

summer/fall  
2014



# Rc

## Research Connection



OKLAHOMA NSF EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

## Growing Diversity in STEM

According to the U.S. Bureau of Labor and Statistics, the science and engineering workforce is projected to grow faster than any other sector in the coming years.

“This growth rate provides an opportunity, as well as an obligation, to draw on new sources of talent to make the S&E workforce as robust and dynamic as possible,” observed The National Academies’ 2011 Expanding Underrepresented Minority Participation Report.

But we are starting at a deficit: Women,

representing 51 percent of the U.S. population, remain underrepresented in engineering (19 percent), computer sciences (18 percent), physics (19 percent), and math (43 percent) fields, according to the most recent National Science Foundation Committee on Equal Opportunities in Science and Engineering Report. African Americans, Hispanics and Native Americans, as a group, make up 28 percent of the U.S. population, but hold only 12 percent of science, technology, engineering and math (STEM) jobs according to the report.

Oklahoma NSF EPSCoR is cultivating a stronger and more diverse STEM workforce pool through a portfolio of outreach initiatives designed to increase participation of women and underrepresented minorities in STEM fields. The programs reach all

points of the STEM pipeline: elementary school students to grad students, and K-12 teachers to college faculty, with special emphasis on Native Americans, African

Americans and women.

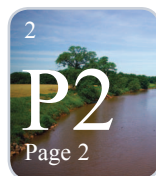
About the Programs:  
Oklahoma NSF EPSCoR recently provided funding to establish two new “first-of-their-

**continued on page 2**

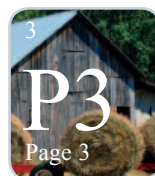
**12%**  
of STEM jobs are held  
by underrepresented  
minorities.



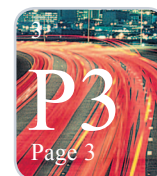
**UPCOMING EVENTS!**  
Mark your calendar to participate in these upcoming OK EPSCoR events.



**WATER DATA WEB PORTAL**  
The OWS Web portal makes it easier to track water quality and availability throughout the state.



**SURVEYING OKLAHOMANS**  
Oklahoma Weather, Society and Government Survey launched.



**ROA+ AWARD RECIPIENTS**  
Eight regional faculty members receive 2014 Research Opportunity Award Plus funding.

A SEMI-ANNUAL NEWSLETTER PROMOTING STEM RESEARCH IN OKLAHOMA

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-kind" science programs for Native American high school and college students in rural Oklahoma. The Environmental Science and Math Pathway Program at CareerTech's Pontotoc Technology Center (PTC) in Ada is scheduled to launch in August 2014. It is the first STEM education program offered by PTC. High school students from nine school districts in six southern Oklahoma counties

with high Native American populations will have access to the in-depth, two-year course. At the university level, undergraduate students at College of the Muscogee Nation (CMN) now have access to the college's first science course and laboratory; a CMN Native American science instructor, hired through EPSCoR funding, leads students in lab and field research experiences throughout the year.

Other outreach programs include summer

research experiences for Tribal College and HBCU students; hands-on science kits and STEM mentoring for 12,000 Girl Scouts; authentic research experiences for rural-area/high-minority school teachers; interactive women in science conferences for secondary students; and more.

For a complete list of OK EPSCoR STEM initiatives, visit [www.okepscor.org](http://www.okepscor.org) or email the outreach coordinator at [gmliller@okepscor.org](mailto:gmliller@okepscor.org).



## Upcoming Events

### MARK YOUR CALENDARS

#### AUTHENTIC RESEARCH EXPERIENCES FOR TEACHERS

JUNE 9-12, 2014

Integrated Grassland Observation Sites  
Kiamichi Forest Research Station  
El Reno & Idabel, OK  
[www.okepscor.org/calendar/teachers](http://www.okepscor.org/calendar/teachers)

#### CHOCTAW NATION'S JONES ACADEMY STEM CAMP

JULY 13-18, 2014

Jones Academy Boarding School  
Hartshorne, OK  
[www.okepscor.org/calendar/jones-stem](http://www.okepscor.org/calendar/jones-stem)

#### WOMEN IN SCIENCE CONFERENCE

OCTOBER 14, 2014

Mabee Center  
Tulsa, OK  
[www.okepscor.org/calendar/wis](http://www.okepscor.org/calendar/wis)

#### RESEARCH DAY AT THE CAPITOL

MARCH 31, 2015

State Capitol of Oklahoma  
Oklahoma City, OK  
[www.okepscor.org/calendar/2015-rdc](http://www.okepscor.org/calendar/2015-rdc)

For more program information visit [www.okepscor.org](http://www.okepscor.org) or contact Gina Miller, outreach coordinator, at 405.744.9964 or [gmliller@okepscor.org](mailto:gmliller@okepscor.org).

## Web Portal: A One-Stop Shop for Oklahoma Water Quality & Quantity Data.

Photo Credit: Oklahoma State University

**THE OKLAHOMA WATER SURVEY HAS LAUNCHED A NEW WEB PORTAL THAT PROVIDES THE PUBLIC WITH A SINGLE, USER-FRIENDLY INTERFACE TO SEAMLESSLY ACCESS WATER QUALITY AND QUANTITY DATA FROM MORE THAN 20 DIFFERENT GOVERNMENT AGENCIES, TRIBES AND ORGANIZATIONS ACROSS THE STATE.**

The Oklahoma Water Survey's Water Data Web Portal, launched this spring, will make it easier to track water quality and availability throughout the state. The portal is an integrated source of water information gathered from more than 20 different government agencies, tribes and organizations with water management interests and responsibilities, according to OWS Director and Oklahoma EPSCoR Researcher Dr. Robert Puls.

Puls explains that the portal's overriding goal is to provide water resource managers and other users with an efficient and effective method to obtain, organize and interpret local water quantity and water quality data.

The portal provides one-stop

shopping by synthesizing information that, in the past, users obtained by visiting multiple Web sites and navigating cumbersome platforms. Today users can easily download information, including data tables and charts, via the Web portal's single, intuitive interface.

The portal, accessed at [www.okwatersurvey.org](http://www.okwatersurvey.org),

has applications to benefit a vast array of users, including researchers, city planners, public safety officers, farmers, educators, property owners, and recreational water enthusiasts.

Scientists can easily obtain verified water quality and water

quantity data to use in their research, while individuals and families can use the portal to investigate lake levels or to check recreational water quality at some locations before making their weekend summer plans.

**"The portal provides one-stop shopping by synthesizing information..."**

The mission of the Oklahoma Water Survey is to study the state's water resources and to collect, analyze,

interpret and disseminate research-based information about water to researchers, students, teachers, citizens, governments, businesses and organizations. The Web portal is a primary agent of this mission. For more information, visit [www.okwatersurvey.org](http://www.okwatersurvey.org).

# Surveying Oklahomans' Perceptions



Photo Credit: OSU

The Oklahoma EPSCoR 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. They are examining 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.

In the first year of the EPSCoR research project, significant gains have been made in the observatory network focus area, with the development of the Meso-Scale Integrated Socio-geographic Network (M-SISNet) sampling frame.

EPSCoR researchers have implemented the M-SISNet's five-year "Oklahoma Weather, Society and Government Survey" to learn how Oklahomans perceive weather patterns and climate, how they use energy, and their thoughts on societal and government issues. Six hundred and seven Oklahomans from 72 counties participated in wave one of the survey

this year. The random, address-based, state-wide sample will be increased to include up to 3,000 respondents in the coming months. Most participants will take the survey online.

M-SISNet survey observations will be paired with weather data from the Oklahoma Mesonet and social data from the U.S. Census. This integrated approach will provide an infrastructure to understand and model Oklahomans' behaviors, attitudes and preferences related to land, water, weather and energy use over time, and how their perceptions and reactions are shaped by their belief systems.

"Until now, we've had excellent scientific data on weather in Oklahoma (gathered via the Mesonet), but didn't have such good data on Oklahoma residents' subjective



perceptions of weather," explained Dr. Carol Silva, co-principal investigator for the M-SISNet group. "So, one of the things we are doing is asking Oklahomans about their perceptions of weather and climate, and then matching their perceptions with this hard scientific data—no one has done this before, in the way we are doing it. By integrating data from human, natural and technological systems, we have the potential to make connections that have previously been overlooked," she said.

Do Oklahomans perceive weather and climate accurately? Since their behaviors may be influenced by their perceptions, it is important to know whether or not our state's residents are accurately assessing weather and climate in the state and what types of actions they are taking in the areas of water use, energy use, property use and emergency preparation in response to these perceptions.

To find answers, the M-SISNet survey will be fielded up to 18 times (approximately quarterly) before the Oklahoma EPSCoR grant concludes in May 2018.

*Thank you to Nina Carlson for her assistance with this story.*

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## ROA+ 2014: RESEARCH OPPORTUNITY AWARD PLUS RECIPIENTS

The Research Opportunity Award Plus (ROA+) program provides regional university faculty members from primarily undergraduate institutions in Oklahoma with the opportunity to perform research at one of Oklahoma's comprehensive research campuses during the summer months. ROA+ awards facilitate collaborations and enhance research efforts across the state. Through the program, visiting researchers incorporate their research experiences into classroom curriculum and present their work at conferences.

### FACULTY MENTOR & LAB

Henry Neeman, OU  
Babu Fathepure, OSU  
Andrew Dzialowski, OSU  
William Caire, UCO  
Charles Brown, TU  
Carey Pope, OSU  
Nicholas Materer, OSU  
Robert Puls, OU

### VISITING RESEARCHER

Joselina Cheng, UCO  
Ratnakar Deole, NSU  
Suneeti Jog, NSU  
Brandon McDonald, CU  
Valerie O'Brien, TCC  
Andrea Holgado, SWOSU  
Dane Scott, ECU  
Guy Sewell, ECU

### RESEARCH FOCUS

STEM Online Tutorials  
Salinity Proxies & Climate  
Climate Variability & Wetlands  
Climate Effects on UV-Vision  
Parasites & Climate Change  
Silver Nanoparticles  
CO<sub>2</sub> Reduction  
Water Resource Management Tool



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OK EPSCoR is funded through awards from:



**HOW TO GET INVOLVED:**

405.744.9964

[WWW.OKEPSCOR.ORG](http://WWW.OKEPSCOR.ORG)



# Because STEM is a part of Oklahoma's Future.

The Oklahoma Experimental Program to Stimulate Competitive Research (OK EPSCoR) was established by the National Science Foundation in 1985 to strengthen Oklahoma's exploration and growth in science, technology, engineering and mathematics. OK EPSCoR's central goal is to increase the state's research competitiveness through strategic support of research instruments and facilities, research collaborations, and integrated education and research programs.

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