

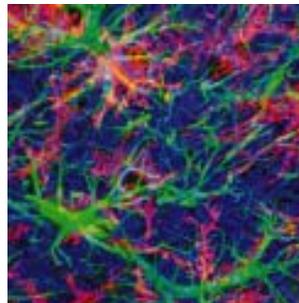
EPSCoR

NEBRASKA

Experimental Program to Stimulate Competitive Research

Annual Report

May 2006



Greetings from the Director



F. Fred Choobineh

The second annual Nebraska Research Expo was held at the Cornhusker Marriott in Lincoln on March 29, 2006. The Research Expo was a great success with over 400 attendees, approximately twice the number who attended the first year. The Expo was followed by the first annual Nebraska Innovation Forum, which got off to a strong start on March 30, 2006 (see stories on p. 5). The next Research Expo and Innovation Forum will be held in Omaha in the spring of 2007. Nebraska researchers have obtained \$141 million in grant funds through EPSCoR programs since 1991. These funds continue to support research, infrastructure and economic development, outreach to members of groups that are underrepresented in the sciences, and educational programs.

It is my pleasure to welcome three new members to the Nebraska EPSCoR State Committee. They are Drs. Clague P. Hodgson, Marjorie Langell, and Terri L. Wasmoen. I appreciate the efforts on behalf of EPSCoR of those members whose terms ended in 2005: Dr. Joseph Daugherty, Mr. Herman Person, and Dr. James Van Etten (see story on p. 3).

Although recent months have been productively eventful for EPSCoR, one event is noted with sorrow. That event is the death of Nebraska EPSCoR's first State Committee chair, Dr. Robert Allington, who served in that capacity for thirteen years and stepped down shortly before his death. Bob Allington's noteworthy achievements are too many to be covered even in the tribute that follows these greetings, but I note here his special dedication to Nebraska as evidenced by his years of service to EPSCoR. The new State Committee chair is Mr. Lyle Middendorf, who certainly is not new to EPSCoR. His appointment as chair was preceded by over twelve years of consistently valuable service as a committee member. Lyle is a respected scientist whose entrepreneurial vision will honor the legacy of Bob Allington and continue to serve Nebraska well.

A Tribute to Dr. Robert Allington



Robert Allington

Dr. Robert Allington, 70, died on Sunday, March 26, 2006, at his home in Lincoln, Nebraska. Dr. Allington gave thirteen years of service to the Nebraska EPSCoR State Committee as its first chair. He resigned as chair in late 2005.

A true entrepreneur, Dr. Allington founded Isco in his garage in 1958.

The company became a multi-million dollar manufacturer of instruments for water-pollution monitoring, research and analysis. Dr. Allington was CEO of Isco until the company merged with Teledyne Technologies in 2004 when he became senior vice president and chief scientific officer of Teledyne Isco, Inc. A UNL alumnus, Dr. Allington served on the Chemistry Industrial Advisory Board of UNL as well as many other boards including the Nebraska Polio Survivors, League of Human Dignity, and Nebraska Research and Development Authority. His research resulted in an honorary doctorate in chemistry from UNL. *R&D Magazine* named him the 1991 Research and Development Executive of the Year. In 2005, Dr. Allington received the fourth annual Pittcon Heritage Award in recognition of his achievements in ana-

lytical chemistry and instrumentation. The award is given by the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon) and the Chemical Heritage Foundation to recognize outstanding entrepreneurs whose careers have inspired achievement, promoted public understanding of instrumentation sciences, and highlighted the economic role of analytical chemistry.

Although those who worked with him at Nebraska EPSCoR are saddened by his passing, Dr. Allington leaves a lasting legacy not only as a remarkable scientist and entrepreneur but as a leader devoted to civic service. Nebraska EPSCoR expresses appreciation for that legacy and special appreciation for Dr. Allington's service as its first State Committee chair.

State Committee News

With appreciation for their service, EPSCoR notes that terms ended for three State Committee members in 2005. Industry representatives **Dr. F. Joseph Daugherty**, and **Mr. Herman Person** began their committee service in 1993. In the 1990s, Dr. Daugherty specialized in strategic planning and business development for joint venture companies and served as a principal of a boutique investment banking firm. He is president of and a member of the Board of Directors, Eleos, Inc., a director of Trimed Research, and managing partner of Phenolics, LLC. Mr. Person was director of corporate product development at Vishay Dale, based in Columbus, Nebraska, before retiring. He served as a committee member both before and after his retirement. **Dr. James Van Etten**,

University Professor of Plant Pathology at UNL, served the State Committee as an active member for over ten years, beginning in early 1995. He received one of the highest honors a U.S. scientist can achieve with his spring 2003 election to the National Academy of Sciences. A most distinguished career has not interfered with Dr. Van Etten's strong commitment to Nebraska EPSCoR. When interviewed for the 2004 *Annual Report*, he said, "I have good colleagues, and I have no regrets about making my career in Nebraska. Nebraska has been good to me. I have a passion for science and believe that EPSCoR can continue to be a big help to develop science in Nebraska."

Nebraska EPSCoR welcomes new State Committee members and a

new chair. The close of 2005 brought three new members, **Drs. Clague P. Hodgson, Marjorie Langell, and Terri Wasmoen**. Dr. Hodgson is founder and president of Nature Technology Corporation (NTC), a Lincoln-based company involved in the development of technology for DNA vaccines, gene medicines, and DNA manufacturing. Dr. Langell is Charles Bessey Professor of Chemistry at UNL. Dr. Wasmoen is the senior director of Biological Research for Schering-Plough Animal Health based in Elkhorn, Nebraska. The governor appointed **Mr. Lyle Middendorf, P.E.**, to chair the State Committee on December 20, 2005 (see related stories on p. 2). A committee member since 1993, Mr. Middendorf is senior vice president and chief technical officer at LI-COR, Inc., based in Lincoln.

EPSCoR Grant Projects

NSF

Metabolite Signaling: The Metabolite Signaling Molecular Biology for Secondary Classrooms (MBSC) program is an outreach program designed to:

- Use biotechnology as a vehicle for *gaining a greater understanding of science concepts and facilitate the use of science inquiry at the high school level*
- Provide *science-content expertise and technical training to pre-service and in-service high school teachers in the area of biotechnology*
- Provide *equipment and instructional assistance for teachers participating in the Science Outreach Program*
- Partner with University of Nebraska-Lincoln faculty in the development of *inquiry-based research activities for high school students*
- Develop a long-term strategy of involvement with high school students to *increase the number of students going forward into post-secondary science programs*



Program coordinator, Sarah Zulkoski-Benson, assists Lincoln Southeast High School students load DNA into agarose gels for gel electrophoresis.

- *Increase students' awareness of careers in science*

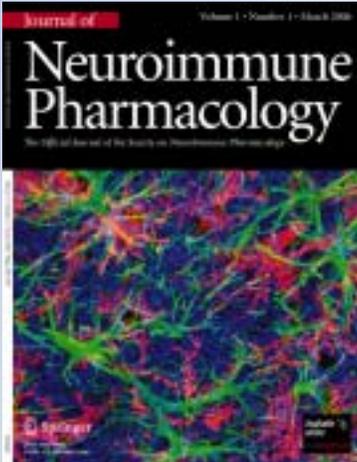
In its first year (2004-2005), MBSC served 365 Lincoln high school students. MBSC is supported by the three-year Research Infrastructure Improvement (RII) grant awarded in

2004. In its second year (2005-2006), the program expanded to serve 800 high school students and to include rural northeastern Nebraska. Expansion to urban Omaha schools is planned, and the program is expected to serve 2000 or more students in its third year. Students who show particular aptitude are invited to the University of Nebraska-Lincoln to participate in a selective summer research program.

Nebraska Center for Cell

Biology: The Nebraska Center for Cell Biology (NCCB) was established at Creighton University (CU) with support from the 2004 RII grant. The NCCB obtained a confocal microscope with greatly enhanced capability over the previous system. A remote user can control all functions of the confocal microscope and operate it with minimal intervention from an NCCB operator. Twenty new users were trained on the con-

focal in 2004, and 16 were trained in 2005. An image of brain glial cells that NCCB obtained on the confocal microscope appears on the cover of the first issue of *Journal of Neuroimmune Pharmacology*.



Recognized by the CU School of Medicine as a core facility, the NCCB has established research collaborations with St. Jude (Memphis), the University of Nebraska Medical Center, Virginia Military Institute, and the University of South Dakota.

Mobile Computing and Wireless Networks: This RII grant-supported project continues to strengthen research and develop education in the

area of mobile computing, which is a growth industry in Nebraska. Researchers at UNO are exploring avenues in wireless sensor network technology for medical applications. Collaborations with the University of Nebraska Medical Center have created a unique opportunity to develop plans for utilizing sensor networks in medical applications. Currently, a pilot study is being conducted to collect data for availability of a patient's medical record in real-time to prevent wrong matches for blood work and/or medications. Find more information online at <http://nwind.ist.unomaha.edu>.

DoD

In 2006 Nebraska received two Department of Defense (DEPSCoR) awards, one for an Air Force Office of Scientific Research (AFOSR) project and one for an Office of Naval Research (ONR) project, totaling over \$1.1M. Twenty-five projects were selected out of 103 submitted with \$11.5M in awards made to 22 academic institutions in 17 states. Nebraska's AFOSR project is "Self-Configuration and Localization in Ad Hoc Wireless Sensor Networks" at UNL. The ONR

project is "Nanostructure-Designed Dielectric Materials for High-Energy Density Capacitors" at UNL.

Dr. Kurt Preston, DEPSCoR program director, spoke on "DoD Funding Insights for University Principal Investigators" at UNL on March 15 and at UNMC on March 16, 2006. More information is available at <http://epsco.unl.edu/events>.



Dr. Kurt Preston speaks to interested researchers in Nebraska.

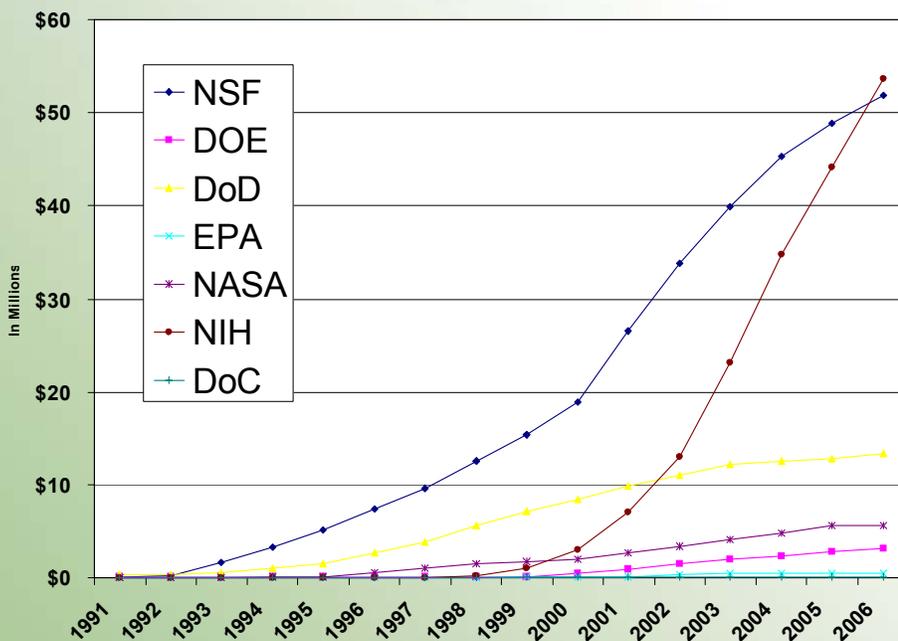
DOE

In early 2006 Nebraska received a Department of Energy National Lab Partnership award for a research project entitled "Magnetic Cluster States in Nanostructured Materials." The project represents a dovetailing of research interests at two DOE National Laboratories and the University of Nebraska-Lincoln.

In the final year of a five year DOE Research Implementation Award for "Carbon Sequestration and Global Climate Change," work continues at UNL on carbon sequestration in rain-fed and irrigated agricultural ecosystems and the role of carbon sequestration in mitigating increases in atmospheric carbon dioxide concentrations. The project includes year-round measurement of fluxes of carbon dioxide at three study sites along with extensive analysis and calculations.

NASA

The NASA Nebraska EPSCoR grant is in the final year of a five-year grant cycle. The three collaborative re-



Cumulative Federal R&D funds expended by Nebraska EPSCoR

search teams, Airborne Remote Sensing (ARS), Small Aircraft Transportation Systems (SATS), and Convective Extinction of Fuel Droplets (CEFD) are continuing their research and publications, as well as securing funding for sustainability after NASA EPSCoR. In addition, a comprehensive, external evaluation is nearing

completion. The evaluation was conducted to determine the future course of the NASA EPSCoR program and to assess the impact of its first 10 years in Nebraska. The evaluation will help Nebraska be more competitive in the next round of NASA EPSCoR grant submissions which will establish new collaborative

research teams. The NASA EPSCoR program is managed by Dr. Brent Bowen at the University of Nebraska at Omaha.

New Awards

DOD \$1.1M

DOE \$475,000

Nebraska Research Expo

The second annual Nebraska Research Expo was held at the Cornhusker Marriott Hotel in Lincoln on March 29, 2006. It was a great success with over 400 people attending, providing academic and business researchers the opportunity to showcase their research, to hear distinguished speakers, and to exchange ideas. The Expo began with welcoming remarks from NSF EPSCoR program director Karen Sandberg, followed by a presentation from NSF EPSCoR head Sherry Farwell.

Highlights of the conference included three full-day tracks and six half-day mini-tracks presenting research in the areas of: Future of Bridge Engineering in the U.S.; Integrated Structural Biology and Bioinformatics; Metabolite Signaling; Genomic Responses to Dietary Mol-

ecules in Mammals; Basic Biological Research on Aging and Longevity; Genome-wide Gene Regulatory Networks; Nanoscale and Nano-structured Semiconductors: Materials and



Mercedes Bell, a UNMC summer research student, presents her poster at the Expo.

Devices; Biosensors and Networks; Nanomanufacturing Engineering; and Wireless Networks and Distributed Sensors. Additionally, participants had

opportunities to peruse business and academic research center displays highlighting their research and development activities. Capping off the day, the reception/poster session showcased 102 posters presenting research while encouraging interaction among students, faculty, and business people in science, technology, engineering, and mathematics.

The third annual Nebraska Research Expo will be held in Omaha in 2007, continuing to inspire interdisciplinary collaboration among business and academic research communities. Visit <http://epscor.unl.edu> for information (including programs, abstracts, and speaker bios) on either the 2005 or 2006 Research Expo and for announcements regarding the 2007 Expo.

Nebraska Innovation Forum

Nebraska EPSCoR, in collaboration with a number of organizations, sponsored the first annual Nebraska Innovation Forum at the Cornhusker Marriott Hotel in Lincoln on March 30, 2006. Co-sponsors were Bio Nebraska Life Sciences Association, Greater Omaha Chamber of Commerce, Lincoln Chamber of Commerce, Midlands Venture Forum, Nebraska Chamber of Commerce and Industry, Nebraska Department of Economic Development, Nebraska Economic Development Association, and the University of Nebraska. Ap-

proximately 200 business people, legislators, and scientists attended the Innovation Forum, which included discussions led by speakers from Nebraska and around the country on transforming innovative ideas into economic development. Participants were welcomed by Pete Kotsiopoulos, Vice President for University Affairs, University of Nebraska. They heard morning introductory remarks from University of Nebraska President James B. Milliken. The afternoon introductory remarks came from Jim McClurg, who chairs the Board of Re-

gents, University of Nebraska, and the Board of Directors, Bio Nebraska Life Sciences Association. After addressing the previous day's Research Expo participants, NSF EPSCoR program director Karen Sandberg stayed to attend the Innovation Forum as well. For more information about the Nebraska Innovation Forum including speakers' names, biographical information, and presentations, see <http://epscor.unl.edu>. Information about the second annual Innovation Forum in Omaha will be forthcoming on the web site also.

Economic Development and Outreach/Educational Activities

Economic Development

In 2005 and 2006, the Nebraska Engineering, Science, and Technology Internship Program (NESTIP), offered internships to six students from UNO, UNK, and UNL. The students provided technical expertise to participating companies including Interaction Arts and Technologies, Inc.,

Olsson Associates, Morrissey Engineering, Inc., Transcript International, Pro-Solutions, Inc., and IntelliCom Computer Consulting, Inc. IntelliCom was named the 2006 recipient of the Walter Scott Entrepreneurial Business Award, given to a business that has established technology partner-

ships with the University of Nebraska. The company has hired 11 former interns into highly skilled positions. Nebraska EPSCoR continues to receive positive comments from students & employers about NESTIP.

Outreach/Educational Activities

Diversifying the Sciences: Nebraska EPSCoR maintains strong commitment to recruiting students who are members of underrepresented groups in the sciences. EPSCoR supports the following summer programs: **Summer Enrichment Program for Minority Undergraduate Students** at UNMC; **UNL Summer Research Program**; and **CU's Discovery Research Program**.

Six summer program students from UNL and UNMC's 2005 programs presented posters at the second annual Nebraska Research Expo on March 29, 2006 (see story p. 5). EPSCoR supports young science students through summer programs like **Bright Lights** and the **Good Medicine Camp**.

serves 130-160 students per semester; more than 87% of them are Native American. There are Hispanic, African American, and Caucasian students also. Students are predominately female (63%), with an average age of 31 and at least two (2) children. Efforts are also being made to recruit recent high school graduates.



High school women explore the sciences at the 2006 Women in Science Conference.



LPTC's new more user-friendly computer lab makes teaching easier and learning more enjoyable.

LPTC faculty members continue to build Geographic Information Systems and Remote Sensing curriculum. NSF EPSCoR has provided much-needed support to upgrade the computer lab, which had many problems such as wiring that was not adequate for the number of systems being

run and outdated equipment. LPTC faculty report that the upgrade resulted in dramatically increased lab use and increased interest in computer classes.

Women in Science: The eighth annual **Women in Science Conference** was held on February 24-25, 2006, at the Cornhusker Marriott Hotel in Lincoln encouraging high school women to pursue their interests in science, mathematics, engineering and technology. Sixteen high schools were represented, including not only Nebraska schools but also a Manhattan, Kansas, school. Sixty-three students were in attendance with their teachers. The keynote speaker, Dr. Miriam Rodon-Naveira, Chief Science Advisor/Higher Education Director for NASA Dryden Flight Research Center is a NASA biologist and environmental research scientist. The conference was sponsored by Nebraska EPSCoR and the UNL Center for Science, Mathematics, and Computer Education.



Bright Lights Adventures Through Time Mummy Wrap

Tribal College Outreach: NSF Nebraska EPSCoR provided continued support for Little Priest Tribal College (LPTC) in collaboration with NASA Nebraska EPSCoR. LPTC

from August 11-14, 2005. NSF EPSCoR outreach funds provided a unique opportunity for five faculty from small colleges in Nebraska to attend, enhancing their development in information systems and technology areas while providing interaction with people from all over the world. Find details of the conference at <http://amcis2005.isqa.unomaha.edu>.

The Department of Computer Science and Engineering hosted the regional **ACM Programming Contest** on November 5, 2005. Support from EPSCoR allowed UNL to host one of the largest ACM Regional Programming sites in the country. Over 100 students and coaches from 12 different colleges and universities across 6 states comprised the 29 teams that participated. The competition provides a unique opportunity for UNL recruitment by showcasing the Computer Science and Engineering graduate program with its state-of-the-art

Access Grid and Visualization Center, PrairieFire supercomputer, and the newly renovated Avery Hall. This year, the winning team from UNL placed first out of over 180 competitors, solving 6 of the 10 problems posed in the contest. By placing in the top slot of the region, the team earned the right to represent the region at the 30th Annual ACM ICPC World Finals held in San Antonio from April 9-13. The UNL Grindor team received honorable mention.

Nebraska EPSCoR supported two engineering researchers from UNL in attending the **Northcentral States Nanosystems Consortium Workshop** in Denver on October 13, 2005. The workshop was a collaborative effort to nurture intellectual energy and enthusiasm among its members and to identify a core group of NSNC members whose mission is to create collaborative NIRT, NER or other NSNC proposals to NSF.

Nebraska EPSCoR sponsored “**Inventing, Patenting, and Licensing**” by Dr. Patrick MacCarthy of the Colorado School of Mines, presented on October 6, 2005, at the Nebraska Union on the UNL City Campus. Nebraska business people, college and university faculty, grad students, postdocs, and staff learned about securing intellectual property rights for inventions. Find more information at <http://epscor.unl.edu/events>.

Plans are under way for the installation of an **access grid node** at the **University of Nebraska at Kearney**. This installation will bring to five the total number of access grids that NSF EPSCoR has funded or co-funded throughout Nebraska. The access grids are used in over 150 worldwide institutions for simultaneous group-to-group interactions primarily for lectures, training and large-scale scientific and technical collaborations.

Nebraska EPSCoR Newsmakers

Ruma Banerjee (NIH COBRE PI) spoke as one of the UNL Chancellor’s Distinguished Lecture Series speakers for The Nebraska Lectures and received a University of Nebraska Outstanding Research and Creative Activity Award.

Ken Cassman (DOE EPSCoR Co-PI) was named a fellow in the American Association for the Advancement of Science (AAAS) for his contributions to crop ecology, agro-ecology, and research in natural resource conservation and global food security.

Fred Choobineh (Nebraska EPSCoR Director) received the Joseph K. Walkup Prominence in Industrial Engineering Award from the Department of Industrial and Manufacturing Systems Engineering at Iowa State University. The award is given to alumni who have earned prominence in their professional work.

Aaron Dominguez (past First Award recipient) received a \$550,000 Faculty Early Career Development (CAREER) grant from the National Science Foundation for five years.

Richard Murphy (State Committee member) was selected to receive an award as one of the Top 15 Irish-American Life Scientists of the Year by Enterprise Ireland, BioLink USA-Ireland, and Irish America Magazine.

K.P. Rajurkar (past DoD EPSCoR awardee) received the 2005 Charles F. Carter Jr. Advancing Manufacturing Award from the Association for Manufacturing Technology.

Steve Reichenbach (NSF EPSCoR R&D Partnership awardee) was recognized as “Technology Professor of the Year” by the Applied Information Management (AIM) Institute. The award is presented to a postsecondary educator who is an outstanding technology educator/administrator, a dynamic colleague and a caring mentor to students.

David Swanson (past NSF EPSCoR RII Co-PI), Aaron Dominguez (past First Award recipient), and Ken Bloom received a five-year, \$2 million grant from the National Science Foundation and will play a key role in one of the world’s largest physics experiments known as the Compact Muon Solenoid or CMS.

Shashi Verma (DOE EPSCoR PI) won the 2006 award for Outstanding Achievement in Biometeorology from the American Meteorological Society.

Xiao Cheng Zeng (NSF EPSCoR nanomaterials researcher) was named a fellow of the American Physical Society. He received the 2004 Sigma Xi Young Scientist Award and presented his lecture on Science and Science issues.

State EPSCoR Committee Members

Mr. Lyle Middendorf, *Chair, Sr. Vice President & Chief Technical Officer, Advanced Research & Development, LI-COR, Inc., Lincoln*

Dr. Lee Jones, *Vice Chair, Executive Vice President and Provost Emeritus, University of Nebraska*

Mr. Richard Baier, *Director, Nebraska Department of Economic Development*

Dr. Thomas Bragg, *Associate Vice Chancellor for Research & Dean of Graduate Studies, UNO*

Dr. Michael Cherney, *Professor of Physics, Creighton University*

Dr. Judith Christman, *Stokes-Shackleford Professor & Chair, Department of Biochemistry & Molecular Biology, UNMC*

Dr. Clague Hodgson, *President, Nature Technology Corporation, Lincoln*

Dr. Marjorie Langell, *Charles Bessey Professor of Chemistry, UNL*

Dr. Richard Murphy, *Chairman, Biomedical Sciences, Creighton University*

Dr. Jay Noren, *Executive Vice President and Provost, University of Nebraska*

Dr. Prem Paul, *Vice Chancellor for Research & Dean of Graduate Studies, UNL*

Dr. Ronald Raikes, *State Senator, State of Nebraska*

Dr. Thomas Rosenquist, *Vice Chancellor for Research, UNMC*

Dr. Gregg Rothermel, *Professor and Jensen Chair of Software Engineering, Department of Computer Science and Engineering, UNL*

Dr. Anthony Starace, *George Holmes University Professor, Department of Physics and Astronomy, UNL*

Dr. Terri Wasmoen, *Sr. Director, Biological Research, Schering-Plough Animal Health Corporation, Elkhorn*

Dr. Ilze Zigurs, *Mutual of Omaha Distinguished Chair of Information Science & Technology, UNO*



Nebraska EPSCoR • W192 Nebraska Hall
Lincoln, NE 68588-0557 • Ph: (402) 472-8946
Fax: (402) 472-8948 • Email: epscor@unl.edu
<http://epscor.unl.edu>

STATE EPSCoR OFFICE STAFF

Dr. F. Fred Choobineh, P.E., *Director*

Dr. Gaynell Gavin, *Communication Specialist*

Ms. Karla Roth, *Administrative Assistant*

Ms. Nancy Simnitt, *Administrative Technician*

Annual Report Editor: Gaynell Gavin

Design and Layout: Karla Roth

Copy Editor: Nancy Simnitt