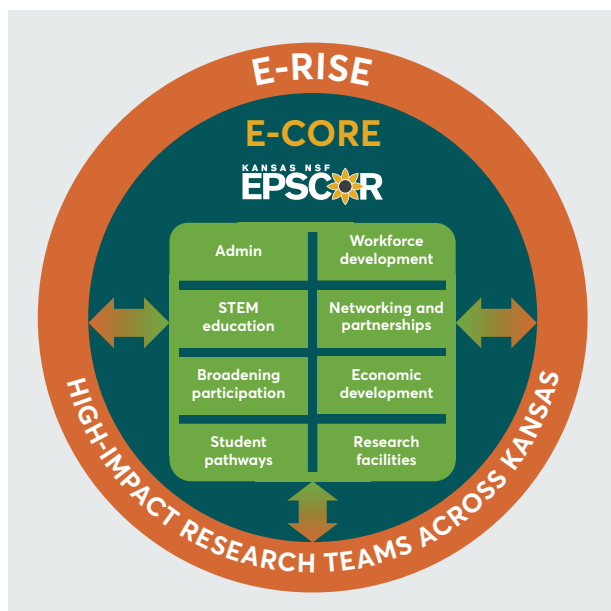


Cultivating Talent

Research Fellowships are jumpstarting the careers of rising stars, including KU engineer **Ana Colaco Morais** who investigates advanced manufacturing of polymers and K-State engineer **Davood Pourkargar** who uses machine learning for drug delivery.

New Agile Approach

NSF recently retired its flagship Track-1 program. Gone are the days of being “locked in” to a single research project for five years.



Now, a new agile framework makes it possible to pursue multiple research frontiers at once, propelled by a strong foundation. The new multi-pronged approach works in tandem to boost innovation at speed and scale as follows:

- **E-RISE ignites research:** This strategy incubates high-impact research teams, linking statewide networks around consequential science and technology topics.
- **E-CORE accelerates impact:** This strategy fills vital “core” needs in the innovation ecosystem, such as forging industry-academic partnerships, driving local economies, enhancing research facilities, easing career pathways, and more.

Building the Core: Mobilizing for Kansas

We aren’t just waiting for the future—we are actively shaping it.

Kansas NSF EPSCoR Director Belinda Sturm is currently forging a powerhouse team to secure our state’s first E-CORE initiative. To pinpoint top priorities, she is spearheading statewide meetings with Board of Regents members along with education, commerce, and Indigenous leaders.

To connect and engage all elements of the state’s research ecosystem, E-CORE will use the Kansas NSF EPSCoR office as its centralized administrative core. Every investigator pursuing EPSCoR initiatives in Kansas—from E-RISE to FEC and so on—can leverage this administrative core, leaving them to focus on discovery and innovation.

Partner with Kansas NSF EPSCoR

Strong partnerships are key to securing competitive NSF grants. Our office has been connecting partners across Kansas for over 30 years to help EPSCoR proposals succeed. Whether you’re an educator, innovator, city planner, or community leader, contact us for assistance in securing these funds for the state.

We aren't just waiting
for the future—we are
actively shaping it.

ADVANCING KANSAS INNOVATION TOGETHER

Success in research is a team effort

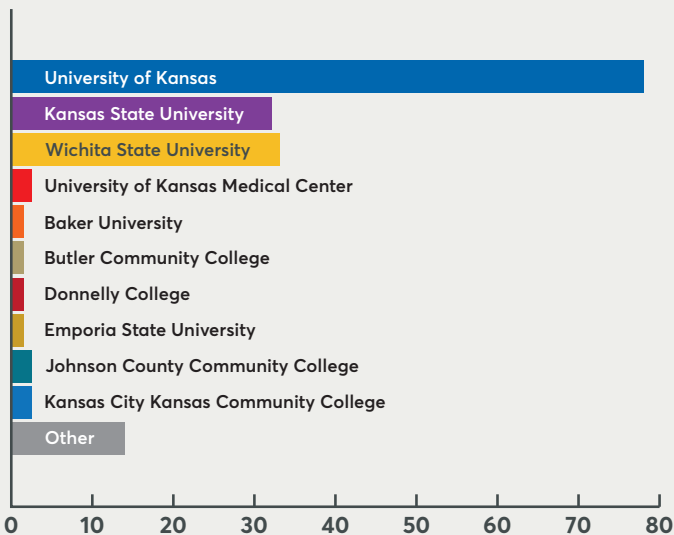
At Kansas NSF EPSCoR, we specialize in the development and long-term stewardship of large-scale projects that propel our state toward a more competitive future.

Since 1992, Kansas NSF EPSCoR has demonstrated a consistent ability to develop and manage NSF's flagship Track-1 projects. Our office has successfully secured eight of these large-scale grants, establishing a steadfast track record for research across the state.

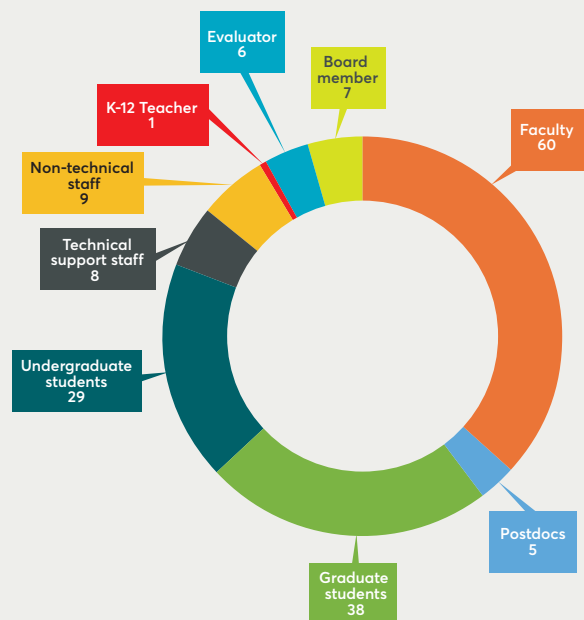
Our current Track-1 project, Adaptive & Resilient Infrastructures driven by Social Equity (ARISE), is a \$24 million, five-year initiative launched in 2022. This project reflects a massive collaborative effort, uniting The University of Kansas, Kansas State University, Wichita State University, and a dozen more academic institutions.

163 CURRENT ARISE TEAM MEMBERS

Institution



Role



Here's how the numbers stack up



INVESTMENT SINCE 1992

\$88.7 million

NSF EPSCoR RII
Track-1 Awards

>\$8.8 million

Seed grants for novel research
and education initiatives in
Kansas

2.3 to 1

Return on Investment (R.O.I.)



RESEARCH IMPACTS

177

Junior faculty careers jump-
started with First Awards

25

Faculty hires at four
universities in Kansas

>1,487

Publications anchored to
Kansas science & technology
priorities



EDUCATION IMPACTS

831

College students gained
research experience

579

Youth empowered to
pursue science

>250

Students gained data
science skills

Anchored to State Priorities

All our projects are anchored to the Kansas Science and Technology Plan. Endorsed by the chief research officers of Kansas research universities and the Kansas Board of Regents EPSCoR Review Committee, this S&T plan seeks to increase the impact of higher education and grow the Kansas economy.

Return on Investment

Kansas scientists have become more competitive in acquiring federal funding because of EPSCoR. Our return on investment says it all. For every dollar pumped into research by NSF EPSCoR since 2006, Kansas scientists have secured more than **double** that in additional research funding.



THE ARISE INITIATIVE: BUILDING A DISASTER-RESILIENT KANSAS

Why it matters?

Kansans face growing challenges from increasingly frequent and extreme weather.

The big picture

ARISE researchers focus not just on strengthening physical infrastructure, but also on the people, systems, and decisions that shape community resilience.



Kansas ranks 8th in the nation for federal disaster declarations and the risks are rising.



Taking smart actions now to reduce disaster risk will safeguard lives and protect economies.

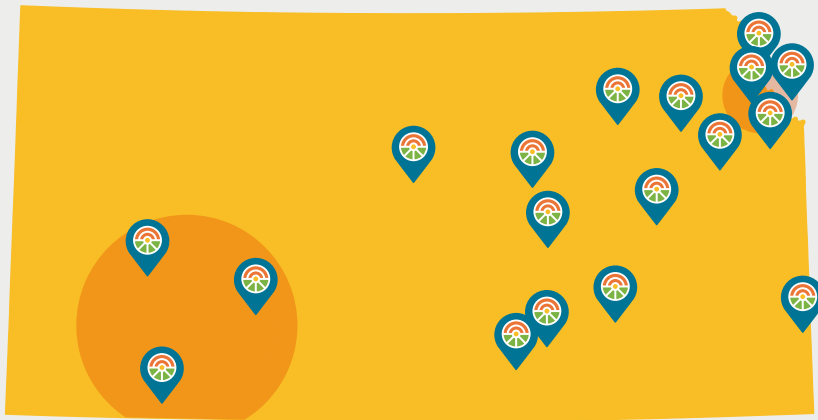


Together, we can significantly lessen post-disaster suffering and recovery cost.

The remainder of this issue highlights the statewide impact of ARISE—from engineering more resilient buildings to accelerating disaster recovery and cultivating local talent.

How it works for Kansas

Led by Professors Belinda Sturm (KU), Bala Natarajan (K-State), and Elaina Sutley (KU), ARISE connects researchers with residents in five counties—Ford, Finney, Seward, Johnson, and Wyandotte. More than 1,000 Kansans have contributed so far, through surveys, interviews, and other activities. Dozens of other cities, businesses, and other leaders partner with ARISE in both rural and urban regions to achieve its goals.



SIX HIGH-IMPACT OUTCOMES

DISASTER PLANNING & RECOVERY SUPPORT

Empowering local leaders to support all residents, including the most vulnerable.

PROBABILISTIC HAZARD MAPS

Supports disaster planning and response through interactive visuals of past storms.

BEHAVIORAL & INSTITUTIONAL INSIGHTS

Enhancing policies for disaster response.

PREDICTIVE TECHNOLOGY

Simulating real-world disaster scenarios with AI models to guide resilience enhancements.

COMMUNITY-DEFINED RESILIENCE METRICS

Locally developed indicators reflect real community needs and attainable goals.

WORKFORCE & STEM PIPELINE

Educating learners of all ages with in-demand skills such as data science.



DESIGNING FOR THE STORM

A Profile of Elaina Sutley

"When I was a graduate student, the city I lived in was hit by a superstorm of tornadoes," said Elaina Sutley. "It was the first time I realized that structural engineers do not design buildings to withstand tornadoes."

The realization sparked a mission. Today, Sutley has dedicated her career to ensuring the built environment can survive the extreme forces of nature.

As an Associate Professor and Associate Dean at the University of Kansas School of

Engineering, she leads critical research and education efforts—including as a co-principal investigator for the ARISE statewide initiative.

A Human-Centered Approach

Sutley's work breaks the mold of traditional engineering. By integrating social science with computational methods, she ensures that human outcomes remain the primary focus of structural solutions.

Her research spans the spectrum of natural disasters—including tornadoes, hurricanes,

"We won't stop tornadoes from happening, but if we do a better job of designing for them, we can prevent such catastrophic outcomes."

floods, wildfires, and earthquakes—with a specific emphasis on community resilience and long-term housing recovery.

Most notably, her research is helping modernize building codes across the country. Alongside colleagues on the ARISE team, she is collecting the data to help local leaders make informed decisions about disaster preparation and recovery.

National Recognition

Her impact gained significant national attention this past year when she was named a **2025 Blavatnik National Award for Young Scientists** laureate in physical sciences and engineering. Awarded by the New York Academy of Sciences, this prestigious honor includes a \$250,000 prize—the world's largest unrestricted award for early-career scientists.

The Heart of the Work

Despite the accolades, Sutley's motivation remains rooted in the field.

"It is a gut-wrenching feeling to be standing somewhere with complete destruction all around you, knowing that the debris you see used to be people's homes, lives, and memories," she says. "We won't stop tornadoes from happening, but if we do a better job of designing for them, we can prevent such catastrophic outcomes."

For Sutley, the goal is simple but profound: keeping people safe before, during, and after the storm.



COMMUNITY CONNECTIONS

Surveying Kansans about Energy and Water Security

In January 2024, a blizzard struck Finney County, Kansas. The fierce storm turned the community's daily routine into a nightmare. Heavy snowfall trapped cars on the highway. It forced essential packing-plant workers to shelter in place over night. Then the power lines failed, and dangerous cold air swept into many of our homes.

ARISE scientists are looking for ways to help Kansans become resilient during severe weather like this blizzard. As part of this effort, they sent surveys to thousands of Kansans in 2025 to ask about their weather experiences.

Each county surveyed had different concerns. In Finney, for example, the survey found that residents are most concerned about high winds, hail, and ice.



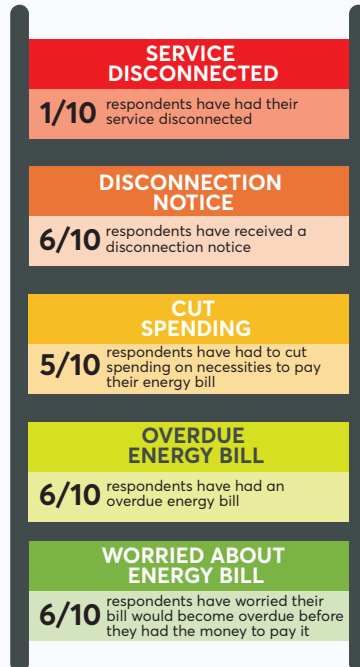
cold during the blizzard in Finney County. The impacts were felt everywhere, with a great loss of connection, safety, and comfort. The community's infrastructure was hit hard too, with one out of three residents experiencing power outages and nearly the same number losing heat.

While a power outage is a manageable inconvenience for many residents, it can lead to significant hardship for those who struggle to pay their energy bills. For these energy-insecure neighbors, a crisis can render it impossible to afford basic energy needs.

9% of Finney County residents are energy insecure.

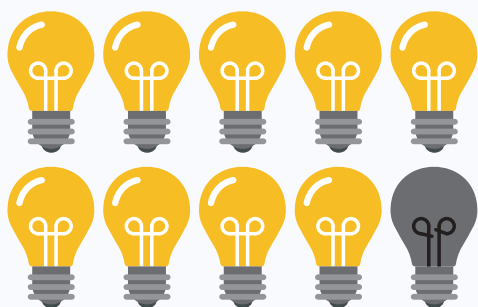
This means that when disasters like a blizzard hit, nearly one in 10 neighbors are forced to make impossible choices between heating their homes and feeding their families.

THE LADDER OF ENERGY INSECURITY FOR FINNEY COUNTY



The "Ladder of Energy Insecurity" shows how high utility costs force Finney County families to prioritize electricity over essential needs.

Losing power in winter can be challenging due to sudden high winds, ice, and cold snaps, which can down power lines. Residents face tough choices between heating their homes and fulfilling other basic needs, like food and transportation. Therefore, preparing in advance is crucial.



Kansas scientists are searching for solutions to help residents become resilient to natural hazards.

The team's work is aimed at helping all Kansas, including rural and vulnerable communities. The goal is to find ways to help everyone rebound faster and suffer less from large-scale disasters.

These findings provide important insights for policy makers deciding how to invest in water and energy infrastructure systems. As natural disasters like floods and storms become increasingly common, local leaders need information like this to ensure their communities can withstand these disasters.

About the Team

Guiding the research are K-State agricultural economist **Jason Bergtold** and the KU civil engineer **Elaina Sutley** with postdoc **Yongwang Ren**, graduate students **Saba Faghirnejad** (KU), **Mariam Gharib** (KSU), **Madison Graham** (KU), **Eliyasu Osman** (KSU), and **Rumana**

Sharmin, (KU), and several undergraduates.

Contact us to view more findings from the 2025 survey at nsfepscor@ku.edu



Jason Bergtold (KSU, right) discusses research findings with undergraduate researcher Nick Thomason at KU Undergraduate Research Symposium.

FROM RESEARCH TO REAL LIFE

New computer models aim to simulate disaster impacts to help local leaders safeguard communities.

When a disaster hits, the damage isn't just about downed power lines or broken pipes—it's about the cascading failures that follow. A power outage shuts down water pumps; a flooded road hampers repair crews. To tackle this challenge, ARISE scientists are building revolutionary tools to help leaders prepare for and respond to emergencies.

The "Flight Simulator" for Cities

Using a sophisticated framework called hetero-functional graphs, two new tools reveal the invisible threads connecting electricity, water, and transportation systems. Much like a flight simulator, these computer models allow city planners to test recovery strategies in a virtual environment before a real disaster hits.

"One of the tools is a co-simulator that involves high-resolution simulation of all the systems together," said George Amariuca, associate professor of computer science at K-State. "The other is an agent-based model that is more lightweight and can be run faster, and...enhanced more easily with new functionality — although it will have to be validated against the co-simulator."

Key Features for Resilience

Several features make these tools useful for enhancing community resilience. For example, they incorporate equity, using social vulnerability scores to assess community needs and ensure resources reach those who need them most.

They also incorporate wind speed physics and rainfall data to calculate the probability of equipment failure in the real world. And

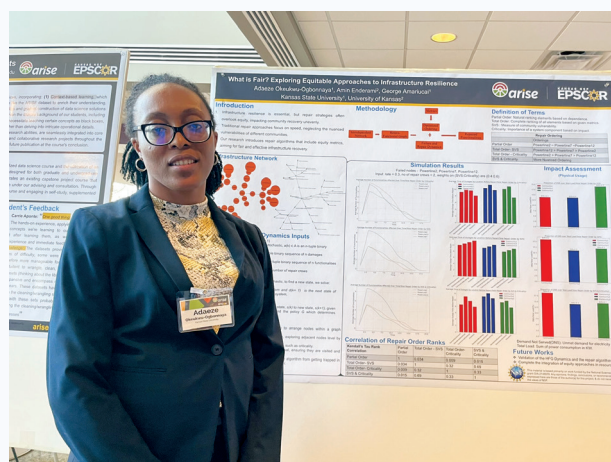
by using geographic proximity, the tools can predict connections—such as which water pump links to which power transformer—streamlining a mapping process that once took months.

From Concept to Ford County

With the "Proof of Concept" phase complete, the team is moving to the real-world to conduct simulations for Ford County, Kansas. This phase will help the team validate their theories and refine the model for broader use.

About the Team

Three faculty members lead the effort, including **George Amariuca** and **Bala Natarajan** at Kansas State University and **Elaina Sutley** at the University of Kansas. Key contributors include postdocs **Chia-Fu Liu** (KU), **Rahul Madbhavi** (KSU), and **Amulya Sreejith** (KSU), along with **Adaeze Okeukwu** (KSU).

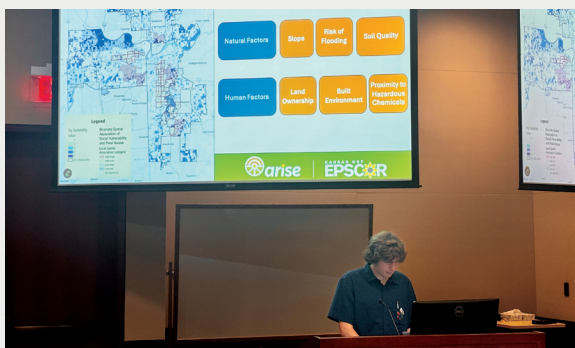
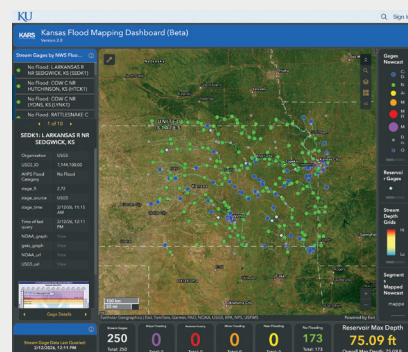


Recent K-State doctoral graduate Adaeze Okeukwu presents her research at the 2023 ARISE Annual Symposium.

ARISE Research in the News

Statewide study reveals infrastructure concerns among Kansas leaders. A study by KU and Wichita State found that rural leaders cite clean water and federal funding as top concerns, while urban officials focus on transportation and power-related "cascading failures." The study concludes that building resilience requires tailored strategies to address unique regional workforce and fiscal challenges. Key contributors are former ARISE Postdoc **Hsi-Chuan Wang**, KU Professor **Rachel Krause**, and WSU Assistant Professor **Xiaoheng Wang**.

A web-based dashboard automatically maps flooding in near real time, giving emergency operators a clear picture of where the water is and how deep it's expected to be along most major Kansas waterways. The tool uses stream gauge data and a terrain-based model developed by KU researcher **Jude Kastens**.



Boosting urban food systems in Kansas: To improve food access across urban areas in Kansas, K-State Assistant Professor **Shakil Kashem** is studying how city planning and policy can build more equitable, resilient food systems. Undergraduate **David Hipp** (University of Illinois Urbana-Champaign) contributed to the research by mapping viable places for urban agriculture in Kansas City as part of the ARISE REU program. They will present their findings at the International Conference on Urban Affairs in Chicago this April.

New research finds KC fare-free bus policy attracted new riders and increased use. KU Assistant Professor **Joel Mendez** says these changes could potentially enhance mobility and quality of life, particularly for people from communities who have historically had limited access to political power, education, and economic opportunities.



Kansas NSF EPSCoR Supercharges Research with First Awards for Junior Faculty

This year Kansas NSF EPSCoR announced four new First Awards—prestigious seed grants that supercharge the careers of assistant professors at Kansas universities. These competitive grants are designed to spark groundbreaking research and sharpen grant-writing skills, setting the stage for long-term academic success.

Since its launch in 1992, **177 assistant professors** across six Kansas universities have received First Awards. These projects can be transformative for faculty. Many recipients have gone on to win major federal research grants and earn national acclaim. **It's a proven launchpad for the state's brightest minds.**

Each award provides up to \$50,000 for a full year of innovative research and educational efforts tied to the bold goals of the ARISE project. This year's award recipients are diving into topics packed with real-world impact ranging from smart infrastructure to resilient housing.

2025 First Award Recipients



Nishit Jaideep Shetty, Assistant Professor
University of Kansas

Strengthening Resilience of Built Environments Through Early Mold Detection



Shruti Kshirsagar, Assistant Professor
Wichita State University

Advancing Robust Building Damage Detection for Resilient Infrastructure



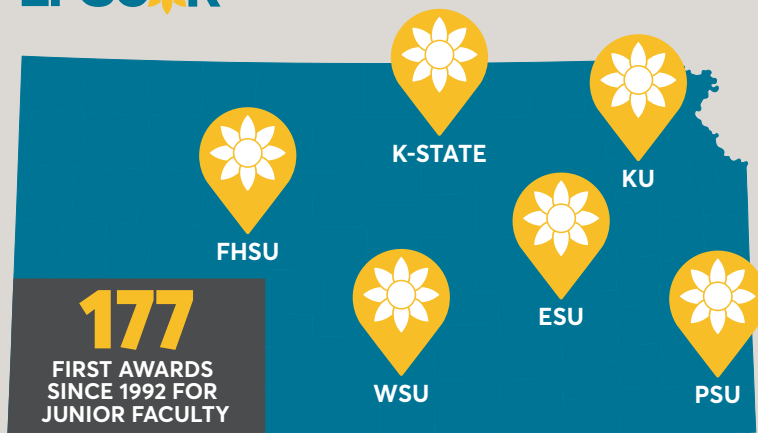
Sankha Narayan Guria, Assistant Professor
University of Kansas

Towards a Reliable Software Stack for Communications in Smart Infrastructure



Yoonjung Ahn, Assistant Professor
University of Kansas

Evaluating Disparate Impacts from Multi-Climate Risks for Manufactured Homes



Since its inception in 1992, Kansas NSF EPSCoR has invested in 177 assistant professors with its First Award program. These awardees hail from six universities in Kansas. Many have gone on to secure prestigious federal grants and achieve national recognition— hallmarks of the program's success in building a strong, sustainable research ecosystem in Kansas.

10 new seed grants kickstart high-impact research and education in Kansas

This year, Kansas NSF EPSCoR announced 10 new **Research and Education Innovation (REI) Awards**. These powerful seed grants are designed to spur homegrown ingenuity at Kansas universities, initiating high-impact research for Kansas.

Each award provides up to \$50,000 for nine months of innovative endeavors. The ARISE project has issued **23** total REI awards to date.

2025 REI Award Recipients



Yoonjung Ahn, Assistant Professor
Geography & Atmospheric Science,
University of Kansas
*Manufactured Housing Residents' Air
Quality Exposures and Perspectives*



**Matthew Howland, Assistant
Professor of Anthropology**
Anthropology, Wichita State University
*Documenting and Disseminating History
and Mortuary Segregation at Highland
Cemetery*



Nishit Shetty, Assistant Professor
Civil, Environmental, and Architectural
Engineering, University of Kansas
*Characterizing the fungal microbiome
in indoor air and stormwater to improve
resiliency to mold.*



Rachel Krause and Hala Altamimi
University of Kansas
*Nonprofits as Third-Party Governance
Actors in Community Resilience*

2025 REI Award Recipients



Lior Shamir and Safia Malallah

Kansas State University
*Artificial Intelligence and Data Science Educational
Module for K-5*



Balasubramaniam Natarajan and Rahul Madbhavi

Kansas State University
CLARA: County-Level AI for Resilience and Assistance



George Amariuca

Kansas State University
*Conversational, Context-Aware, Adaptive Surveys: An AI-Driven Platform
to Expand Human Data Collection Capacity across Kansas Institutions*



Visvakumar Aravinthan, Lokesh Das

Wichita State University

Jason Bergtold

Kansas State University

Madison Graham

University of Kansas

*Quantify Voluntary Load Reduction to Enhance System Resilience
for Resource Adequacy Events*



Xiaoheng Wang and Quan Lei

Wichita State University

*Assessing Local Government Decision-Making for Resilient
and Equitable Infrastructure*



Jason Bergtold

Kansas State University

Madison Graham

University of Kansas

Behavioral Experiments to Assess Behavioral Intentions of Kansas Residents

First Award Outcomes

Meg Kurnit/KU Marketing

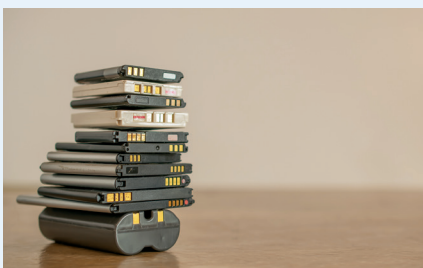


New research reaffirms benefits of Indigenous fire sovereignty

KU Assistant Professor **Melinda Adams** is bridging the gap between ancestral knowledge and modern climate resilience through Indigenous-led cultural burns with the Ioway Tribe of Kansas. Last year's First Award supported three workshops with the Ioway Tribe and a joint cultural burn demonstration at the KU Field Station. This work created a cultural burn stewardship plan to restore sites

in the Ioway Tribal National Park and co-produced a framework for understanding regional approaches to cultural burns as a resilience tool.

Remigiusz Góra / Adobe Stock



Assessing the health of lithium-ion batteries

WSU Assistant Professor **Davi Soares** credits his 2023 EPSCoR First Award as a career catalyst. The funding launched his research into real-time lithium-ion battery health, ensuring that critical infrastructure—from power grids to emergency backups—remains safe and resilient. A major breakthrough in Soares' work proves that

monitoring battery aging can be affordable using low-cost Raspberry Pi hardware. "This award has been instrumental in supporting my research," Soares noted, as it supported a graduate student, supplies, and international conference travel. To date, the project has produced two journal publications and the preliminary data for several major grant proposals.

Chinnapong / Adobe Stock



How Libraries are Critical Infrastructure

Emporia State Assistant Professor **Amanda Hovious** used her EPSCoR First Award to study how public libraries are far more than book repositories—they are critical social infrastructure. Her research reveals that libraries often serve as hubs during disasters. They also battle low adult literacy and a lack of community resources. She said: "Being part of this project was the best thing that's happened in my career...It's given me a chance to work alongside people from different disciplines and learn methodologies like community-engaged research."



Harnessing the Power of Data for Kansas

"We live in a world awash with data," said Donna Ginther, Roy A. Roberts & Regents Distinguished Professor of Economics at KU.

Harnessing all this data is a huge challenge. This is why the **Kansas Data Science Consortium (KDSC)** was created in 2022 as a key educational pillar of the ARISE project, Kansas' current major NSF EPSCoR initiative.

Driving workforce and economic development

By connecting learners and employers, KDSC provides students with real-world experiences while helping organizations solve complex problems.

Dozens of businesses, nonprofits, and other organizations partner with KDSC, sharing data for class projects. Then college students across the state work on those projects as part of a course, gleaming insights for their partner organization.

While KDSC invites all colleges in Kansas to partner, seven schools have done so to date, including: KU, K-State, WSU, Baker University, Butler Community College, Donnelly College, and Johnson County Community College. KDSC also hosts a free online repository of its curricula to support educators statewide.

Connecting Talent with Opportunity

Each spring, KDSC hosts an annual conference to showcase student projects, such as custom data dashboards and code. The next conference will be May 2, 2026 in Manhattan. Anyone can attend. It is especially valuable for employers to recruit skilled data professionals.

Ginther gave the keynote presentation at the 2025 KDSC Conference. About 140 students, educators, business leaders, and community members gathered in Lawrence for the event, which featured data promoting the well-being of Kansans.

"Researchers in Kansas are leveraging this new era of information to improve the lives of Kansans," Ginther said.

Free Data Science Consulting

KDSC has expanded its mission by offering free consulting services to students, faculty, and community members. Managed by KU Data Engineer Benjy Jacobs, these services include data searches and integration, dashboard development, geospatial analysis, regression analysis, data scraping, data pipeline management, data wrangling and visualization.

About the Team

KDSC is led by Michael Branicky (KU), Lior Shamir (KSU), and Sergio Salina-Monroy (WSU). Other faculty and staff include: Jeff Girard (KU); William Duncan (KU); Emma Howard (KU); Benjy Jacobs (KU); Stephen Paolillo (KU); Kiran Mihir (JCCC); Brian Dye (Butler); Ana Maradiaga (Donnelly); Nicholas Adongo (Donnelly); Judith Smrha (Baker); and Stephanie Brockmann (Baker).

LEARN MORE

data.ku.edu/community-partners
data.ku.edu/kdscon
datarepository.ku.edu



Retired Johnson County Community College educator Suzanne Smith learns about a student's data analysis at the annual KDSC conference.

New Dashboards Equip Kansas Leaders with Disaster Recovery and Water Data

KDSC researchers created a public-facing website known as the **Kansas Extreme Events dashboard**. This new tool is the fourth in a suite of dashboards to streamline data-driven decision-making across the state.

The Extreme Events dashboard acts like a speedometer in a car—but instead of depicting speed it gauges how various storms impact Kansans.

The messy data powering this dashboard were previously siloed in separate public datasets. Bringing together these sources proved to be a significant undertaking.

"If you go through their website, it's a lot to take in," said Jash Patel, a KU graduate student who built the cyber infrastructure for the dashboard. "It took me three or four weeks to finalize which datasets I needed to work with. I had to do a lot of data wrangling."

Policy and Impact

The Extreme Events dashboard is the fourth such tool created by the team to support the **State of Kansas Water Plan**. Each dashboard helps users grasp issues such as drought severity, aquifer depletion, reservoir health, disaster recovery, and infrastructure resilience.

Policymakers, researchers, and residents can use the new dashboards to see statewide patterns. This functionality allows planners to identify counties most affected by extreme climate events, track aquifer stress, and understand federal assistance trends for longer-term planning.

Collaborative Effort

The dashboards are the result of a multi-partner collaboration, leveraging an NSF



William Duncan, assistant research professor of data science at the University of Kansas, mentors KU graduate student Jash Patel on a data science project.

Convergence Accelerator known as The WATER Hub, KU's Institute for Policy and Social Research, the Kansas Data Science Consortium (KDSC), and the NSF EPSCoR ARISE project.

"Winning a competitive award from Convergence would not have been possible without the EPSCoR network," said William Duncan, assistant research professor at KU.

On the Horizon

The team is currently working on an interactive weather dashboard that shows rainfall and drought patterns across Kansas for the past 30 years. They have two other dashboards in the works.

—Melinda R. Cordell

Explore the Kansas Extreme Events dashboard and other resources at waterhub.ku.edu.



Undergraduates Search for Pathways to Disaster Resilience

Hannah Gideon has loved science since she was a child. But it wasn't until this past summer that she discovered the right path to the career of her dreams.

From May 27 to August 1, 2025, Hannah and 13 other students were paired with professors at Kansas State University, the University of Kansas, and Wichita State University, for the ARISE Research Experiences for Undergraduates (REU) program organized by Kansas NSF EPSCoR.

"I enjoyed every second of it," Hannah said.

Besides doing research on disaster resilience, the program gave students transformative learning opportunities, as documented in Story Maps and photo essays created by the students.

Field trips to several towns in Kansas, for example, shed light on human and physical infrastructure systems. One field trip trekked to Lawrence to explore the Wakarusa Wastewater Treatment Plant. Another headed to Olathe to learn about community resilience, with students assembling kits for at-risk residents battling extreme heat.

Weekly "percolators" spotlighted career paths with different professors while three sessions built skills in data analytics. Students also gave three-minute research talks at K-State and shared scientific posters at a KU-led symposium.

With all of these experiences, some of the students, like Hannah, even reimaged their future careers.

"The REU helped me realize that I needed to transfer to another institution if I wanted to be successful in my career," Hannah said about her transfer from Fort Hays State University to K-State to study environmental engineering.



(Top) K-State undergraduate Hanna Gideon conducts summer research at KU. (Middle) 2025 REU cohort stand outside the KU Burge Union with mentors. (Bottom) REU participants tour water treatment facility in Lawrence, Kansas



How a Tabletop Role-Playing Game Teaches Resiliency

A Wichita State University group teams up with museum staff at the University of Kansas to bridge the gap between infrastructure research and practice with a new role-playing game for all ages.

"When you say the words 'environmental finance' everybody's eyes glaze over. Which I get," said Tonya Bronleewe, director of WSU's Environmental Finance Center (EFC).

But finances are the lifeblood of every town and city, especially when related to infrastructure and the environment.

Bronleewe and her team have been working with the ARISE project to find ways to bring infrastructure research to communities in Kansas. One of those ways is with games to make learning fun.

In spring 2023, John Colclazier, program manager at the EFC, created a tabletop role-playing game with Bronleewe for an ARISE outreach event led by Associate Director of Informal Science Education Teresa MacDonald at the University of Kansas Biodiversity Institute and Natural History Museum.



Tonya Bronleewe, director of the Environmental Finance Center at WSU, teaches college students how to play tabletop game.

"When we initially developed this game, we did not have engineering students in mind," Colclazier said.

Instead, the game was first designed to be played by low income children and their families from KU's TRIO program at Kansas City Kansas Community College.

"The purpose of the tabletop game was to introduce these concepts of resiliency," Colclazier said. "Not just prepared or unprepared, but [how to deal with] unexpected events that your city has to respond to, the relationship between all of these different departments, and how resources compete with each other."

Since then the game has been enjoyed by players from kindergarten to college. It's been used twice with low-income families in Kansas City and twice with the ARISE Research Experiences for Undergraduates (REU) program at KU. It's even gone beyond ARISE to be used with 74 teenagers at a KU summer engineering camp.

The Rules of the Game

In this game, everybody is a city leader allocating resources for city services. Each town has eight departments: animal shelter, water, electrical, stormwater, street repair, trash management, parks and pools, and wastewater management.

After drawing their city with colorful markers, each player gets tokens to fund their city. They can earn more but also lose them—just like city budgets—with each card picked from the



REU participants K-state undergraduate Hannah Gideon and WSU undergraduate King Nguyen play tabletop game.

deck. Some years you're flush with cash after making a big deal that fills the coffers. Other years, there's a water main break, or never-ending snowfall, or a water tower to fix.

And, this being Kansas, natural disasters are always in the cards.

"It never fails that we have somebody that faces the tornado card, which is the most consequential card, within the first couple of turns of the year," Colclazier said. "If you deal with a tornado in year 1, it constrains your budget so tightly that it's hard to bounce back later on."

Players do their best to budget city departments when tokens are low. The game plays out differently every time. It encourages questions and helps players understand the choices city leaders must make.

Secret Tunnels in City Infrastructure

"Engineers are shaping the societies we live in, in ways that high schoolers, or even your average people, aren't necessarily thinking about," said Meredith Morris-White, undergraduate recruitment and outreach director for the KU School of Engineering.

When she played the tabletop game at an engineering summer camp with 9th and 10th grade campers—74 in total—they had a blast.

"Some of them had very carefully thought out, well-plotted cities," Morris-White said, "and then one of them said, 'Mine's in the shape of a cat!'" Other enterprising students chose to use their budgets to connect their towns with a secret tunnel.

Next Steps

Colclazier has a personal stake in teaching resiliency. He grew up in Greensburg, Kansas, which was almost completely destroyed by a catastrophic EF5 tornado when he was 11 years old.

"There is a human component to the work that we're doing and that can lead to improved outcomes during times of great distress for communities," he said.

The team plans to continue hosting the role-playing game in the future. A slide-deck, directions sheet, and scenario cards are available in English and Spanish in digital format for printing upon request.

—Melinda R. Cordell



Children and their family members play tabletop game at a KU-led Family STEM Night event at Kansas City Kansas Community College.



Honors and Recognition



Jason Bergtold earns teaching honor for second year in a row

Jason Bergtold, K-State agricultural economics professor and ARISE project theme leader, was awarded the 2025 Dr. Ron and Rae Iman Outstanding Faculty Award for Teaching. The honor is given to faculty who demonstrate exceptional teaching, strong student relationships, and distinguished service to the university. This latest recognition follows his 2024 David Mugler Outstanding Teaching Award from the K-State College of Agriculture.

Career Milestones

Two Kansas educators retired this year. Both were instrumental in developing activities for the Kansas Data Science Consortium (KDSC) since its launch in 2022.



Janice Akao retired as the department chair of accounting at Butler Community College this May. Stepping into her role at KDSC is Brian Dye, assistant professor of computer networking. He will continue the community data labs projects at Butler.



Suzanne Smith, chair and associate professor of data analytics at Johnson County Community College, retired in December 2025. On June 1, she transferred her KDSC duties to Kiran Mihir, assistant professor of computer information systems.

Engineering Education

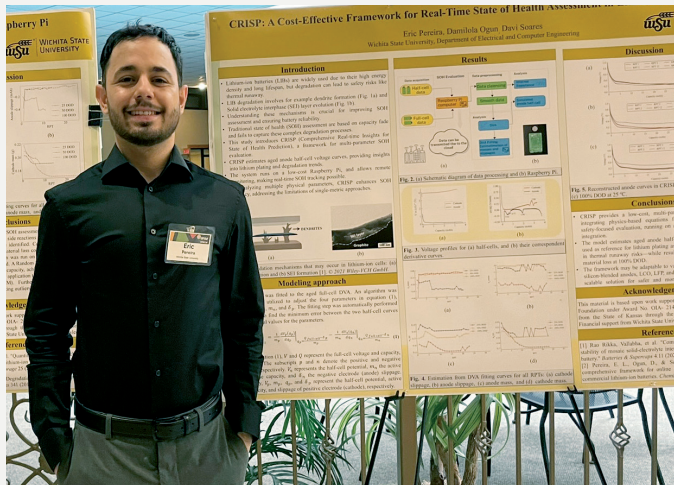
Two ARISE educators published four papers at the 2025 American Society for Engineering Education Conference in Montreal, Canada:



Safia Malallah had three papers related to K-12 data science.



Claudia Bode had one paper on integrating art & engineering for undergraduates.



Eric Luiz Pereira

Five Graduate Students Win Poster Awards

At the 2025 Annual ARISE Symposium, the following students were recognized for their outstanding research posters aimed at boosting resilience in Kansas: **Adaeze Okeukwu-Ogbonnaya** (KSU), **Sachin Viththarachchige** (WSU), **Cynthia Esiaka** (KU), **Eric Luiz Pereira** (WSU, left), and **Priyanka Gautam** (KSU).



KU Research Professor Jude Kastens received two grants recently from the Kansas Dept. of Agriculture: \$50k to study inundation characteristics for constructed ponds along the Arkansas River in Colorado; and \$100k to develop AI-based crop and water analytics.



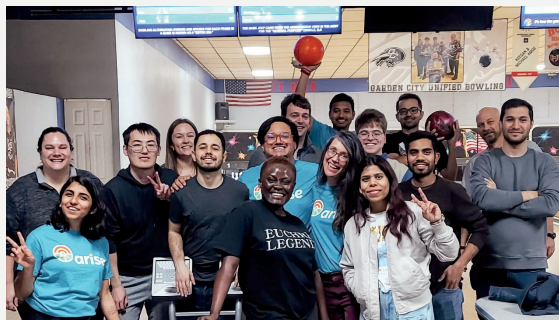
KU Associate Professor Jeffrey Girard received the 2025 Shulenberg Award for Innovation & Advocacy in Scholarly Communication for his sustained commitment to open science. The tools he created have been cited in more than 2,000 peer-reviewed publications and adopted by hundreds of research groups worldwide.



Elaina Sutley, Associate Professor and Associate Dean at the University of Kansas School of Engineering, is one of three faculty at KU to receive a University Scholarly Achievement Award this year.



KSU engineer Lior Shamir's recent research using data from NASA's James Webb Telescope got noticed by Neil DeGrasse Tyson! While not ARISE research, it's exciting to see a professor's discovery spark national news.



Symposium Success

The 2025 Annual ARISE Symposium was a resounding success—packed into two days of inspiring research, beautiful landscapes, and even a little bowling fun! Of the 87 attendees gathering in Garden City, Kansas, 20% represented vital community partners and liaisons. Thank you all for sharing resilience research and your efforts to strengthen the state's workforce.



KU engineer Michael Branicky was inducted as a AAAS Fellow for his work in modeling, analysis and control of cyber-physical systems and for applications to networked control systems and robotics. He attended the induction ceremony in Washington, D.C. in June.



K-State Associate Professor Vaishali Sharda was named a University Outstanding Scholar, which recognizes "exceptional mid-career tenured faculty members who demonstrate extraordinary potential for academic distinction." She was also awarded a Roots of Research Faculty Honor, which planted a white oak on campus to mark the award.



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University of Kansas
Lawrence, KS 66047

Meg Kurnin/KU Marketing



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