ND EPSCoR

ND EPSCoR provides leadership and coordination to broaden North Dakota's science, technology, engineering, and mathematics (STEM) workforce pathway from elementary through graduate school; supports and grows statewide STEM research efforts and competitiveness at participating institutions of higher education; and conveys the impact of STEM research, outreach, and workforce efforts to North Dakota stakeholders.

CURRENT PROJECTS

New Discoveries in the Advanced Interface of Computation, Engineering, and Science (ND-ACES, RII Track-1, PI Heidi Grunwald, Lead institution: NDSU) combines the efforts of ND's materials design, cellular systems, and computational scientists to predict the metastasis of breast and prostate cancer. The project also trains students, provides STEM outreach to Tribal college and university (TCU) students, connects ND-based industry and clinical organizations, and disseminates stories to North Dakotans regarding STEM research activities in the state. ND-ACES requested and was granted a no-cost extension, which ends on June 30, 2026.

ND EPSCoR partnering institutions secured an award for their **Sustainable Programs Advancing Research and Knowledge across North Dakota (SPARK-ND, E-CORE, PI Sheridan McNeil, Lead institution: NDSU)** anticipated total amount of $7,963,804 over four years. Planned activities include outreach to rural schools, engagement with primarily undergraduate institutions and TCUs to recruit and retain STEM students, and development of multi-institutional research teams across the state using networking events, workshops, and funding opportunities.

Artificial Intelligence on Sustainable Energy Infrastructure Networks (AISUSTEIN, RII Track-2, PI Ying Huang, NDSU) contributes to energy security and sustained economic prosperity for parts of the US with extreme weather conditions and scattered populations. The project aims to meet the critical challenges related to vulnerable energy systems by creating holistic solutions against the negative impacts of energy disruptions on complex interdependent infrastructure networks via the exploration of innovative artificial intelligence (AI), engineering, economics, and operations research methodologies. AISUSTEIN was also granted a no-cost extension, which will end on September 30, 2026.

Tribal Energy Sovereignty (TES, RII Track-2, PI Wayne Seames, UND) is creating technologies and infrastructure that will provide potential solutions for energy outages and shortages in Tribal Nations and rural communities while enhancing pathways into STEM careers for TCU students. R&D focuses on building energy roadmaps for Tribal Nations and rural communities based on technology advancements plus environmental, economic and social impacts assessments for: 1) power, heat and fuel generation, 2) power, heat and fuel distribution, and 3) supply resiliency. This foundational project is part of a larger effort, the Energy and Critical Minerals Resiliency global initiative.

Continental-scale, high-order, high-spatial-resolution, ice flow modeling based on graphics processing units (RII Track-4, PI Anjali Sandip, UND) contributes to research on rising sea levels due to ice discharge from the Antarctic ice sheet. The project aims to develop methods that will enable the ice sheet modeling community to quantify uncertainty bounds in sea-level-rise projections with greater confidence, better identify the sources most responsible for those uncertainties, and determine the types of satellite measurements needed to reduce those uncertainties.

IMPACTS IN 2024-2025 ACADEMIC YEAR

Research

ND-ACES researchers from the Cellular team developed a new hydrogel material that supports viable and robust growth of multiple cell types. This novel hydrogel will be a transformative platform for multiple types of experimental approaches to better understand the mechanisms of cancer biology. The Materials team developed a different hydrogel using a dietary fiber that they extracted from agricultural byproducts such as wheat bran and sugar beet pulp. This hydrogel supports the growth of triple-negative breast cancer cells in three dimensions. Using ag byproducts may create a low-cost platform to study a highly aggressive cancer.

Workforce Development

Several of this year's RSTE (Rural Student Teaching Experience) participants have gone on to accept permanent teaching positions in rural North Dakota schools. Of the 16 RSTE participants who completed their student teaching between fall 2024 and spring 2025, thirteen were offered P-12 teaching positions. Ten of the thirteen planned to stay in North Dakota.

Outreach

In an activity-packed two-week program, thirteen students from three Tribal colleges immersed themselves in hands-on science at this year's NATURE University Summer Camp. Designed for North Dakota TCU students with an interest in STEM, the camp paired participating students with researchers from UND and NDSU. On the last day of camp, each student or group presented their research findings during the camp's closing ceremony.

STATEWIDE FUNDING

Program	Institution or Lead Institution	Years Funded	Award Type	Amount
ND-ACES	NDSU	2020-2026	RII Track-1	$20,000,000
SPARK-ND	NDSU	2025-2029	E-CORE	$7,963,804
Cooperative agreement awarded to: NDSU (lead institution), Cankdeska Cikana Community College, Mayville State University, Minot State University, Nueta Hidatsa Sahnish College, Sitting Bull College, Turtle Mountain College, United Tribes Technical College, UND, and Valley City State University				
AI SUSTEIN	NDSU	2021-2026	RII Track-2	$5,977,484
Tribal Energy Sovereignty	UND	2023-2027	RII Track-2	$4,000,000
mRNA Processing and Adaptation	NDSU	2021-2026	RII Track-4	$187,257
Stability Analysis in Power Grids	NDSU	2021-2025	RII Track-4	$191,781
Toxicity of Micro/NanoPlastics	NDSU	2023-2025	RII Track-4	$191,801
Ice Flow Modeling (GPUs)	UND	2024-2026	RII Track-4	$286,102
Expanding Pathways for Rural Students	UND	2025-2027	EPSCoR Research Fellows	$299,999
Quantum Algorithms	UND	2025-2026	EPSCoR Research Fellows	$299,977
Co-funding from ten NSF directorates				$9,244,422
			Total Investment	**$48,642,627**