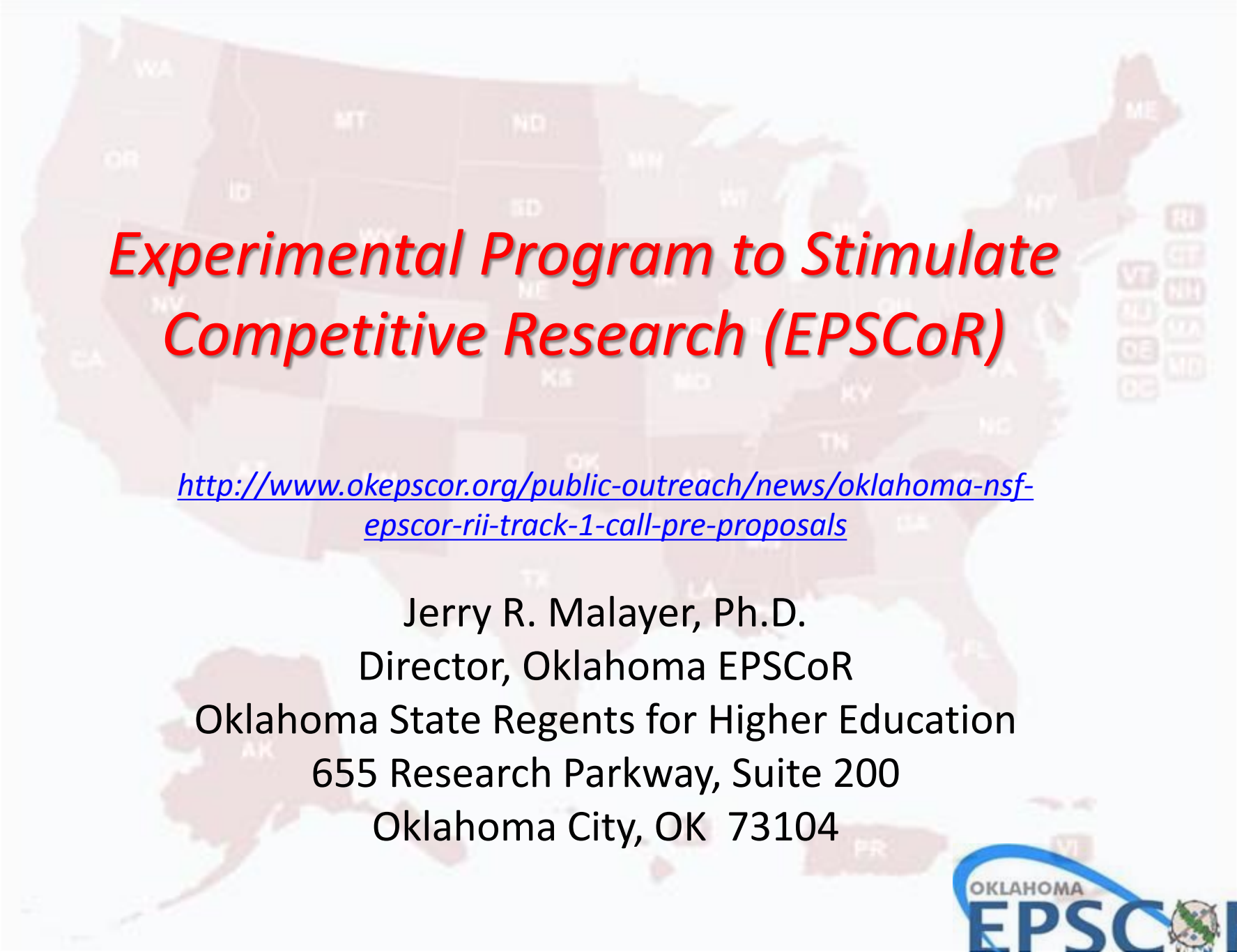




Experimental Program to Stimulate Competitive Research (EPSCoR)

<http://www.okepscor.org/public-outreach/news/oklahoma-nsf-epscor-rii-track-1-call-pre-proposals>

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Experimental Program to Stimulate Competitive Research (EPSCoR)

Science and engineering talent can be found among young people in every state, and *the long-term health of the U.S. research enterprise depends on providing opportunities for these young people to develop their talents no matter where they may live or attend college.* Participation in research is an essential component in science and engineering education.

Consequently, students in all parts of the country must have the chance to participate in high-quality research, and *it is in the national interest that federal funding be provided to universities in every state to ensure that these research opportunities are available.*the nation needs a robust supply of researchers to keep expanding the frontiers of knowledge, and all states need citizens capable of understanding and applying new developments in science and engineering

National Research Council. The Experimental Program to Stimulate Competitive Research. Washington, DC: The National Academies Press, 2013.





YOUR PARTNER FOR SUCCESS

> *Our mission is to strengthen Oklahoma's competitive research*

Commercialization vouchers
Industry internships
Research opportunity awards
Grant writing workshops

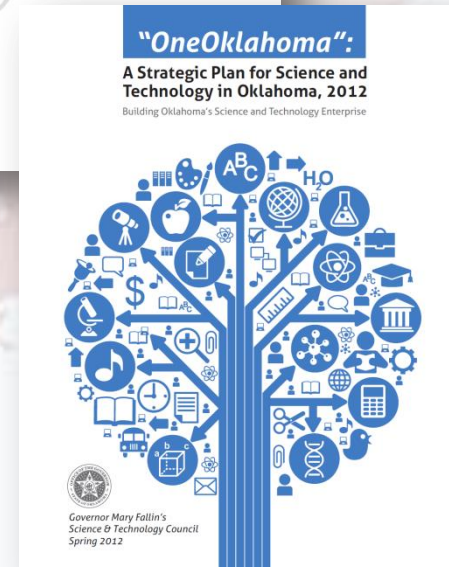
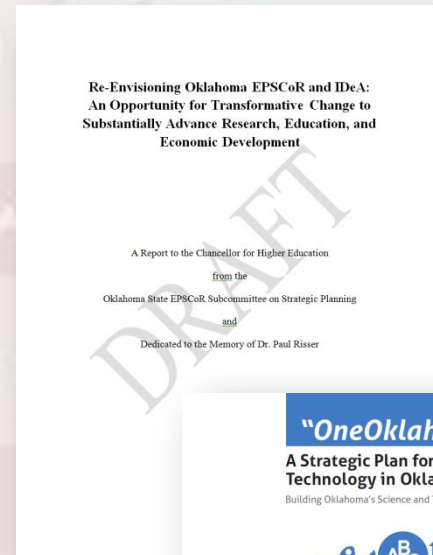


Supercomputing symposiums
Entrepreneurial workshops
Business plan competitions
Undergrad research experiences

OK EPSCoR Experimental Program to Stimulate Competitive Research
for program information call 405.744.9964 or visit www.okepscor.org

New Directions for EPSCoR/IDeA in Oklahoma

- **New Oklahoma EPSCoR Strategic Plan** re-envisions EPSCoR/IDeA in OK
- **Advance role of State Committee** as a focal point for executing the State's S&T Plan (created by the Governor's S&T Council)



New Directions for EPSCoR/IDeA in Oklahoma

- Broad State-wide portfolio analysis of R&D strengths/priorities (academic, industry) **aligned** with Federal activities
- State-wide **EPSCoR Researcher Network**
- Expand role of **State EPSCoR Director** – **coordinate with Secretary of S&T** and promote the big picture
- Stronger links to **economic development** and greater engagement of the **private sector**
- **Multi-state and regional** initiatives
- Sustained strategic investments in **greatest strengths**; to most effectively build sustainable research capacity within the State – which is the foundational notion of EPSCoR – ***Oklahoma should work to ensure some degree of theme continuity across RII submissions***



Climate Variability Research

Oklahoma NSF EPSCoR Research Infrastructure Improvement Award No. IIA-1301789

Oklahoma: A Perfect Storm for Climate Variability Research

Oklahoma's unpredictable weather and large precipitation gradient work together to create a vulnerable and diverse landscape that is exceptionally well-suited for the climate-based research that NSF EPSCoR scientists are performing.

This research team, representing more than a dozen disciplines and four institutions from across the state, is working to advance understanding of how socio-ecological systems can adapt sustainably to climate variability.

Scientists will examine complex human, climate and natural resource systems, while addressing three interlinked research focus areas: an observatory network, a forecasting system, and a decision support system.

The knowledge gained from this project will be used to empower managers to effectively adapt social and ecological systems to climate variability and to educate Oklahomans about the expected consequences of regional environmental change.



**OBJECTIVE 1.****FEEDSTOCK DEVELOPMENT**

To discover molecular mechanisms and tools for biomass development through the use of genomics, functional genomics and genetic transformation approach.

OBJECTIVE 2.**MICROBIAL CONVERSION**

To understand the molecular basis and mechanisms underlying efficient microbial conversion of biomass to liquid fuels through direct and indirect fermentation.

OBJECTIVE 3.**CHEMICAL CONVERSION**

To improve existing processes and to develop new catalytic/thermochemical conversion processes of cellulosic biomass.

BIOFUELS INNOVATION FOR OUR ENERGY FUTURE



CELLULOSIC BIOENERGY RESEARCH

Oklahoma EPSCoR scientists are developing unique methods to transform non-food energy crops, such as switchgrass, into liquid fuel.

One such innovation, the "GRASSohol" process, will enhance biofuel refinement and potentially produce more than 60 gallons of ethanol per dry ton of material.

Researchers are also investigating new technologies to convert lignocellulosic biomass to gasoline and diesel fuel. These technologies have the potential to significantly reduce the capital cost of new biofuel refineries and capture a high percentage of the biomass carbon.



BIOENERGY RESEARCHERS

The OK NSF EPSCoR Research Infrastructure Improvement Award 2008-2013, "Building Oklahoma's Leadership Role in Cellulosic Bioenergy," is a multi-institutional collaborative project that includes researchers from Oklahoma State University, University of Oklahoma and Samuel Roberts Noble Foundation.

OBJECTIVE 1**FEEDSTOCK DEVELOPMENT**

Mali Mahalingam, OSU
Stephen Marek, OSU
Kiran Mysore, SRNF
Tim Samuels, OSU
Ramanjulu Sunkar, OSU
Million Tadege, OSU
Rao Uppalapati, SRNF
Zeng-yu Wang, SRNF
Yanqi Wu, OSU

OBJECTIVE 2**MICROBIAL CONVERSION**

Laura Bartley, OU
Mostafa Elshahed, OSU
Sub Gollahalli, OU
Zhili He, OU
Chris Hemme, OU
Ramkumar Parthasarathy, OU
Bradley Stevenson, OU
Ralph Tanner, OU
Joe Zhou, OU

OBJECTIVE 3**CHEMICAL CONVERSION**

Danielle Bellmer, OSU
Roberto Galliaso, OU
Ron Halterman, OU
Pete Heinzelman, OU
Ray Huhnke, OSU
Friederike Jentoft, OU
Rolf Jentoft, OU
Ajay Kumar, OSU
Lance Lobban, OU
Richard Mallinson, OU
Ken Nicholas, OU
Krishna Patil, OSU
Daniel Resasco, OU
Alberto Striolo, OU

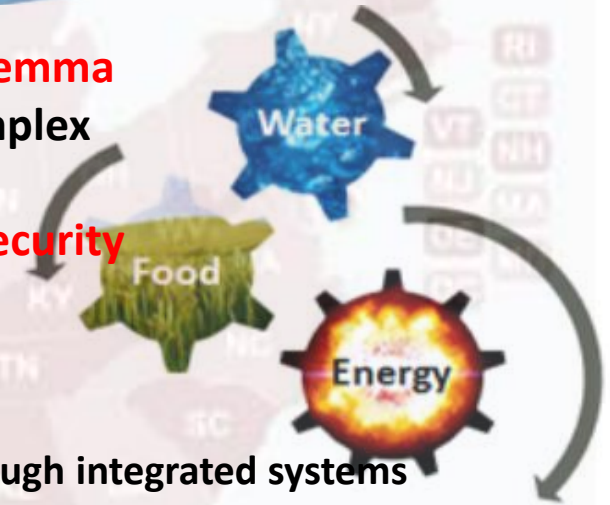
THE UNITED STATES EPA PREDICTS THAT 85% OF DEDICATED ENERGY CROPS IN THE U.S. WILL BE GROWN IN OKLAHOMA BY 2022. (Federal Register/Vol. 74, No. 99/Table VB2-5)



Food, Energy and Water System

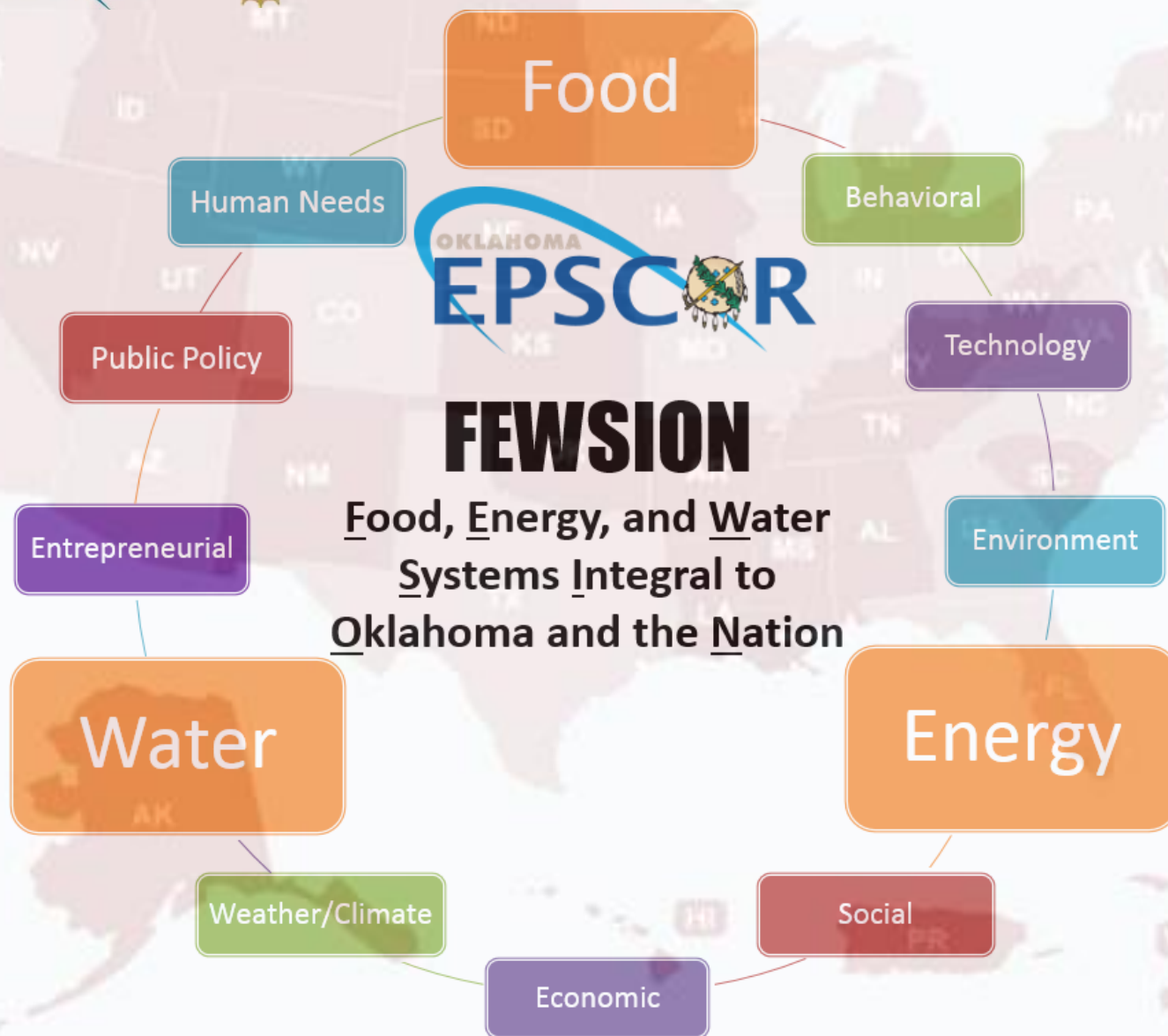


- The **water security, food security and energy security trilemma** creates a multidimensional web that is a structurally complex network.
- **Finding solutions to our global water, food, and energy security problems will require significant action**, either through institutional and behavioral paths or technological and infrastructure paths, including:
 - Understanding the complex nature of the FEW system through integrated systems modelling
 - Create methodologies for effective data integration/cyber elements at multiple temporal and spatial scales of terrestrial systems
 - Fundamental science and engineering to create new technologies and solutions to FEW problems
 - Education, Workforce and Community development
- ***Define FEW system broadly....incorporating physical, natural, biologic, engineered, social/behavioral processes and cyber elements***



Perrone, D. and Hornberger, G. M. (2014), Water, food, and energy security: scrambling for resources or solutions?. WIREs Water, 1: 49–68. doi:10.1002/wat2.1004

Innovations at the Nexus of Food, Energy and Water Systems (INFEWS) [Program Solicitation](#) NSF 16-524



Convergence



Goals of FEWSION

- ***The over-arching goals of the Oklahoma EPSCoR Track 1 RII program will be:***
- Significantly advance our understanding of the integral systems of food, energy, and water by **identifying key intellectual challenges relevant to Oklahoma and similar regions of the world, and developing scalable, sustainable capacity** for conducting sound research that adopts the systemic framework we have described.
- Enable innovative system-level and technological solutions to critical FEW problems, including availability, affordability, and sustainability, that can be implemented **via public-private partnerships and engagement of the private sector.**
- Leverage the research capacity, new knowledge, and collaborative relationships being developed within the current (2013-2017) and previous Track-1 RII awards.
- **Grow the quantity and diversity of the scientific and technical workforce in Oklahoma capable of studying and managing the FEW system, through the following avenues:**
 - Researcher recruitment (i.e., hiring addition research faculty in the topic area)
 - Inter-campus collaboration on the topic both on the research and academic/outreach
 - Professional development programs to increase expertise of existing researchers
 - Educational outreach programs that increase the pipeline of numerous and diverse students choosing careers in fields relevant to the topic

Goals of FEWSION

- *Compelling, significant research questions of national/international significance that can only be addressed via a multi-disciplinary, multi-institutional, truly integrative approach*
- The categories listed as strengths/priorities are not mutually exclusive, or exhaustive....
 - e.g., human health, animal health, food production, agriculture, energy production and utilization, water, ecology, climate, sustainability, and social and economic adaptation are strongly interrelated → BIG OPPORTUNITY to link these disciplines
- *Social/behavioral/economic sciences are important as well as integrative components of a true system*
- *Encourage broadest possible participation*

Process

- **The Oklahoma EPSCoR Advisory Committee will select the team, maintain active involvement with the team as the proposal develops, and approve the proposal to be submitted for the 2017 RII program.**
- Applicants should clearly specify how their proposed program will address the over-arching goals outlined. Pre-proposals that integrate compelling research with strong capacity-building and impactful outreach components will be favored.
- **A multi-disciplinary, multi-campus team is critical to success.** All pre-proposals must involve researchers from at least two, and preferably all three, of the state's comprehensive research universities (OSU, OU, and TU) *PLUS one investigator from a regional institution.*
- The hiring, professional development, and outreach components should include a diversity plan. The outreach components should be connected with the FEWSION research theme and, whenever possible, integrated with the specific research being proposed.
- The NSF solicitation for the 2017 RII competition has not been released. The most current solicitation for the RII competition will be used for advanced planning and can be accessed via the following link: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503429

Process

- **Pre-Proposal Requirements.** Formal pre-proposals to lead Oklahoma's 2017 RII application are required. **The deadline for submission of the pre-proposal to the Oklahoma EPSCoR Advisory Committee is June 29, 2016 at 5:00 p.m.** The pre-proposal, structured as per the instructions in the RFP, are to be submitted electronically to dhammon@osrhe.edu.
- **Researchers submitting pre-proposals must acknowledge and agree to a set of statements that signify the special nature of an RII submission, and the continued and significant coordinating role that the Oklahoma EPSCoR Advisory Committee will have as the final NSF proposal is developed.** Applicants should include and sign an explicit statement that they acknowledge and agree to the following:
 - The Oklahoma EPSCoR Advisory Committee has the right to combine proposals and/or proposal components from multiple applicants, and invite specific researchers to participate on a leadership team composed differently than the one in this pre-proposal.
 - The final project team (and thus the final range of sub-projects) will evolve throughout the proposal development process, under the supervision and final approval of the Oklahoma EPSCoR Advisory Committee.
 - The final proposal will require the development and integration of significant “broader impacts” (in particular, diversity impacts) that far exceed those likely to be fully specified in a pre-proposal.

Process

- **Selection Process.** The pre-proposals will be distributed to the Oklahoma EPSCoR Advisory Committee for their consideration. It is likely (but not yet finalized) that some applicants will be invited to meet with and/or make an oral presentation to the Committee or a subcommittee thereof. **Depending upon the nature and quality of the pre-proposals, the Committee may take any one of a number of actions, including (but not limited to):**
 - Direct two or more pre-proposers to work collaboratively and submit a single, revised pre-proposal
 - Down-select to a subset of the pre-proposals and invite more detailed pre-proposals
 - Select a single pre-proposal that will form the basis of the Oklahoma Track 1 submission for 2017
- Once the process described above is complete and a lead team is chosen, it is anticipated that additional projects (research as well as educational and outreach projects) will still be solicited and added to the final proposal to NSF. So researchers interested in the FEWSION theme should continue to monitor the development of the 2017 Track 1 proposal, even if they are not chosen to lead the proposal.



<http://www.okeysco.org/public-outreach/news/oklahoma-nsf-epscor-rii-track-1-call-pre-proposals>

Questions?

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