2022 ANNUAL REPORT
DIRECTOR’S MESSAGE

On August 9, President Biden signed the CHIPS and Science Act (CHIPS) into law. CHIPS is an acronym for Creating Helpful Incentives to Produce Semiconductors; but there is far more to this legislation than semiconductors alone. CHIPS is a congressional authorization that will also double NSF funding over a five-year period. In addition to doubling the NSF budget, CHIPS also provides an increase in the percent of NSF funding going to EPSCoR jurisdictions such as Nebraska. Therefore, the impact of this legislation on “The Good Life” state is even greater because of EPSCoR-specific increases in NSF funding.

In fiscal year 2022, the EPSCoR amount in the NSF budget was approximately 12.6% of research and related activities; but with the appropriation of CHIPS, this amount will increase over six years starting with 15.5% in FY23, ramping up to 20% in FY29. There is also set-aside funding for scholarships (including at community colleges), graduate fellowships and traineeships, and postdoctoral awards.

Another activity impacting Nebraska is the recent “Envisioning the Future of NSF EPSCoR” study that was conducted by 19 committee members from around the country. This “visioning committee” invited stakeholders to provide input online and via listening sessions so that the committee could make recommendations on investment strategies and opportunities to increase the future success of NSF EPSCoR. The committee made eight recommendations and 19 suggestions across the broad areas of Economic Development, Research and Infrastructure Capacity and Competitiveness, Education and Workforce Development, and Broadening Participation. Their final report is available at nsf.gov/resources.nsf.gov/2022-08/Envisioning-The-Future-of-EPSCoR-Report.pdf.

As 2022 draws to a close, the nationwide legislative and visioning activities described above paint a bright future for strengthening capacity and capability in science, technology, engineering, and mathematics (STEM) in Nebraska and beyond. We at Nebraska EPSCoR look forward to making this future a reality by continuing to grow Nebraska’s STEM enterprise. I hope you enjoy reading about our STEM-based research, education, and outreach activities in this report.

“Nationwide legislative and visioning activities paint a bright future for STEM in Nebraska and beyond.”

Nebraska EPSCoR 2022 Annual Report

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Cover Image (and this page): Research from Nebraska’s Emergent Quantum Materials and Technologies (EQUATE) project, funded by the National Science Foundation’s (NSF) Established Program to Stimulate Competitive Resources (EPSCoR), was featured in the journal, Advanced Materials. University of Nebraska-Lincoln physics professors Peter Dowben and Christian Binek collaborated with Professor Jonathan Bird at the University of Buffalo to investigate spin dependent electronic transport in graphene for their studies of magnetoelectric and ferromagnets. This work showed a large spin relaxation length, which is promising for developing new technologies—a striking international achievement. Fundamental aspects of this work—such as quantum interference effects in the spin currents—are also investigated by EQUATE FRG 1 theorist Alex Kovalev.
Nebraska EPSCoR’s mission. In 2022, the committee noted several changes among its membership:

COMINGS & GOINGS

RE-APPOINTED

- Jerry Hudgins, PhD — Professor, University of Nebraska-Lincoln
- Yuri Lysyshchenko, PhD — Professor, University of Nebraska Medical Center
- Roni Reiter-Palmon, PhD — Professor, University of Nebraska at Omaha
- Juliane Strauss-Soukup, PhD — Associate Vice Provost for Research and Scholarship, Creighton University

Thank you to all members of the Nebraska EPSCoR State Committee for your expertise and energy!

Martin to lead State Committee

AT THE ANNUAL MEETING of Nebraska EPSCoR’s State Committee in November, Dr. Tyler Martin was unanimously elected by the group to serve as the committee’s chairperson. Martin grew up in Hebron, Nebraska, and has more than 30 years of experience in the biotechnology industry. After earning his bachelor’s degree with honors from the University of Nebraska at Kearney, and an MD degree from the University of Nebraska College of Medicine, he was a resident in Pediatrics at the University of Nebraska Medical Center and a post-doctoral fellow in the UNMC Enterprise on Viral Hepatitis and Pediatric Infectious Diseases at Washington University in St. Louis, where he was named the outstanding teaching fellow at St. Louis Children’s Hospital.

Martin has led development activities to support more than 100 Investigational New Drug (IND) Applications and developed four drugs that eventually received FDA or EMA approval. He has held senior leadership positions with several successful biotech companies including Chiron, Sangamo, and Dynavax. He returned to Nebraska with plans to start a consulting practice and biotech incubator. Today, Dr. Martin is the Chairman and CEO of Great Plains Biotechnology, a consulting company with headquarters in Lincoln. He is currently Chairman & CEO of Aeolian Biotechnology Corporation, a private vaccine company developing an improved pneumococcal pneumonia vaccine.

He was appointed by the governor to the Nebraska EPSCoR State Committee in 2016. Martin also serves on the boards of the Vaccine Policy Advisory Board of Bio, the Biodiversity Policy Advisory Board of Bio, UNeMed, and Adjuvance Technologies.

With 30 years since Nebraska EPSCoR began, metrics take shape...we aim to share these “KPIs” with the State Committee and this publication’s readers:

RETURN ON INVESTMENT: FIRST AWARDS TO CAREER AWARDS

FIRST and CAREER Awards are a sustainable investment in Nebraska’s STEM enterprise as awardees gain a foundation for long-term leadership in integrating education and research.
FRG1: QUANTUM MATERIALS
Led by Xia Hong, FRG1 includes theoretical physicists and chemists who focus on Thrust A (Topology, Spin-Orbit-Coupling, and Correlation-Driven Phenomena in Emergent Ferroic Materials), Thrust B (Magnetoelectric and Valley Control of Layered 2D Materials), or Thrust C (New Materials for Spin-Qubit Systems).

FRG2: QUANTUM TECHNOLOGIES
Electrical and mechanical engineers are pursuing this focus, including Thrust A (Quantum Sensing and Metrology) and Thrust B (Quantum Communications). Abdehsamadi Labadou leads this team.

FRG3: QUANTUM INFORMATION PROCESSING
Jonathan Wrubel’s team of experimental physicists explores this focus including Thrust A (Quantum Sensing and Metrology) and Thrust B (Quantum Communications). The team is led by Rebecca Lai, EQUATE’s associate director.

Highlights include:
- FRG1 theoretical physicist Ergonoy Tzyamal and his team investigated antiferromagnetic materials with non-spin-degenerate Fermi surface but globally spin-independent conductance. This work is published in Nature Communications (12:2055, 2021). Bink and Peter Driehuis collaborated with Professor Jonathan Bird at the University of Buffalo to study materials that could lead to the realization of a new type of transistor, attracting international attention. Their work, published in Advanced Materials (43:110530, 2022), includes a representation featured on the cover of this publication. FRG1 leader Xia Hong promoted EQUATE achievements on a National Nanotechnology Initiative podcast.
- EQUATE FRG1 theoretical physicist Robert Streubel was chosen to present their research at the 27th NSF EPSCoR National Conference, November 15–16 in Portland, Maine.

After the death of EQUATE FRG1 physicist Ralph Skomski in April, EQUATE’s Management Team elected Robert Streubel, with UNL Chemistry. The first cohort chosen by the EQUATE Management Team includes physicist entrepreneurs as well as rising early-career colleagues, especially prolific collaborator and writer, who specialized in theoretical physics research. Streubel is a post recipient of NSF EPSCoR’s FIRST Award and has an active NSF grant, Magnetic Order in Disordered Bipolar Nanostructures. Streubel studied for his Ph.D. at Leibniz Institute for Solid State and Materials Research Dresden, Germany, and was a postdoctoral researcher at Lawrence Berkeley National Laboratory.

FRG1’s strategic plan includes funding for Sweet Grant Science, relevant research from additional Nebraska college, especially rising early-career scientists and engineers. The first cohort chosen by the EQUATE Management Team is led by YANAN WANG and SIAMAK NEJATI from UNL’s Science and Technology Ventures and the Nebraska Business Development Center. Each EQUATE FRG and the Outreach team have a role in the annual Nebraska Research & Innovation Conference (NRIC) in April, which gathered project participants from throughout the state. The event’s theme was “Commercializing Quantum Technologies in Nebraska: From Research to Licensing.”

EQUATE’s organization structure is a pyramid, with three Focused Research Groups (FRG) and three Strategic Thrusts (X): Quantum Materials, Quantum Technologies, Quantum Information Processing.
Awards in the past year are described below:

CAREER awards support pre-tenure faculty who excel at research, teaching, and the integration of those areas. FIRST Award recipients who progressed to earn NSF CAREER Recipients, who are required to submit a CAREER Award proposal to NSF within the next award period. Nebraska EPSCoR’s website lists FIRST Award details and deadlines. NSF’s for these Finalists to be evaluated using NSF proposal review criteria by external experts in the relevant field. The Nebraska EPSCoR State Committee then selects FIRST Award program. Destino’s students will present their research to other scientists the project each summer through the Omaha-based Haddix STEM Corridor undergraduate researchers. Students from local high schools will also join programs that offer academic, social, cultural and financial support for first- via research training opportunities. He aims to provide research training

$565,000

With this NSF-funded project, Destino’s also developing a learning curriculum-building program, providing materials science research from Omaha public schools in a collaborative summer research/undergraduate and graduate students in this important research.

$547,613

As the world learned from the recent COVID-19 pandemic, RNA research

$508,780

As 2022 ends with longer nights and cooler

$1.2 MILLION

A five-year, $2.2 million NSF CAREER Award supports Joseph Yesselman, assistant professor in UNL’s Department of Chemistry, in his work on RNA structures. His NSF-funded project, titled “Determining the Fundamental Rules of RNA Tertiary Contact Formation,” could help advance scientists’ understanding of how RNA functions—and equip them to work against viruses that harm people and other living organisms. As the world learned from the recent COVID-19 pandemic, RNA research could shape vaccines that help protect against new viruses. Yesselman aims to produce a computational model that will help predict whether and how RNA sequences may connect, and the potential impact on other nearby molecules. He’ll build on his prior work, software he developed that’s called RNAMake, to analyze RNA strands as 3D structures. His next step will now apply new quantum simulators for those calculations at the nanoscale quantum computing is coming, said Yesselman.

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Joel Destino, an assistant professor with Creighton’s Department of Chemistry, Destino will investigate fundamental chemistry for designing novel nanoparticles that can be used to 3D print by this alternative method,” Destino said, “research training opportunities. He aims to provide research training for aspiring high school and undergraduate researchers from diverse backgrounds. The funding enables him to hire Creighton students in the Educational Opportunity/TRIO programs (federally-funded outreach programs that offer academic, social, cultural and financial support for first-generation college students, as well as summer undergraduate researchers. Students from local high schools will also join the project each summer through the Omaha-based Haddix STEM Corridor Coordinator, Caryl Schramm, who is dedicated to other scientists and the public at weekly scientific development workshops on campus.

$756,713

Research/Internship Program from Omaha public schools in a collaborative summer research/ under the leadership of UNL’s Jae Sung Park. As 2022 ends with longer nights and cooler temperatures (in the northern hemisphere), Katarzyna Glowacka pays extra attention—specifically, to a family of grassy plants called miscanthus and their non-photosynthetic chemists (NPQ) abilities. Glowacka, an assistant professor of biochemistry at the University of Nebraska-Lincoln, received a CAREER award from NSF; her five-year, nearly $1.4 million project aims to show how the plants react to add protection from cellular damage in photosynthesis, the way plants gain energy from sunlight. Her UNL research has the advantage of using the automated greenhouses in the University of Nebraska Innovation Campus. Glowacka is a first-generation scientist who moved to the US from her home in Poland; after working at the University of Illinois, she was hired to UNL Biochemistry via funding from Nebraska EPSCoR’s 2016-2022 NSF-funded Center for Root and Rhizobium Innovation (CRIE). During her NSF CAREER award, she plans to draw on her background in attracting youth to the study of plants.

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Park focuses on both predictive and multiscale dynamics in turbulent flows to develop a more rigorous strategy for steering turbulence toward desirable states by predicting and controlling targeted vortices. On Park's team, graduate and undergraduate students use mathematical tools and create computer models to better predict the probabilities of where and when turbulence creates a new vortex within the flow.

"Most of the interest in turbulence for airplanes, even reducing turbulence by 5% might be enough to reduce (fuel) consumption by up to half," Park said. "And if we can reduce air turbulence by even 1%, it’s been said we could save about $1 billion per year on fuel costs.”

Another example he’ll pursue in this project is in collaboration with the University of Nebraska-Lincoln’s College of Agricultural, Consumer and Environmental Sciences. Ruiguo Yang, associate professor of biological systems engineering at UNL, earned a five-year, $550,000 NSF CAREER award for his "further research on carbon nanotubes potential as an innovative disease detection resource.

Iverson’s lab team studies nitric oxide as a key signaling molecule within the body that is reduced to increase oxygen supply (as opposed to oxygen use) during exercise and is involved in cellular metabolism. Little is known about nitric oxide’s function in the body since it degrades very quickly. Her team works to develop and build platforms that allow for in vitro and in vivo carbon nanotube use sensor. They apply a technique they developed, pairing a nanotube that can detect hydrogen peroxide with another nanotube that detects both hydrogen peroxide and nitric oxide, to find its actual concentrations—challenging, amid a process that happens in less than a millisecond. With this award Iverson will also share with undergraduate, and high and middle school industries. BioWRAP’s plan includes mentoring their training,Vecchio and his team will be CryoEM specialists, and visualize structures of membrane proteins assemblies they study at atomic-level detail – plus share their expertise with other researchers and students across Nebraska.

Nebraska enters BioWRAP collaboration

A TRIO OF NEIGHBORING states’ colleges—Kansan State, South Dakota State University, and the University of Nebraska-Lincoln—received nearly $6 million from the National Science Foundation’s Research Infrastructure Improvement Track-2: Focused EPSCoR Collaborations. This NSF Hill Track II-NECT award creates a partnership called Biopolymers with Regenerative Agricultural Properties (BioWRAP), to advance farm use of biopolymers.

The four-year project plans to connect natural and man-made systems, stopping harmful weed—crop till cycles, and helping build green rural economies. The team will use lab and field trials, novel analytics and products, and links between people, farms, industries, and natural systems to help improve soil and land use with an all-in-one system to better manage weeds, nutrients, soils, and water resources.

Christopher Ray, director of the Nebraska Water Center, helped assemble the team. Karima Schoengold, associate professor of agricultural economics and faculty fellow of the Daugherty Water for Food Global Institute, leads BioWRAP’s Nebraska group, which includes Erin Haacke, assistant professor of earth and atmospheric sciences; Christopher Proctor, associate extension educator with agronomy and horticulture; and Loren Isom and Mark Wilkins with the Industrial Agricultural Products Center.

“Structures of Membrane Protein Assemblies”

"Structures of Membrane Protein Assemblies" with A $540,000 NSF CAREER Award, Ruiguo Yang, assistant professor of mechanical and materials engineering, explores how cell-cell bridges respond to strains of different magnitudes and rates. In Yang’s work at the intersection of biology and engineering, these junctions maintain tissue integrity and regulate cell-cell signaling; understanding their response to strain could reveal mechanisms of diseases like cancer, genetic mutations in the cardiovascular system and more — and offer clues about how to effectively treat them.

“Nebraska enters BioWRAP collaboration

BIOWRAP’s leaders seek to reduce the use of synthetic pesticides by 50% in the region. The leaders will use nanoparticles associated environmental impacts in agricultural production via integrated thrust areas: • develop biopolymer-based materials for use in agricultural production • measure the agricultural effectiveness and associated environmental impacts of the technology • estimate the potential social and economic impact of BioWRAP in communities across Nebraska & the agricultural economy of the proposed technology

BioWRAP research includes: engineering biopolymers including functionalized PIA-based biopolymers, protein based sprayable biopolymers, and hybrid polymer systems; studying the impact of this technology on strengthening of agroecosystems by evaluation of biopolymer with respect to weed suppression and crop production efficiency; nutrient cycling, soil moisture retention and life cycle impacts along with environmental accounting; and assessing the broader impacts of the new BioWRAP technology using socio-economic analysis of product adoption and rural sustainability.

The project’s research activities aim to enable industry engagement and potential career opportunities for students in rural industries. BioWRAP’s plan includes mentoring of early-career faculty plus students at undergraduate, graduate, and high and middle school levels, and interacting with rural communities via field days, surveys, interviews, and educational outreach activities.
Making a Difference at Nebraska's Small Colleges

Engaging undergraduates in research activities increases their interest in pursuing graduate and professional degrees, and helps grow the pool of potential students choosing careers in these areas. Supported by the National Science Foundation’s Experiences for Undergraduate Research Program, Nebraska EPSCoR’s Undergraduate Research Experience grant program adds opportunities for students in small public and private Nebraska colleges and universities that offer undergraduate degrees related to science, technology, engineering, and math. The award maximum is $5,000 for a one-year project term.

ALLEN THOMAS, ASSOCIATE PROFESSOR of chemistry at the University of Nebraska at Kearney (UNK), liked an idea from psychobiology undergraduate Mackenzie Hagemeister for a research project: making molecules that block the enzyme that produces melatonin in the human body’s pineal gland.

Hagemeister aimed to regulate melatonin levels and decrease an over-supply in people with seasonal affective disorder, including one of her family members.

Thomas framed the research as “Pyrophosphatase biosensors as serotonin N-acetyltransferase inhibitors for treating circadian rhythm disorders” and proposed it for funding via Nebraska EPSCoR’s Small College Undergraduate Research Experiences program. With this award, Thomas gained support for salaries to pay the project’s student researchers for the summer. Thomas advised the students’ day-to-day work, and developed a proposal to take the research further, via funding from the National Institutes of Health (NIH). The NIH funded the project for $393,000, and aligned mentoring from a Harvard University professor of medicine and biological chemistry and molecular pharmacology.

“The NIH award is designed primarily for undergraduate institutions like UNK,” Thomas said. “A big component is student involvement and exposing undergraduates to research.”

“Everything I learned to put forward an idea that becomes the basis of a grant proposal,” she said. “Even at the graduate level it’s probably not common, but at the undergraduate level would say it’s quite rare.”

For the second consecutive year, Nebraska EPSCoR’s new “TRE” awards provide funds for Teaching and Undergraduate Research Experiences at the state’s small public or private colleges with annual research expenditures of less than $8 million. This TRE program emphasizes new, shared-use equipment and instrumentation that will enhance research and/or education activities for STEM (science, technology, engineering, and math) learning. Requests for TRE proposals (RFPs) are issued annually, with a limit of one request per institution. Each equipment proposal must not exceed $50,000 total. The award pays 80% of the equipment’s cost, with 20% coming from the requesting institution. TRE awards are supported by NSF EPSCoR funding, and the Nebraska EPSCoR State Committee decides the TRE proposals selected for funding.

NEBRASKA EPSCoR PROVIDES EQUIPMENT FUNDING

Bryan College of Health Sciences — Increasing auto clave capacity at Bryan College of Health Sciences

Doane University — Enhancing Teaching and Research in Engineering at Doane University

Little Priest Tribal College — Teaching Equipment for Little Priest Tribal College’s New A.S. in Biology Program

Midland University — Chemistry & Human Performance Equipment

Nebraska Indian Community College (NICC) — Equipment for Bachelor’s in Environmental Science

University of Nebraska at Kearney — Enhancing Learning and Research at UNK with Portable Eye-tracking

Lauren Gillespie, Ph.D. — a biological sciences instructor at Central Community College-Columbus — earned the 2022 Dale P. Parnell Faculty Recognition Award from the American Association of Community Colleges. Gillespie received the honor at the AACC 2022 convention: April 30 – May 3 in New York City. Named for the former AACC President and CEO Dale P. Parnell, this award honors individuals going above and beyond to make a difference in the classroom. Dr. Gillespie was also recently selected as the Nebraska Community College Association’s recipient of the 2022 Faculty Recognition Award.

A first-generation student from rural Maine, Gillespie joined the federal TRiE programs at age 16 when which put her on a path to not only college, but to her decision to attend the University of Massachusetts-Amherst on a Division I field hockey scholarship becoming a nationally ranked scorer, and graduated with a bachelor’s degree in science. After working as an avian research assistant for Texas Tech University and the Cary Institute of Ecosystem Studies, Gillespie pursued her doctorate in biology at the University of Southern Mississippi.

CCC President Dr. Matt Gotschall said that in the past five years Gillespie has co-led a significant National Science Foundation grant for the college and made connections with several NSF projects, major research universities, and industry partners. Students benefit from her expansion of applied research in her courses and extracurricular activities and her help in applying for grants, writing papers, and presenting at conferences.

“From my perspective, she is a passionate advocate for undergraduate research,” Thomas advised the students’ day-to-day work, and developed a proposal to take the research further, via funding from the National Institutes of Health (NIH). The NIH funded the project for $393,000, and aligned mentoring from a Harvard University professor of medicine and biological chemistry and molecular pharmacology.

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How do we love STEM engagement? Let us quantum the ways...

Nebraska EPSCoR’s outreach ramped up its activities to engage K-16 students with STEM (science, technology, engineering, and math) learning, and to broaden participation in STEM by under-represented groups – especially via Omaha’s Girls, Inc. and the federally-funded “Educational Talent Search” programs and Upward Bound for first-generation college students and other minorities in STEM.

Nebraska EPSCoR’s Young Nebraska Scientists (YNS) added two new summer camps – FoodScience: How the Cookie Crumbles, and Engineering Plant Cell Walls – for high school and middle school students, respectively. YNS doubled the number of High School Researchers (HSRs) placed in paid summer positions in the labs of EQUATE researchers. Working with EQUATE partner NCMN (Nebraska Center for Materials and Nanoscience) and funder J.A. Wollam Co., the HSRs and REUs (Research Experiences for Undergraduates, from other colleges/universities) enjoyed weekly lunches called “Science and a Slice” with pizza, sodas, and talks from physicists and engineers. The HSRs also toured Lincoln’s J.A. Wollam Company, which manufactures most of the world’s top ellipsometry equipment (for measuring thin film coatings in semi-conductor chips and more). The HSRs’ end-of-summer research presentations, at UNL’s Summer Symposium, were dazzling.

Several high school and community college teachers enhanced their capabilities in EQUATE placements: Research Experiences for Teachers and Remote Activities and Instrumentation for Nanoscience — with mentoring both lab-based and with NCMN Outreach Specialist Steve Wignall, a former high school physics teacher at O’Neill and Seward schools. Nebraska EPSCoR Outreach Coordinator Jodi Sangster, Ph.D., expanded the slate of YNS Mobile Labs which include equipment, supplies, and instructions shipped for free to high schools around the state: soil science, food science, water quality, quantum, and wearable technologies are some of the new packages. More than 1,000 students at 19 Nebraska schools used YNS molecular biology mobile labs in the past year, and half of those students were first-time users.

Watch for new activities in citizen science, funded by EQUATE, to roll out in 2023 — with topics including antibiotic discovery, mosquito tracking, dog genetics, and more.

Nebraska EPSCoR’s Outreach
CLOCKWISE FROM TOP LEFT: YNS High School Researchers begin work at UNL’s Jorgensen Hall; Research Experience for Teachers (RET) participant Kendra Sibbernsen, with Metro Community College, works in a Nebraska Engineering lab; Columbus-area youth try experiments while learning with UNL Faculty; A poster by Lali Raegassa, a two-time YNS High School Researcher, earns smiles from her family visiting UNL’s Summer Research Symposium.

YNS campers learn food science skills by testing samples for mycotoxins and microbial contamination of OPEL Food Science and Technology.
DOE EPSCoR Funds Two Nebraska Researchers

THE U.S. DEPARTMENT OF ENERGY (DOE) announced $21 million in funding for 29 new projects through its Established Program to Stimulate Competitive Research (EPSCoR). Projects coupling innovative ideas from EPSCoR-eligible institutions with leading-edge capabilities at the DOE national laboratories were chosen based on competitive peer review under a DOE Funding Opportunity Announcement for Building EPSCoR-State/National Laboratory Partnerships. Two of the 29 awards went to Nebraska researchers:

- Jongkwan Eun, associate professor with UNL Civil Engineering, received $950,000 for a three-year project: Building Partnership with Sandia National Laboratories in Development of Novel Engineering and Nuclear Waste Repository (Oak Ridge National Lab is also a partner).
- Peter Sutter, professor with UNL Electrical & Computer Engineering, gains $1.5 million for a three-year project: Tunable Few-Layer van der Waals Crystals and Heterostructures as Emerging Energy and Quantum Materials (Oak Ridge National Lab is also a partner).

Both projects began in September 2022. According to the DOE’s release, these awardees will build expertise and capabilities that help their institutions to compete more successfully for other federal R&D funding—advancing geographic diversity of researchers conducting critical energy-related research.

Boys Town Adds COBRE for Pediatric Brain Health

NEBRASKA EPSCoR 2022 Annual Report
2022 NSF EPSCoR Co-Funding for Nebraska

The National Science Foundation (NSF) EPSCoR co-funds specific NSF units in support of meritorious proposals from individual investigators and teams in EPSCoR jurisdictions. These proposals have been peer-reviewed and recommended for award, but could not be funded without the combined, leveraged support of NSF EPSCoR and the corresponding directorates. Co-funding leverages EPSCoR investment and facilitates participation of EPSCoR scientists and engineers in NSF-wide programs and initiatives.

For this term*, NSF EPSCoR Co-Funded projects brought $4,032,975 to Nebraska; $2,054,643 of this total was from NSF EPSCoR. Recipients were:

- NICOLE IVERSON, University of Nebraska-Lincoln (UNL) Dept. of Biological Systems Engineering | CAREER: Extracellular Hydrogen Peroxide and Nitric Oxide Detection and Quantification Via Biocompatible Carbon Nanotubes.
- ALEXEY KRASNOSLOBDSEV, University of Nebraska at Omaha (UNO) Dept. of Physics | Collaborative Research: Exploring self-organization of functional nucleic acid supramolecular assemblies with stimuli responsive properties.
- PHILIPPE MALCOLM, UNO Dept. of Biomechanics | Collaborative Research: Detecting Gait Phases with Raised Metabolic Cost using Robotic Perturbations and System Identification for Enabling Targeted Rehabilitation Therapy.
- JEFFREY MOWER, UNL Dept. of Agronomy & Horticulture | Investigating recurrent cooption of mitochondrial cytochrome c maturation systems in Archaeplastida.
- JEAN MARCEL NGOKO DJIOKAP, UNL Dept. of Physics & Astronomy | Strong-Field and Ultrafast Processes.
- BRADLEY PARSONS, Creighton University Dept. of Chemistry | Single O2 from van der Waals Complexes and the Competition Between Product Channels.
- SOPHIA PERDIKARIS, Edith Gonzalez, Isabel Rivera-Collazo, and William Belcher, UNL School of Global Integrative Studies | IRES Track I: At the Frontier of Big Climate, Disaster Capitalism, and Endangered Cultural Heritage in Barbuda, Lesser Antilles.
- XAVIER PEREZ GIMENEZ, UNL Dept. of Mathematics | Spanning Structures in Random Graphs.
- ROBERT STREUBEHL, UNL Dept. of Physics | Investigating recurrent cooption of mitochondrial cytochrome c maturation systems in Archaeplastida.
- JOSEPH YESSEMELMAN, UNL Dept. of Chemistry | CAREER: Determining The Fundamental Rules of RNA Tertiary Contact Formation.
- ERIC VILLA, Creighton University Dept. of Chemistry | RUS-CAS Reaction Dynamics of Anderson-Type Polycarboxylate Ions in Aqueous Solution: Relating Solid-State Structures with Solution-State Properties.

*In late 2021, the following co-funding award was made – which was not included in our 2021 listing:

Cumulative Federal EPSCoR/IDeA Funding in Nebraska

Nebraska became an EPSCoR state in 1992 and has successfully competed for almost $370 million in federal research funding. This chart shows funding by agency and the cumulative growth of funding over time for the most recent decade: 2012 – 2022.

<table>
<thead>
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<th>Agency</th>
<th>Funding (in thousands)</th>
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<tr>
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</table>

The following bar chart illustrates the cumulative funding from 2012 to 2022 by agency.
2022 State EPSCoR/IDeA Committee Members

Dr. Jon Anderson, Committee Chair, Innovation and Technology Manager, LI-COR Biosciences

Ms. Nisha Avey, Business Innovation Consultant, State of Nebraska Dept. of Economic Development

Dr. Kenneth W. Bayles, Interim Associate Vice Chancellor for Research, University of Nebraska at Omaha

Dr. Charlie Bicak, Senior Vice Chancellor for Academic and Student Affairs, University of Nebraska at Kearney

Dr. Jeffrey Gold, Executive Vice President and Provost, University of Nebraska

Mr. Dan Hoffman, Chief Executive Officer, Invest Nebraska Corp.

Dr. Jerry Hudgins, Professor and Dept. Chair, University of Nebraska-Lincoln

Mr. Phil Kozera, CEO, MatMaCorp

Dr. Jennifer Larsen, Vice Chancellor for Research, University of Nebraska Medical Center

Dr. Yuri Lyubchenko, Professor, University of Nebraska Medical Center

Dr. J. Tyler Martin, Sr., Chairman & CEO, Aeolian Biotechnology Corporation

Dr. Justin Mott, Associate Professor, University of Nebraska Medical Center

Dr. Roni Reiter-Palmon, Professor, University of Nebraska at Omaha

Dr. Daniel P. Schachtman, Professor, University of Nebraska-Lincoln

Dr. Janet Seger, Professor, Creighton University

Dr. Juliane Strauss-Soukup, Committee Vice-Chair, Associate Vice Provost for Research and Scholarship, Creighton University

Ms. Gloria Thesenvitz, Founder & Board Chair, Nova-Tech, Inc.

Dr. Robert Wilhelm, Vice Chancellor for Research & Economic Development, University of Nebraska-Lincoln