2025 Nebraska EPSCoR
Science and Technology Plan

Science & Technology Plan for Nebraska

prepared by Nebraska Established Program to Stimulate Competitive Research (EPSCoR)

VISION

The State of Nebraska recognizes the important role that science and technology plays in growing the state's economy and improving the quality of lives of its citizens. For the state to be a leader in research development and to be competitive in a global economy, it must enhance science and technology efforts in Nebraska. This is accomplished by forging new partnerships among educational institutions, private industry, and governmental entities.

POLICY

To help grow its research enterprise, Nebraska must utilize science and technology efforts through the collaboration of educational institutions, private industry, and governmental entities. These partnerships will result in the development and commercialization of new technologies, and growth in measures of Nebraska's STEM workforce and its outputs.

GOALS

- Increase statewide basic and applied research programs that are globally competitive.
- Improve globally recognized science and technology efforts in agriculture, food science, and engineering.
- Enhance K-12 education and higher education offerings that embed the most modern research discoveries in STEM fields.
- Develop globally prominent research programs that measure, model, and predict changes in ecosystems.
- Strengthen globally leading basic research programs in human health, development, and science.
- Improve the entrepreneurial environment at institutions of higher education by encouraging researchers to pursue solutions to real-world problems.
- Utilize partnerships among government, educational entities, and the private sector to enhance research and development capabilities and accelerate technology transfer.
- Strengthen innovative research leading to new products and new markets by supporting the commercialization of applied research through startups and licensing agreements.

IMPLEMENTATION STRATEGIES

Nebraska will create a framework within which industry, government and education can jointly identify initiatives pursuant to the vision and goals stated above. This framework will involve the Nebraska EPSCoR/IDeA Committee and a newly formed Nebraska EPSCoR Advisory Board (NEAB). The Nebraska EPSCoR/IDeA Committee membership includes research faculty and the head administrators from Nebraska's top 5 research universities. The NEAB will be composed of representatives from state government, business and private industry. Together, the combined groups will:

- Initiate a process that accelerates commercialization of new technologies and demonstrates associated education and training activities via public-private partnerships.
- Increase funding opportunities for the commercialization of science and technologies through state and federal grants, and private philanthropy.
- Sponsor events and create settings for meaningful industry-university interactions with the potential to rapidly stimulate innovation and competitiveness.
- Develop educational and marketing strategies to promote science and technology and their value to the state.

FEDERAL FUNDING VIA NSF EPSCoR

The U.S. National Science Foundation (NSF) has introduced two funding opportunities, E-CORE and E-RISE, to support research infrastructure improvement in EPSCoR jurisdictions such as Nebraska. E-CORE supports jurisdictions in building sustainable capacity in targeted research infrastructure and administrative cores that underlie the jurisdiction's research ecosystem. E-RISE supports the incubation of research teams in STEM endeavors linked to this Science and Technology (S&T) Plan.

As Nebraska continues to advance scientific discovery, innovation, and education with historically limited NSF funding, it is imperative that we leverage the collective expertise, resources, and collaboration across the entire jurisdiction. The Nebraska EPSCoR office in Lincoln will coordinate, facilitate, and act as a hub for all current and future E-CORE and E-RISE ecosystems to catalyze interdisciplinary and inter-institutional collaborations statewide in accordance with the S&T Plan.

The Nebraska EPSCoR office has a 30-year history of working closely with the Nebraska EPSCoR/IDeA Committee (referred herewith as “State Committee”) to leverage identified resources outlined in Nebraska’s S&T Plan and foster collaboration among researchers, institutions, and industries across different disciplines to create a dynamic ecosystem that enhances research competitiveness and accelerates knowledge dissemination.

As the administrative core for the state, the Nebraska EPSCoR office supports educational initiatives that enhance STEM curricula mentorship and contribute to training a highly skilled workforce to accelerate the translation of use-inspired research, drive regional innovation, and benefit Nebraska’s economy.

Funding from an E-CORE grant to the Nebraska EPSCoR office will support and extend the reach of future E-CORE and E-RISE programs statewide. NSF stipulates that E-CORE and E-RISE programs adhere with the S&T Plan and interact with the State Committee. As the primary research administrative core for the past 30 years, Nebraska EPSCoR will continue to serve Nebraska’s STEM community by:

- Coordinating State Committee meetings and S&T Plan updates;
- Serving as a bridge between the State Committee and Nebraska’s E-CORE and E-RISE programs;

- Coordinating E-RISE applications to avoid duplication in research topics at Nebraska institutions;
- Organizing the annual Nebraska Research Innovation Conference (NRIC) by involving Nebraska's future E-RISE programs;
- Coordinating statewide research and workforce development in all of Nebraska's NSF EPSCoR programs.

NSF stipulates that funded E-RISE projects are expected to engage with other E-RISE and E-CORE projects in the jurisdiction as part of the effort to build a sustainable research ecosystem. E-RISE subawards to Nebraska EPSCoR with sufficient justification is an additional means to facilitate jurisdictional communication and collaboration especially in areas of education, outreach, and community engagement.

TACTICAL OBJECTIVES

Invest in Infrastructure

Advance the development of competitive, innovative research programs and centers in the state through strategic investments in physical and human infrastructure.

- Commit resources for advanced instrumentation in current and emerging research niches that are of strategic importance to the state and nation.
- Promote broad access to advanced instrumentation by Nebraska scientists across research institutions to maximize use and increase collaborations.
- Prioritize investments that utilize collaborative approaches and develop infrastructure that increases collaborative research.
- Leverage resources to attract and hire talented, world-class faculty in areas of strategic importance to expand Nebraska's research capabilities and national competitiveness.
- Support programs that promote the development and retention of existing faculty.
- Support programs that assist early career faculty to initiate successful research programs.
- Provide funding for technicians with the expertise and skills to ensure infrastructure investments are efficiently and effectively facilitated.
- Expand access to high-speed broadband internet throughout the state.

Develop a Globally-Competitive Science & Technology Workforce

Nurture a world-class pipeline of STEM students through a portfolio of programs that reach students in grades K-16 to increase the number of professionals choosing STEM careers.

- Support programs that enrich academic and informal STEM experiences in grades K-16.
- Immerse secondary and post-secondary students in STEM research and work experiences in university laboratories and Nebraska businesses.
- Support programs that enhance STEM education and research opportunities at Nebraska's small colleges and non-research academic institutions.

- Support rigorous mentoring programs for undergraduate students, graduate students, and postdoctoral researchers.
- Expose the public to engaging educational STEM programs associated with Nebraska research projects.

Foster Visionary Collaborations

Strengthen and sustain transdisciplinary and multi-institutional partnerships and enhance linkages with industry.

- Invest in research collaborations between in-state STEM industries and university researchers with the potential for high growth that result in nationally competitive research, stimulate entrepreneurial activities, and develop and market intellectual property.
- Diversify, expand, and improve the productivity of Nebraska's agri-business cluster to increase demand for production and to create global leadership in value-added, 21st-century agriculture.
- Cultivate collaborative, multi-institutional research initiatives as well as strategic multi-state projects that lead to large-scale research center grants.
- Scale public-private partnerships that create more internships and apprenticeships to increase the STEM workforce in Nebraska.
- Support transdisciplinary research initiatives of strategic importance to the state and nation as well as innovative projects with the potential for substantial and transformational results.
- Foster collaborations and initiatives that lead to formal federal agency proposals and provide internal seed funding for promising research that spans disciplinary boundaries.
- Build upon Nebraska's strong health care system to enhance the community experience and strengthen the workforce.

Expand Research Capacity in Existing and Emerging Areas

Develop programs to foster competitive research and technological development in basic and applied sciences that increase the state's research capacity and national competitiveness.

- Develop advanced materials that take advantage of our growing knowledge of quantum phenomena.
- Develop high performance computing to advance the analysis of complex phenomena through modeling and simulation.
- Increase knowledge in life sciences to address issues of biodiversity, habitat fragmentation, and invasive species.
- Pursue new discoveries and development of ideas and techniques that advance the boundaries of foundational physical science disciplines.
- Develop materials science and engineering for energy technologies, including zero-carbon energy sources.
- Determine biological effects of energy-related chemicals and radiation.

- Create and/or advance knowledge for intelligent automation and robotics, material characterization and synthesis, biomedical devices and tissue engineering, civil infrastructure and transportation engineering, advanced manufacturing processes and equipment, sensors and sensing principles, and bioengineering related to national security.
- Expand methods and knowledge in environmental toxicology, waste management, water sciences, ecosystems change, biodiversity, contamination of surface and ground water, geographic information and remote sensing technologies, hazardous and medical waste management, risk analysis, and biosecurity.
- Innovate and advance knowledge in software engineering, cybersecurity, sensor and communication networks; remote sensing technologies, mobile computing and artificial intelligence; data mining and data fusion techniques to extract and analyze information from very large data sets and social networks, bioinformatics, and computational biology.
- Promote innovative biomedical methods and technologies that will enhance the development and implementation of diagnostics and therapeutics that promote increased health and quality of life for our citizens.
- Develop areas of excellence in biomedical research with emphasis on biomechanics and movement disorders, hearing and neurosensory diseases, pediatric brain health, drug target discovery, prevention of obesity, rural drug addiction, cancer and infectious disease.

THIS SCIENCE & TECHNOLOGY PLAN APPROVED BY COMMITTEE VOTE: May 8, 2025.

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