

# A Brief Overview of Kansas NSF EPSCoR and the ARISE Project

*“How Kansas EPSCoR, and the ARISE Project, advance research infrastructure improvement and Science & Technology growth in Kansas (and beyond)”*

# NSF Established Program to Stimulate Competitive Research

## About NSF EPSCoR

The U.S. National Science Foundation's EPSCoR program pursues a mission to enhance the research competitiveness of targeted jurisdictions (state, territory or commonwealth) by strengthening science, technology, engineering and mathematics (STEM) capacity and capability through a diverse portfolio of investments from talent development to local infrastructure. The EPSCoR program envisions its jurisdictions as recognized contributors to the national and global STEM research enterprise. The program:

- **Catalyzes** research capability across and among jurisdictions.
- **Establishes** STEM professional development pathways.
- **Broadens** participation of diverse groups and institutions in STEM.
- **Effects** engagement in STEM at national and global levels.
- **Impacts** jurisdictional economic development.

# EPSCoR Research Infrastructure Improvement Program Track-1 (RII Track-1)

RII Track-1 awards provide up to \$20 million total over five years to support research-driven improvements to jurisdictions' physical and cyber infrastructure and human capital development in topical areas selected by the jurisdiction's EPSCoR steering committee as having the best potential to improve future R&D competitiveness. The project's research and capacity-building activities must align with the specific research priorities identified in the submitting jurisdiction's approved Science and Technology (S&T) Plan.

# KS State S&T Plan

## Kansas Science + Technology Plan

Effective August 1, 2021

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# Alignment with KBOR Strategic Plan Foresight 2020



**The ultimate goal is  
to increase graduates  
in high-demand,  
sustaining-wage fields.**

## Three Special Initiatives:

1. Excel in Career Technical Education (2012)
2. University Engineering Initiative (2012)
3. Kansas Nursing Initiative

## Target industries for talent pipeline



**Advanced  
manufacturing**  
*including aviation*



**Agriculture**  
*including animal  
health*



**Architecture,  
construction,  
engineering**



**Business  
and financial  
services**



**Computer science**  
*including  
cybersecurity*



**Education**



**Energy**



**Health  
sciences**

# KS State S&T Plan

**Our vision is to elevate, stimulate, grow,  
and translate science and technology research  
in Kansas to improve the quality of life and  
economic resilience of its citizens.**

## Areas of strength

1. One Health: Intersection of human, animal & environmental health
2. Aviation & transportation
3. Agriculture & bioscience
4. Advanced manufacturing & polymer science
5. Energy & environment
6. Security

## Areas of opportunity

7. Smart infrastructure & resilience
8. Precision agriculture
9. Digital transformation & automation
10. Harnessing genomics

We identified two additional foundational areas that require infrastructure investment to build science and technology research capacity broadly across multiple fields.

## Foundational infrastructure needs

1. Rural broadband and connectivity
2. Data literacy, data storage, and open data access to enable research

[KS State Science & Technology Plan:](https://www.kansasregents.org/academic_affairs/kansas-epsco-idea)

[https://www.kansasregents.org/academic\\_affairs/kansas-epsco-idea](https://www.kansasregents.org/academic_affairs/kansas-epsco-idea)

# Recent Investments in Research Capacity

## Kansas University Engineering Initiative

**\$105M**

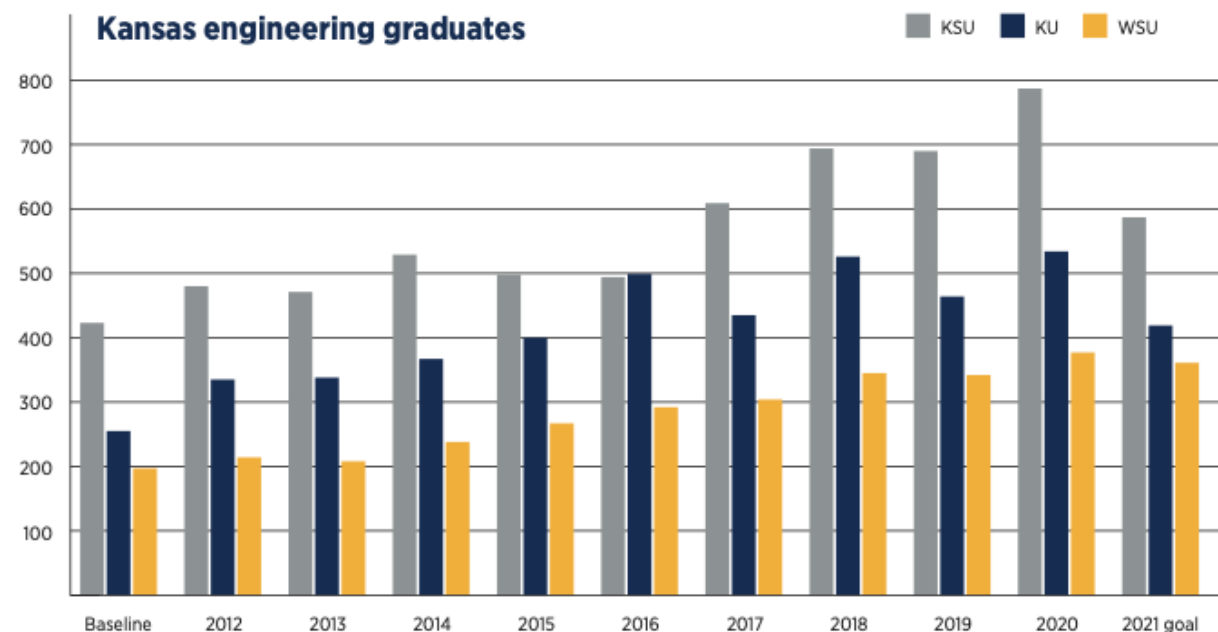
initial 10-year  
investment in 2012

**1,365**

initial annual goal for  
undergraduate degrees

**1,698**

revised goal after passing  
original target in 2018



## University engineering facilities



**KSU**

Engineering Hall  
108K sq. ft.  
2016

**WSU**

John Bardo Center  
143K sq. ft.  
2017

**KU**

LEEP2  
110K sq. ft.  
2015



# KS State S&T Plan

## Smart infrastructure + resilience

**Kansas is uniquely positioned to capitalize on its expertise in cybersecurity and infrastructure to meet the needs of communities to rebuild aging infrastructure and to become more resilient to the changing climate.**

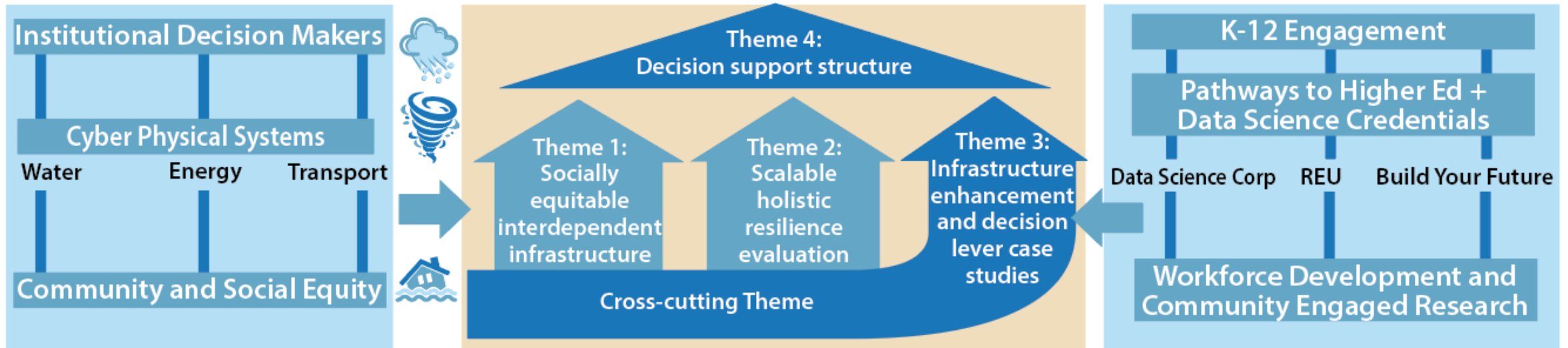
### **Economic impact to the state**

Every \$1 spent on pre-disaster mitigation saves up to \$11 on post-disaster recovery, not including the additional quality of life maintained. Resilience- and risk-informed decision-making can be used to more optimally allocate financial resources where the greatest needs exist to prevent hazards from ever becoming disasters. Such resources could be used to maintain, repair, or retrofit physical infrastructure, or it can be used to build human capacity, both of which create more jobs in Kansas.

# RII Track-1: Adaptive and Resilient Infrastructure Driven by Social Equity (ARISE)

**Vision:** ARISE will build research capacity in Kansas by creating a new social equity-driven paradigm for resilience analysis that, through a pipeline of community leaders and decision-makers, will transform how communities invest in, and manage, human and physical infrastructure.

# Project Overview



# Research Overview

Theme 1 - Socially Equitable Interdependent Infrastructure for Resilience Analysis

T1-1 Measuring social equity

T1-2 Model Framework

T1-3 Model specification and validation

Theme 2 - Scalable holistic resilience evaluation

T2-1 Holistic resilience metric development

T2-2 Institutional decision-making

T2-3 Probabilistic resilience characterization

T2-4 Scalable resilience computation with uncertainties

# Research Overview

## Theme 3 - Infrastructure Enhancement and Decision Levers: Case Studies

T3-1 Transportation management and recovery planning

T3-2 Resilient, safe drinking water delivery

T3-3 Resilient wastewater and stormwater collection

T3-4 Distributed energy resources

## Theme 4 – Decision-Support Structure

T4-1 Understanding and nudging decision-makers

T4-1 Decision-support tool implementation

# Education & Workforce Development

Edu Obj 1 - Develop an interdisciplinary data science consortium

Task 1 Develop a data science capstone course called Community Data Lab (CDL)

Task 2 Establish an online repository for data science curriculum material

Edu Obj 2 – Train the next generation of ARISE scientists

Task 1 REU

Task 2 Collaborate with KS NSF LSAMP Program

Task 3 Create a multi-institution resilience course for graduate students

# Education & Workforce Development

Edu Obj 3 - Engage youth and families through educational programming

Task 1 TRIO Youth & Family Programming

Task 2 Family STEM nights

Task 3 Community Connections through Public Libraries

Edu Obj 4 – Implement a network of community-engaged research

Task 1 CITI Training and Completion of the Community Engagement Module

Task 2 Community Engagement and Outreach Roundtables

Task 3 Community Engagement Advocates

Task 4 Build Public Utility Workforce Capacity

# Seed Funding Opportunities

# FUNDING OPPORTUNITY

## First Awards for research in resiliency and smart infrastructure

Kansas NSF EPSCoR is requesting proposals from early career faculty for First Awards. These seed grants are designed to spur research in resiliency and smart infrastructure. Experts in the field will review the submissions, and offer feedback to help awardees compete nationally for funding.

Notice of intent  
Due Nov. 29, 2022

Full proposal  
Due Jan. 10, 2023

Direct budget up to  
\$50,000 for 12 months

## Who should apply?

Any **tenure-track faculty member\*** who is an Assistant or non-tenured Associate Professor at Kansas State University, University of Kansas, Wichita State University, Emporia State University, Fort Hays State University, Pittsburg State University, or Washburn University.

\*Other restrictions apply.

## About Us

The National Science Foundation Established Program to Stimulate Competitive Research (NSF EPSCoR) ensures every citizen has access to STEM experiences by increasing research capacity in traditionally underfunded regions of the country. For every dollar it invests in Kansas, the state gets back twice that in non-EPSCoR funding.

**LEARN MORE**  
[arisekansas.org](http://arisekansas.org)

# FUNDING OPPORTUNITY

## Research & Education Innovation (REI) Awards

Kansas NSF EPSCoR is seeking proposals for REI Awards in resiliency, with special consideration in these areas: i) Bias in machine learning & automation; ii) Resiliency planning & risk mitigation in indigenous communities; and iii) Emergency management; disaster & resilience planning.

Proposal  
Due Jan. 10, 2023

Total direct budget up to  
\$50,000

Duration of award  
Up to 14 months



## Who should apply?

Any **faculty member** at Kansas State University, University of Kansas, Wichita State University, Emporia State University, Fort Hays State University, Haskell Indian Nations University, Pittsburg State University, or Washburn University is eligible to apply.

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**LEARN MORE**  
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# ARISE Management Structure

## Theme Leaders

- Each Research Theme and Education Objective has a theme leader

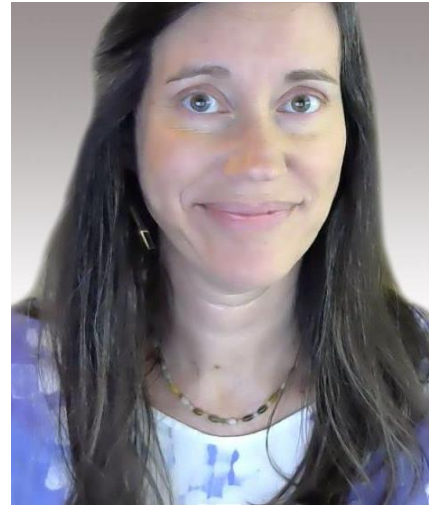
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