

# EPSCoR Funding Impact in North Dakota



## Science and Engineering

INSPIRE-ND (**I**nnovative and **S**trategic **P**rogram **I**nitiatives for **R**esearch and **E**ducation –**N**orth **D**akota), ND's current (August 2014 – July 2019) NSF Track-1 award seeks to: 1) Build research infrastructure and strengthen the state's research competitiveness; 2) Provide research and STEM education opportunities for students across the state, including Tribal Colleges (TCs); 3) Enhance research collaborations between universities and colleges; and 4) Enhance scientific computing.

The award is organized around two research themes: 1) Engage regional climate studies to help predict hydrology and impact on agriculture; and 2) Use of agricultural materials to develop sustainable materials.

- Global climate impacts regional weather, extreme weather events, and agricultural productivity. Through computational modeling and simulation, the Center for Regional Climate Studies (CRCS) aims to understand how global climate impacts North Dakota agriculture in the areas of field hydrology, general land use, biomass production (which affects chemical feedstocks), and human behavior. An EPSCoR grant from the National Science Foundation provides funding for the CRCS to pursue this research. Though obtaining insight from ND stakeholders into the climatological impacts that weather variations have on the ND agricultural economy will be particularly helpful in planning for the future sustainability of this Center. The CRCS team includes researchers from the following educational institutions, all located in ND: University of North Dakota (UND) and North Dakota State University (NDSU) [research universities (RUs)]; Dickinson State University and Valley City State University [primarily undergraduate institutions (PUIs)]; and Cankdeska Cikana Community College, Nueeta Hidatsa Sahnish College, Turtle Mountain Community College, and United Tribes Community College [tribal colleges (TCs)]. For more information, visit: <http://und-crcs.org/>
- North Dakota seeks to advance new discoveries of bio-based, sustainable materials that give more consideration to the environment and contribute to its economy through their sourcing (low cost, renewable), durable lifetimes (long, high durability), and recyclability (efficient, high value). An EPSCoR grant from the National Science Foundation provides funding for the Center for Sustainable Materials Science (CSMS) to pursue this research. In addition to the research on bio-based, sustainable materials (including a recently added expert in forage and biomass crop production to understand viability of crops for industrial uses), the Center will also help to facilitate education, workforce development, and outreach on the importance of sustainable materials. The CSMS team includes researchers from the following educational institutions, all located in ND: NDSU and UND (RUs); Mayville State University and Minot State University (PUIs); and Sitting Bull College (TC). For more information on the Center, visit: <http://csms-ndsu.org/>

NASA EPSCoR utilizes two types of awards: Research Infrastructure Development Awards (RID) and Cooperative Agreement Research Awards (CAN). Ongoing RID projects involve six researchers (four from NDSU and two from UND). ND also has two UND researchers active in CAN awards: Multi-Purpose Research Station in North Dakota in Support of NASA's Future Human Missions to Mars and Derive Phytoplankton Size Classes, Detrital Matter, Particulate Organic Matter and Particulate Inorganic Matter from Ocean Color Observation.

## Workforce Development

An important new component of ND EPSCoR's workforce development is its distributed research experience for undergraduates (REU) program, which allows students from the PUIs and TCs to remain on their home campus while participating in a RU-lead REU cohort. To date, 11 students have participated in the program; several of whom made a decision to continue onto graduate school as a result of participating in the program.



Additionally, NDEPSCoR continues to partner with the five TCs located in ND in *Nurturing American Tribal Undergraduate Research and Education (NATURE)* to provide an educational pathway for American Indian students in ND to pursue STEM degrees. Through summer camps at each of the TCs, NDSU and UND, as well as a Sunday Academy initiative for middle and high school students during the academic year, more than 200 participants are involved annually in this program.

During this past year, four cyberinfrastructure assistantships [designed to 1) increase NDSU graduate students' understanding of advance research computing - hardware and software - at NDSU; 2) provide CI support to NDSU researchers; and 3) help develop CI educational modules for use in informing and training undergraduate and graduate students and faculty at NDSU, the four PUIs and the five TCs located in ND, about the potential uses/benefits of CI] were awarded. Awardees will work 10 hours a week in NDSU's Center for Computationally Assisted Science and Technology (CCAST) and 10 hours a week under their department supervisor.

**Commercialization**

A major achievement during the prior year is a funded project between CSMS researchers and AkzoNobel (the second largest polymer coatings company in the world). This industry partnership brings \$150,000 to CSMS for developing novel epoxies to replace bisphenol A-based coatings. AkzoNobel's funds were matched by the NDSU Center for Biobased Materials Science and Technology (BiMAT) with an additional \$150,000 allocation from that preexisting award, which is in place to enhance the scope of research projects in these arenas at NDSU. The new AkzoNobel CSMS industry partnership join five CRCS and CSMS industry partnerships established in prior years.

**Outreach**

ND EPSCoR participants are working to increase capacity by inspiring ND students early in their careers. A major accomplishment is establishing collaborative relationships with teachers of grades 5 and 8 in 10 rural schools. In the first year of data collection (2016-17), 268 students have participated. Based on innovative science emerging in both CRCS and CSMS, ND EPSCoR's K-12 team developed weather and sustainability interventions for both 5th and 8th grade. In the 5th grade curriculum, there are three CSMS interventions and four CRCS interventions; in the 8th grade curriculum, there are three CSMS interventions (one of which has multiple components) and four CRCS interventions. These interventions support educational standards across multiple areas and have been vetted by certified teachers. The teacher partners are located in nine ND school districts throughout ND; including one exclusively American Indian.

In an increased effort to involve more stakeholder, CRCS added a "science for everyone" section to its website where citizen stakeholders can 1) meet the scientists, 2) learn how things work (is it ever too cold to snow?), 3) learn what things mean (i.e.: what is a blizzard?) and 4) participate in science cafes.

<b>Current Active North Dakota EPSCoR Awards</b>			
<b>Program</b>	<b>Award</b>	<b>Total Amount</b>	<b>Type of Award</b>
NASA	EPSCoR	\$0.75 million \$0.375 million	Cooperative Agreement (1 award) Research Infrastructure (1 award)
		<b><u>Past NSF EPSCoR RII Track-1 Awards</u></b>	<b><u>New Funding Generated (Does not include funds from NSF RII awards, State Funds, or pending proposals)</u></b>
2005-2008		\$6,783,333	\$31,723,012
2008-2014		\$16,500,000	\$48,000,016
2014-2019		\$20,000,000	\$16,581,843

**For more information about North Dakota EPSCoR:  
Visit our website: [www.ndepscor.ndus.edu](http://www.ndepscor.ndus.edu) or  
Call 701.231.8400 (North Dakota EPSCoR State Office)**