



# OKLAHOMA EPSCoR UPDATE

Promoting Innovative Research

OK NSF Established Program to Stimulate Competitive Research | October 2022

## OK NSF EPSCoR Awards Two Seed Grants through the S<sup>3</sup>OK Project

The Oklahoma NSF EPSCoR program through the NSF EPSCoR Research Infrastructure Improvement Track-1 project “Socially Sustainable Solutions for Water, Carbon, and Infrastructure Resilience in Oklahoma (S3OK)” awards two seed grants up to \$75,000 per award that aimed at developing and testing science-based solutions for complex “wicked” problems at the intersection of land use, water availability, and infrastructure in Oklahoma.

The Seed Grant recipients are:



Nazaripouya

**Drs. Hamidreza Nazaripouya** (*Oklahoma State University, OSU*),  
**and Frankie Wood-Black** (*Northern Oklahoma College, Tonkawa*)



Wood-Black

***AI-Enabled Proactive Resilience Enhancement of Electric Infrastructure Against Wildfire***

This project aims to improve grid resilience under wildfires in terms of active robustness, resourcefulness, rapid recovery, and adaptability. Specifically, the project will design and develop a proactive self-healing mechanism for the electrical grid, by

considering real-time wildfire impacts, such that a grid can automatically mitigate wildfire adverse impacts and continue its operation. The expected outcome and benefits in this project are: 1) Wildfire Mathematical Impact Models along with Numerical and Probabilistic Wildfire Impact Scenarios, which will provide a powerful tool to analytically analysis the impact of key wildfire byproducts (e.g., flame, smoke, heat, ash, etc.) on electric infrastructure, and develop probabilistic wildfire impact scenarios and contingency models; and 2) Wildfire Self-healing Solutions, which will offer an integrable decision-making-tool for system self-healing and wildfire impact mitigation to ensure the resilient operation of the grid.



Sadri

**Drs. Arif Sadri** (*University of Oklahoma*), **Kristin Olofsson** (*OSU*), and **David Reed** (*University of Science and Arts of Oklahoma*)



Olofsson

**Risk Mapping of Interdependent Social and Physical Infrastructure Networks in Oklahoma (I-SPIN-OK)**



Reed

The goal of this research is to offer a holistic network diagnostic framework that considers complex interdependencies in coupled social

and physical infrastructure systems. This project aims to measure how risk is communicated in online social networks and develop network profiles of risk communication in conjunction with co-located physical networks. In particular, the research team specifically seek to 1) measure how households, agencies and/or stakeholders activate their access to social and physical networks during a major crisis; 2) examine how social networks correlate, both spatially and temporally, with physical networks that govern risk assessments, concerns about basic needs (e.g. food, water, gas, electricity), and protective actions (e.g. access to local roads, emergency supply, shelter); and 3) uncover how co-dependent and co-located social and physical networks transition from warning to response and shape community recovery.

*Upcoming Event:* **Women in Science Conference**  
October 4, 2022  
Science Museum Oklahoma  
Oklahoma City

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