

Nebraska EPSCoR Science and Technology Plan

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PROCESS:

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ADDED BULLET ADVISED BY STATE COMMITTEE, WHO THEN VOTED APPROVAL
FOR THIS PLAN***

Science & Technology Plan for Nebraska

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 the climate, environment, and ecosystems, to address potential sources of greenhouse gas emissions and research other potential causes of climate change and mitigation.
- 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

- Create a framework within which industry, government and education can jointly identify initiatives pursuant to the vision and goals stated above.
- Develop educational and marketing strategies to promote science and technology and their value to the state.
- Increase funding opportunities for the commercialization of science and technologies through state and federal grants, and private philanthropy.

- Initiate a process that accelerates commercialization of new technologies and demonstrates associated education and training activities via public-private partnerships.

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 diverse, world-class pipeline of STEM students through a portfolio of programs that reach students in grades K-16 in order 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 rigorous mentoring programs for undergraduate students, graduate students, and postdoctoral researchers.
- Expose the public to engaging educational STEM programs associated with Nebraska research projects.

Promote Diversity and Broaden Participation

Support a STEM research and education ecosystem of excellence that is comprised of a broad array of backgrounds, perspectives, knowledge and insights.

- Enhance the appeal of participation in STEM by underrepresented minority and women scientists by recognizing and systematically reducing implicit bias while increasing inclusiveness at all levels of the scientific process.
- Broaden participation and increase diversity in all STEM programs by fostering engagement among demographic groups, institutions, and geographic regions underrepresented in the STEM disciplines.
- Support programs that enhance STEM education and research opportunities at Nebraska's small colleges and non-research academic institutions.
- Enhance STEM education for students in Nebraska's tribal colleges with strategic infrastructure investments

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.
- Sponsor events and create settings for meaningful industry-university interactions with the potential to rapidly stimulate innovation and competitiveness.
- 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, global climate 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.