

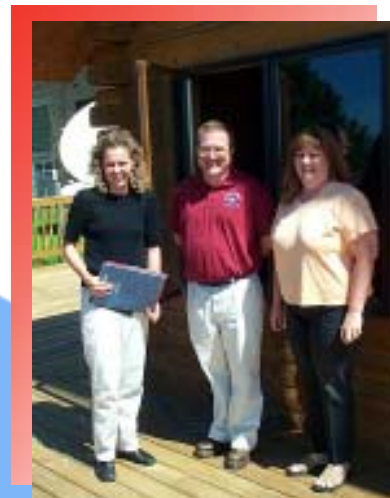
Nebraska EPSCoR



Annual Report

*For the period ended
June 30, 2003*

*Experimental
Program to
Stimulate
Competitive
Research*



A Note from the Chair



Nebraska EPSCoR completed its eleventh full year of operation at the end of June 2003. Selected activities and progress are highlighted in this report. Over \$84 million in research grants have been obtained from federal agencies with EPSCoR programs by Nebraska researchers since Nebraska was designated eligible in 1991. In addition to direct support for infrastructure and specific research projects, considerable assistance has been provided through our education and outreach programs. This coming year, Nebraska EPSCoR marks a new transition with the appointment of a new Director, Dr. Fred Choobineh, a professor at UNL, and the retirement of Dr. Royce Ballinger. On behalf of the state EPSCoR Committee, I would like to thank Royce for his efforts on our behalf and wish him well.

Robert W. Allington, Ph.D.
Chair, Nebraska EPSCoR Committee
CEO and Chairman, ISCO, Inc.

Nebraska EPSCoR Newsmakers

Stephanie Adams (EPSCoR Minority Coordinator) was awarded the prestigious NSF CAREER Award for \$587,568 over the next five years. Adams also received a 2003 Sue Tidball Award for Creative Humanity at UNL.

Robert Allington (Committee Chair) received an award recognizing ten years of service as Nebraska EPSCoR Committee Chair.

Jameela Al-Jaroodi (doctoral candidate with SDI group) was honored with one of three Graduate Research Assistant Awards given at the College of Arts and Sciences annual Alumni Achievement Awards banquet.

Ruma Banerjee (metallobiochemistry cluster scientist) received a \$10 million NIH grant to establish the Nebraska Redox Biology Center as a collaborative research effort between UNL and UNMC's Eppley Cancer Center. The award will cover a five-year period. (See story on pg. 3)

Keith Parker (past EPSCoR Minority Coordinator) accepted a position as the Associate Provost for Institutional Diversity at the University of Georgia.

Stephen Ragsdale (metallobiochemistry cluster scientist) received two honors: 2003 University of Nebraska Outstanding Research and Creative Activity Award and was named Charles Bessey Professor of Biochemistry by the University of Nebraska-Lincoln.

Reuben Rieke's (materials cluster scientist) company, Rieke Metals, Inc., received the Walter Scott Entrepreneurial Business Award for 2003 that recognizes Nebraska businesses that have developed technology relationships with the University of Nebraska.

David Sellmyer (State Committee member and materials cluster leader) is heading a group of UNL researchers who received a \$5.4 million grant over 6 years for a NSF Materials Research Science and Engineering Center (MRSEC) award. (See story on pg. 3)

Jim Van Etten (State Committee member and gene expression cluster leader) was elected to the National Academy of Sciences. This is considered one of the highest honors a U.S. scientist can receive.



Robert Allington,
Royce Ballinger
and Lee Jones

Nebraska Receives Center Grants

UNL scientists received two research center grants this past year. Both of these groups were part of Nebraska EPSCoR's first grant (1993-96) supporting research clusters (materials research and metallobiochemistry) although each group received support along the way from a variety of other sources including the Nebraska Research Initiative. In addition to direct support for research, both centers involve a wide range of activities including graduate and undergraduate research, facility and equipment development, recruiting and mentoring beginning faculty, technology transfer, and educational outreach.

NSF funded a MRSEC (Materials Research Science and Engineering Center) grant (\$5.4 M) to a group of faculty in the Center for Materials Research and Analysis led by physics professor David Sellmyer. The new MRSEC includes scientists from the departments of physics and astronomy, chemistry, mechanical engineering, and biological sciences. The initial focus of the MRSEC involves nanomagnetic structures that have applications in advanced computing and data storage systems, handheld electronic devices, advanced sensors, and future medical technologies.

NIH funded a COBRE (Center of Biomedical Research Excellence) grant (\$10 M) to establish the Nebraska Redox Biology Center. The Center, led by Professor Ruma Banerjee, includes collaborating scientists from UNMC's Eppley Cancer Center as well as four departments (biochemistry, chemistry, veterinary and biomedical sciences, and computer science and engineering) at UNL. The Center's research will focus on the reduction-oxidation reaction balance in cells and how this redox homeostasis is related to diseases such as cancer, cataracts, cardiovascular disease and Alzheimer's disease.



Ruma Banerjee in her lab

Industry Internship Program

After the second year of the Nebraska Engineering, Science and Technology Internship Program (NESTIP), 44 different students, 35 different companies, and 6 universities/colleges have participated in the program. NESTIP was designed to help Nebraska businesses improve their production and help solve their problems by tapping into the knowledge of university/college students in the engineering, science, and technology fields.

Many businesses have indicated how helpful this program has been in giving them an affordable way to hire an intern with new ideas. A few businesses have even hired their intern students full time after the student graduated. New Nebraska businesses benefiting from NESTIP this past year include: GIS Workshop; Eaton Corporation; Nebraska Turkey Growers Cooperative; Kelly Industries, Inc.; LI-COR Biosciences; Lamp, Rynearson & Associates, Inc.; Natura Manufacturing, Inc.; Cash-Wa Dist. Co.; i2rd; Megabase Research Products; and Quality Practitioners, Inc.

New Awards in FY 2002-03

DEPSCoR

\$505,986

EPA

\$410,000

NIH COBRE

\$10M

NSF

\$2.58M

NSF Research Infrastructure Improvement (RII) project

The third and final year of the NSF RII project involving informatics continues to improve infrastructures in research across four campuses (UNL, UNMC, Creighton, UNO) in addition to supporting education and outreach activities. Progress includes:

BRL (Bioinformatics Research Lab) has established a Bioinformatics Core Research Facility providing computational support for analysis on genomics, proteomics and structural biology. BRL supported development of courses in genetic sequence analyses and statistical methods in bioinformatics. A new Graduate Specialization (M.S. or Ph.D.) in bioinformatics has been approved with two curricular tracks (computer science and biological science) and 12 graduate students are currently enrolled. Recent competitive awards to UNL faculty (Drs. Pomp, Gladyshev and Scott) represent additional benefits of the RII investment in BRL.

The **ERP** (Enterprise Resource Planning) group of faculty from three UNL colleges has focused its infrastructure development on intelligent web management for e-commerce, electronic access control policies, methods for scheduling and resource allocation, methods to capture on-line behavior of on-line users, and developing common components for procurement and design.

ICLS (Informatics Center for the Life Sciences) took the major responsibility in organizing the state conference in cooperation with Infotec 2003 (see pg. 5). Computational hardware and software was upgraded and expanded as part of the state's bioinformatics network including nodes at UNMC, UNL, UNO, and CU. Videoconferencing equipment installed at all four campuses allows more effective collaboration and

sharing of lectures and presentations. A new software program (Biodiscovery ArrayPack) allows remote access for DNA microarray analysis directly from the researcher's work-place.

SDI (Secure Distributed Information) members have been active in seeking external support and were recently notified by NSF that one proposal to the MRI (Major Research Instrumentation) program will be funded at \$500,000 to add new visualization capability and computational upgrades to the UNL RCF (Research Computing Facility). Dr. Jiang received a \$40,000 grant from NCITE (National Center for Information Technology in Education) for his I-Minds project, an innovative approach to

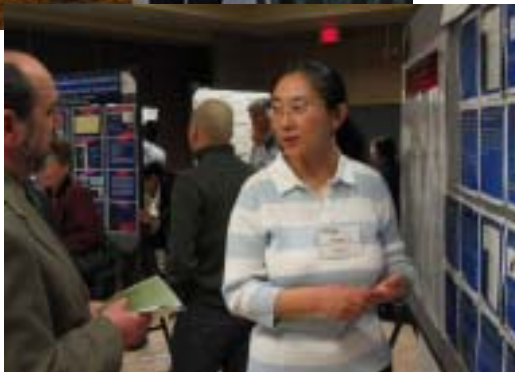
computer-aided education. The 2003 "top500" evaluation of UNL's supercomputer (PrairieFire) developed by the SDI group ranked 29th among USA academic computers, and 200th among all computers in the world. Additional Access Grid Nodes (beyond the original UNL and UNO sites) were developed for the PrairieFire site and the UNL College of Engineering. Plans are being finalized to develop a node at Creighton University.



Farewell reception for SDI post-docs (Swanson, Ramamurthy, Zou, McCarthy, Lei and Jiang)



State conference exhibit and poster



State EPSCoR Conference

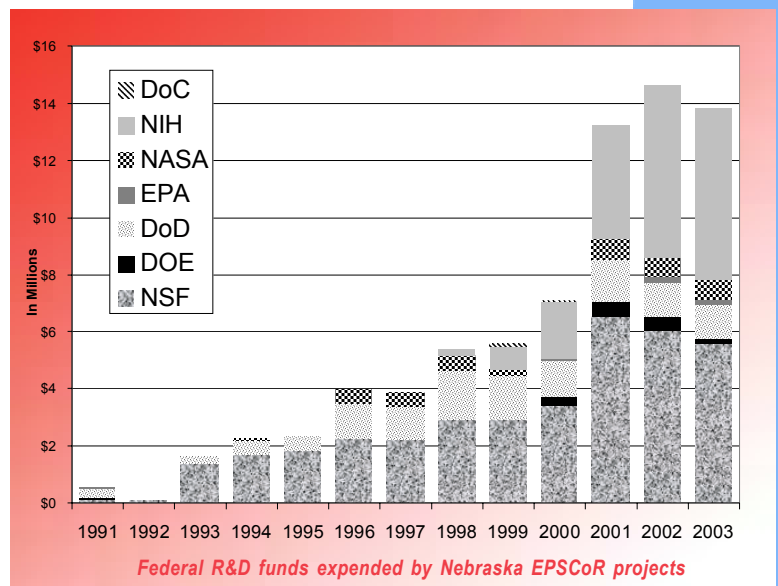
The Nebraska EPSCoR 10th annual conference was held in collaboration with **Infotec 2003** in Omaha on April 8-9. The Infotec conference and trade show was sponsored by the Omaha chapter of the Association of Information Technology Professionals which provides education and professional development for the industry. Infrastructure groups of the Nebraska EPSCoR NSF project, ICLS (Information Center for the Life Sciences), BRL (Bioinformatics Research Lab), and SDI (Secure Distributed Informatics), and the BRIN (Biomedical Research Infrastructure Network) project developed a “bioinformatics track” for the Infotec conference with exhibits and talks of interest to the information technology community. The conference was attended by over 3000 participants.



Attendee visits NICLS exhibit

Activities Supported in FY 2002-03

- **Conference/Workshop Support:** Tenth annual conference, “Bioinformatics and Biomedical Computing in Nebraska” (see above); Women in Science Conference and the Women in Information Technology (IT) & Engineering Conference (see page 6);
- **Educational activities:** Native American Grant Writing Workshop; Undergraduate Minority Research Participation Programs on four campuses; Workshop for High School Women in Information Technologies; Four IT summer camps for underrepresented groups (hearing impaired, women, minorities and upward bound students);
- **Outreach Activities:** Internet Access for Cedar Point Biological Station in western NE; ACM Programming Contest in Computer Science & Engineering Dept., UNL; Nebraska Academy of Sciences travel support; Ho-Chunk Community Development Corp. High School Technology Club and Computer Equipment at Winnebago Public School; National SBIR Conference, Albuquerque, NM; National Society of Black Engineers Conference, Anaheim, CA; CDI-IGERT Assistance Workshop, Boulder, CO; CDI Green Chemistry Workshop, Washington, DC; Minority Recruitment, Jackson State; QEM/MSE Network, Washington, DC; Nat'l NSF EPSCoR Conference, Anchorage, AK; DOE Site Visit, UNL; DOE Nat'l Lab Conference, Albuquerque, NM; NSF Best Practices Workshop, Jackson, WY; NIH BRIN Workshop, Grand Island, NE; Keith Parker federal agency visits; Chadron State Fossil Turtle Project; Wayne State Environmental Science Project; Biodefense Strategic Planning meeting, Nebraska City, NE; Hawaii Int'l Conference on System Science; Travel to EPSCoR Library meeting; Variety of faculty travel to meetings.



- **Research:** Total federal funds awarded to Nebraska EPSCoR programs amount to \$84.9 million as of June 30, 2003 (DoC, DoD, DOE, EPA, NASA, NIH and NSF).

Educational and Outreach Activities

Minority Research Programs – Nebraska EPSCoR continued its tradition of recruiting underrepresented students for hands-on research experiences in labs on four campuses. These programs vary among campuses but include a variety of instruction, presentation, and discussion components. Native American, Hispanic, and African American students participated this year from Alcorn State, Clarion, Dillard, Fayetteville State, Ft. Lewis, Jackson State, Oglala Lakota CC, Pensacola Christian C., Prince George CC, Stanford, Tennessee State, U. Michigan-Ann Arbor, and UNL.



Tasia Hurd (left) and Claudia McDonald talk about a research project

Women in Science Programs – Nebraska EPSCoR has supported a number of programs over the years to encourage success among women in science. This year programs included: **1)** The fifth annual “Women in Science Conference” sponsored by the Center for Science and



Hardware sandbox, where students take computers apart and put them back together

Math Education at UNL attracted 110 young women and 20 sponsoring teachers from across the state to learn about careers in science. The meeting included panel discussions and visits to labs of women researchers. **2)** A “Women in Information Technology and Engineering Workshop” was held at UNO. From 60 nominations from across the state, 24 high school sophomores were selected to participate along with a teacher of their choice. Workshop activities were hands-on and interactive in a variety of technology-related fields. **3)** A Small Grants

Competition to support women faculty in colleges and Universities in Nebraska was conducted twice (late 2002 and early 2003). The grants (up to \$3000) provided funds for travel, student help, or supplies related to a specific research project. The funded grants were selected by a committee of distinguished professors representing each of the four major universities in the state (UNL, UNMC, CU, UNO) chaired by Dr. Ilze Zigurs (State Coordinator for Nebraska EPSCoR Women’s Programs). A total of 36 grants (out of 62 submitted) were funded to women faculty from the four research universities, University of Nebraska at Kearney and two smaller colleges (Wayne State College and Dana College).

EPSCoR Outreach to Tribal Colleges – Nebraska EPSCoR (NSF and NASA grants) has assisted Little Priest Tribal College (LPTC) in a variety of activities in collaboration with LPTC staff. This year, activities included a proposal-writing workshop with participants from LPTC, Nebraska Indian Community College and teachers from Walthill, Santee and Winnebago. One result of the workshop, according to LPTC President Ann Downes, is that

NSF recently notified LPTC that its grant for an internet connection of about \$800,000 will be funded. LPTC also received a DoD grant, a 10-year re-accreditation from the North Central Association, and has collaborated with NASA at UNO and CALMIT (Center for Advanced Land Management Information Technologies) at UNL to develop Native IMAGE (Institute for Managing Applications in Geospatial Extension). The Institute will be headed by Dr. Henry Lehrer and include a USDA-funded extension agent and other technical personnel. Native IMAGE will provide the Winnebago community and LPTC with extensive geospatial data to utilize for both educational and commercial purposes.

Color infrared image of the Missouri River near the Santee Sioux Reservation in Nebraska



Other Program News

Department of Defense (DEPSCoR)

Several changes occurred in the DEPSCoR program at the national level. To accommodate efforts to develop infrastructure, size of grants increased from the \$300,000 range to a minimum of \$500,000. The total number of DEPSCoR grants made in 2002 was 54 (Nebraska received 3 as reported last year) and 31 in 2003 of which only one grant came to Nebraska. This grant was to Dr. Larry Harshman (UNL, BioSci) for a project entitled “Identification of Genes and Proteins that Regulate Stress Resistance.”

DOE EPSCoR

Dr. Mat Varma (Program Director, DOE EPSCoR) and a review team conducted a site visit and review of Nebraska’s DOE EPSCoR project. This project, focusing on carbon sequestration and global climate change involving 14 scientists and 3 departments at UNL, is led by Dr. Shashi Verma. DOE EPSCoR extended support for the project for three years (\$1.99 million) with a slightly expanded scope. In addition to new efforts in data archiving, additional field measurements and an international conference, a new component will examine the genomics of nitrous oxide flux in microbial communities and its relationship to field scale measurements of greenhouse gas flux, carbon sequestration, and crop productivity.

NASA EPSCoR

Nebraska’s NASA EPSCoR program is directed by Dr. Brent Bowen, through the UNO Aviation Institute in collaboration with the Nebraska Space Grant Consortium (NSGC). A new workforce development grant allowed the creation of the Nebraska Geospatial Extension Program (NEGEP) as part of a new national initiative of NASA. NEGEP provides technology transfer and commercialization of geospatial data and systems. As part of this initiative, Native IMAGE was established at Little Priest Tribal College on the Winnebago Reservation (see related article on p. 6). NSGC and EPSCoR co-sponsored the 2003 National Engineer’s Week Future City Competition for 7th and 8th grade students, won this year by three students from Mission Middle School, Bellevue, NE. NSGC and EPSCoR also sponsored the Aeronautics and Space Science section of the Nebraska Academy of Sciences meeting. The NASA-EPSCoR research program continued focusing on (1) small aircraft transportation systems, (2) airborne remote sensing for agricultural research and commercialization, and (3) validated numerical models for convective extinction of fuel droplets.

Nebraska EPSCoR: Change in Leadership

Royce Ballinger will retire after 10 years of service as Director of Nebraska EPSCoR. The state EPSCoR Committee has appointed Dr. Fred Choobineh to assume the position as of January 1, 2004. Dr. Choobineh has served as NSF EPSCoR Co-project Director and Assistant Director of Nebraska EPSCoR for the past three years. He is a Professor of Industrial Management and Systems Engineering at the University of Nebraska-Lincoln. The state Committee extends its appreciation to Dr. Ballinger for his efforts over the past decade.



Lyle Middendorf, Royce Ballinger, Fae Korsmo and Karen Sanderg of NSF and Fred Choobineh

State EPSCoR Committee Members

Dr. Robert Allington, Chair, *CEO and Chairman, ISCO, Inc., Lincoln*

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

Dr. Dennis Alexander, *Director, Center for Electro-Optics and Kingery College Professor of Electrical Engineering, UNL*

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

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

Dr. F. Joseph Daugherty, *Management Consultant, Omaha*

Dr. Derek Hodgson, *Vice Chancellor for Academic Affairs, UNO*

Mr. Lyle Middendorf, *Vice President of Research & Development, LI-COR, Inc., Lincoln*

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, UNL*

Mr. Herman Person, *Director, Corporate Product Development, Vishay Dale, retired, Columbus*

Senator Ron Raikes, *State Senator, State of Nebraska*

Dr. David Sellmyer, *Director, Center for Materials Research & Analysis and George Holmes Distinguished Professor, Physics & Astronomy, UNL*

Dr. James Van Etten, *William Allington Distinguished Professor of Plant Pathology, UNL*

Mr. Al Wenstrand, *Director, Nebraska Department of Economic Development*

Dr. Roy Wilson, *Vice President for Health Sciences, Creighton University*

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

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Ms. Karla Roth, *Administrative Assistant*

Ms. Nancy Simnitt, *Administrative Technician*

