

FOCUS



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SPECIAL INITIATIVES FOCUS ON COMPOSITES, FIBER OPTICS, NANOSCIENCE

Kansas NSF EPSCoR funded three new Special Initiatives for a total of \$404,181 in 2001. Projects include: the purchase of a field-emission scanning electron microscope to enhance research capability in nanoscience in Kansas; research that may offer significant advancements in the mechanics of textile composite materials; and research that may utilize buried fiber optic cables to measure crustal deformation of the earth.

Kansas NSF EPSCoR Special Initiatives Awards provide capital to enhance on-going research projects that have the potential to attract large amounts of non-EPSCoR funding.

In evaluating proposals, reviewers look for projects that encourage collaboration between institutions and investigators, strengthen linkages with industry in science and technology areas critical to technology development in Kansas, develop large-scale cooperative projects focused on areas that interest major NSF or other agency grants, and promote linkages of Kansas institutions with other institutions on a regional or national level to research new technologies.

Eleven proposals requesting total of \$1,645,679 were submitted representing engineering and computer science, biological sciences, physics, geology, and geography.

Awards were made to:

Project Title: Acquisition of a Field Emission Scanning Electron Microscope.

Investigators: Judy Wu, Assoc. Professor, KU Physics and Astronomy; Robert Dunn, Asst. Professor, KU Chemistry; Susan Staggs-Williams, Asst. Professor, KU Chemical and Petroleum Engineering; Robert Goldstein, Professor, KU Geology; and William Dentler, Professor, KU Molecular Biosciences.

Focus: The field-emission scanning electron microscope is a powerful tool that allows sample characterization at nanoscales. Nanoscience is one of the most important new research areas that could lead to revolu-



JUDY WU, ASSOC. PROF.,
KU PHYSICS AND
ASTRONOMY

tion in almost every discipline of science and technology in the new century. Researchers intend to purchase the microscope to bring research capability in nanoscience at KU to a nationally competitive level.

The microscope will enable researchers to see and capture digital images of objects at the nanoscale. Examples of new research may include: design of new porous materials; development of etching processes for submicron semiconductor devices; and mapping tiny growth zones in crystals.

Project Title: Mechanical Performance and Quantitative Nondestructive Evaluation of Textile Composites.

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FIRST AWARDS: JUMP START NEW RESEARCH

The First Awards competition in October 2000 funded 13 proposals for a total of \$513,196, and five mini awards totaling \$19,984. Proposals for the next First Awards competition are due October 15, 2001.

To encourage faculty to prepare and submit proposals to the National Science Foundation early in their careers, Kansas NSF EPSCoR created the First Award Program. Each October, beginning faculty can submit their proposals and compete for First Awards of up to \$50,000. The First Awards are used to jump-start research projects by purchasing supplies and equipment, or to pay the salaries of graduate and undergraduate students who

work in the lab or field.

In October 2000, Kansas NSF EPSCoR received 36 First Award proposals requesting more than \$1.6 million in funding.

First Awards were made to:

-  Kyle Camarda, KU Chemical and Petroleum Engineering, for Optimization Techniques for the Design of Novel Molecules;
-  Jason Ferguson, WSU Physics, for Low Temperature Opacities: Astrophysical Research & Curriculum Development;
-  Kenneth Fischer, KU Mechanical Engineering, for Upper Extremity Modeling to Characterize the Function of Passive Tissues;
-  Karen Garrett, KSU Plant Pathology, for Effects of Environmental Variation on Plant Disease in the Tallgrass Prairie;
-  Ari Jumpponen, KSU Biology, for Niche Separation Among Ectomycorrhizal Fungi;
-  Shuting Lei, KSU Industrial and Manufacturing Systems Engineering for Crack-free Laser Assisted

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FROM THE DIRECTOR

Dear Colleagues:

I am pleased to report that the Phase IV (2002-2005) NSF EPSCoR proposal designed to improve and stimulate university-based science and technology infrastructure and research competitiveness was submitted to the National Science Foundation on July 13; and I'll be even happier to report sometime in the fall that our proposal was successful. I am especially appreciative to the Kansas NSF EPSCoR staff of Barbara Paschke, Patricia Schmidt, and Doug Byers who worked diligently to assemble and transmit the Kansas proposal, and to the research offices at KU, KSU and WSU for their outstanding assistance. Kansas is indeed fortunate in having KTEC as our partner in assisting in the development of the scientific expertise in the state.

Despite substantial increases in total R&D expenditures and increases in total dollar awards at the three Kansas research universities through 1999, these measures still indicated that Kansas institutions lag peer institutions and remain below the national average. Nevertheless, an analysis of both strengths and continuing challenges clearly indicates that faculty productivity in Kansas has increased since the first Kansas NSF EPSCoR award in 1992. The program has made a major impact on strengthening research by assisting in developing infrastructure, leveraging resources in areas of demonstrated capacity, stimulating cross-disciplinary partnerships, identifying new areas of opportunity, and expanding the human resource base in science knowledge.

The Phase IV proposal will continue to implement a series of integrated and complementary strategies designed to increase extramural funding to state researchers and includes competitions for First Awards, New Initiatives, Faculty Start-Up, Multi-User Equipment, Planning and Workshop, and Research



THOMAS N. TAYLOR,
PROJECT DIRECTOR

Advancement grants. An RFP announcing these programs will be issued soon, including submission deadlines.

Increasing the research capacity in Kansas remains a major challenge to all of us.

KANSAS RESEARCHERS EVALUATE DEVELOPING NSF CENTERS

Although campuses generally are deserted during Spring Break, a small group of faculty researchers gathered in the KU Computer Center Auditorium on March 23, 2001 to participate in the NSF EPSCoR Outreach Conference on "Developing National Science Foundation Centers."

A few years ago, faculty interested in learning more about research centers might have traveled to Lexington, KY to attend this event, which was co-sponsored by the Kentucky NSF EPSCoR and the NSF. Today, faculty can participate using the Access Grid, a suite of experimental hardware and software programs, and other resources to support distributed meetings, collaborative work sessions, seminars, lectures and training over the Internet.

For Kansas participants the experience is like watching a very large, multi-screen television where each site can see and hear all of the other sites that are connected to the event. Program directors from the NSF directorates of Engineering, Biological Sciences, Education and Human Resources, and Mathematical and Physical Sciences described the various NSF Centers programs for audiences in several remote locations, including Kansas, and researchers were able to ask the speakers questions after each presentation.

NSF sponsors more than 20 centers programs including Materials Research Science and Engineering Centers, Science and Technology Centers, Engineering Research Centers, Plant Genome Virtual Centers, and Science Learning Centers.

Kansas' access to this event was organized by Kansas NSF EPSCoR and Professor Kenneth Bishop, KU Chemical and Petroleum Engineering. Slides from the conference are available at <http://www.nsfepscor.ukans.edu/> More information about the Access Grid is available at <http://www.accessgrid.org/>

STATEWIDE EPSCoR MEETING, OCTOBER 9

The 2001 Kansas Statewide EPSCoR Conference is scheduled for Tuesday, October 9. The one-day meeting will be held in Lawrence at the University of Kansas Union. More information will be available in September and forwarded to program participants.

EPSCoR ENCOURAGES ATTENDANCE AT SBIR CONFERENCE

Kansas NSF EPSCoR partnered with the Kansas Technology Enterprise Corporation (KTEC) in February 2001 to organize a competition and select winners to attend the National Small Business Innovation Research (SBIR) Conference in Tulsa, OK.

Five applicants from the small business community each received registration waivers and travel vouchers worth \$300 from the NSF EPSCoR to attend the event.

Representing Kansas were: John Callison, Magic Lantern, LLC; William Anemaat of DAR Corporation, Greg Karr, Kansas Advanced Technologies, Inc.; Soma Chakrabarti, BioComp Systems; and Bob Reader, Mid-America Commercialization Corporation.

Applicants were required to write brief statements explaining why their business and the State of Kansas would benefit from their attendance at the SBIR conference.

The NSF SBIR program hopes to promote technological innovation in the private sector. More information is available at the website, <http://www.eng.nsf.gov/sbir>

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NEWSLETTER EDITOR: JANIE RUTHERFORD NEWSLETTER DESIGN: THE DESIGN ELEMENT, INC./BONNIE HALL

STATEHOUSE EXHIBIT ATTRACTS LEGISLATORS' ATTENTION



KSU PROFESSOR AND STUDENTS VISITED WITH SEN. LANA OLEEN (R-MANHATTAN). PICTURED LEFT TO RIGHT: PROFESSOR TIM BOLTON, MANHATTAN; ZACK CASEY, BONNER SPRINGS; SEN. OLEEN; CHRIS WYANT, MULVANE; AND JAGAT SHAKYA, MANHATTAN.

On February 6, Kansas lawmakers had a chance to see how the Kansas EPSCoR programs invest Economic Development Initiatives Fund (EDIF) monies that they receive from the State.

More than a dozen EPSCoR research and development projects were exhibited. Lawmakers were invited to view the exhibits and to discuss projects with faculty and student researchers.

The National Science Foundation (NSF) created EPSCoR, the Experimental Program to Stimulate Competitive Research, to increase the competitiveness of states that traditionally were not recipients of significant amounts of federal research and development funding. Kansas joined NSF EPSCoR in 1992 and now belongs to similar programs at the National Aeronautics and Space Administration (NASA), the Department of Defense (DoD) the Department of Energy

(DoE), and the Environmental Protection Agency (EPA).

Kansas' EDIF monies provide the state matching funds required to compete for funds from the federal agency EPSCoR programs.



WSU PROFESSOR DAVID ALEXANDER DISCUSSED NASA EPSCoR PROJECT "LOW TEMPERATURE ASTROPHYSICS" WITH SEN. PAUL FELECIAO (D-WICHITA).

"EPSCoR is one of the state's best investments," said Thomas N. Taylor, Kansas NSF EPSCoR Project Director. "For every dollar the state invests, the EPSCoR programs immediately return at least one dollar in federal funds. Longer term, some projects realize more than a five-fold return on investment."

The statehouse exhibits included projects headed by faculty at the University of

Kansas, Kansas State University, and Wichita State University. The work involves undergraduate and graduate students from all regions of the state, including Sabetha, Lawrence, Manhattan, Mulvane, Bonner Springs, Merriam, Gypsum, Wichita, Dodge City, Savonburg, Paradise, Salina, and Westwood.

According to Taylor, "EPSCoR enables students to participate in leading edge research, work on the latest equipment, and practice what they learn in the classroom. These expe-

riences improve the quality of their education and enhance their opportunities for future employment."

The exhibits covered a wide range of projects, including:

NSF-EPSCoR—Development of Room Temperature Semiconductor Lasers for Chemical Sensing; An Approach to New Broad Spectrum Antibiotics; and Advanced Manufacturing Center.

DoD EPSCoR—Integrated Design and Analysis Tools for Reduced Weight, Affordable Fiber Steeled Composites; Characterization of Thin Sol-Gel Films.

DoE EPSCoR—Kansas Advanced Semiconductor Research.

EPA EPSCoR—Atrazine in the Hillsdale Reservoir Basin.

NASA EPSCoR—Low Temperature Astrophysics; HYSPIRE: Remote Sensing of Kansas Rural Environments; and Genetic Control of Pulmonary Immunity.



THE DEPARTMENT OF DEFENSE EPSCoR PROJECT "INTEGRATED DESIGN AND ANALYSIS TOOLS FOR REDUCED WEIGHT, AFFORDABLE FIBER STEELED COMPOSITES" WAS EXPLAINED TO REP. BARBARA BALLARD (D-LAWRENCE) BY KU STUDENT KURT SCHUELER, ALSO OF LAWRENCE.

GLORIA TIMMER: FRIEND TO KANSAS EPSCoR

The Kansas EPSCoR community lost one of its greatest friends on October 11, 2000. Gloria Timmer, former budget director for the State of Kansas, died following a long illness. Ms. Timmer was instrumental in establishing and maintaining the State's matching funds for the Kansas EPSCoR programs.

**FIRST AWARD PROPOSAL
DEADLINE 5 P.M.,
OCTOBER 15, 2001**

SPECIAL INITIATIVES FOCUS ON COMPOSITES, FIBER OPTICS, NANOSCIENCE

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Investigators: Richard D. Hale, Asst. Professor, KU Dept. of Aerospace Engineering; Guillermo Ramirez, Asst. Professor, KU Dept. of Civil and Environmental Engineering; and Youqi Wang, Assoc. Professor, KSU Dept. of Mechanical and Nuclear Engineering.

Focus: The proposed research capitalizes on 3-D textile composite expertise within and outside of Kansas, by establishing an integrated project team focused on design, modeling, fabrication, inspection, experimental characterization and multidisciplinary applications of textile composites.

An existing Kansas product team will partner with a preeminent textile manufacturer to explore and develop the mechanical behavior

of textile composites. Additional analysis and optimization routines will be explored for accuracy in predicting the mechanical response of textile composites.

Research topics will be used to educate structural engineers in Aerospace, Civil and Mechanical Engineering disciplines. The research activities allow students to consider design, analysis, manufacturing, quantitative NDE and mechanical testing. Results from research in this area will provide a fundamental understanding of the mechanical performance of textile composites, opening the door to novel structural concepts in aerospace, civil, mechanical and commercial applications.

Project Title: Low Coherent, High Resolution WDM Reflectometry for Fiber Length Measurement.

Investigators: Rongqing Hui, Asst. Professor, KU Dept. of Electrical Engineering and Computer Science; Christopher Allen, Assoc. Professor, KU Dept. of Electrical Engineering and Computer Science; and Stephen Gao, Asst. Professor, KSU Dept. of Geology.

Focus: The proposed research will improve the precision and reliability of measurements of crustal deformation using buried fiber optic cables. The measurement of the Earth's crust is critical to earthquake prediction and understanding other geologic processes. Environmental factors such as weather complicate the measurement of various physical changes, and it's thought that fiber optic cable and lightwaves maybe useful in evaluating changes.

FIRST AWARDS: JUMP START NEW RESEARCH

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Machining of Ceramics with Complex Profiles;

 Robert Peterman, KSU Civil Engineering, for Restraint Moment Elimination Strategies for Improved Durability of Continuous Prestressed Concrete Bridges;

 Christopher Pinner, KSU Mathematics, for Inhomogeneous Diophantine Approximation and Polynomial Problems;

 Christopher Rogers, WSU Biology, for An Experimental Test of Competing

Models of Adaptive Fat Regulation in Small Birds;

 Ernst Schonbrunn, KU Medicinal Chemistry, for The Induced-Fit Mechanism in Enolpyruvyl Transferases;

 Steve Warren, KSU Electrical and Computer Engineering, for Beyond Telemedicine: Realizing a Proactive Home Health Care Delivery Model through Research and Education in Plug and Play Components and Novel Sensors;

 Lawrence Whitman, WSU Industrial and Manufacturing Engineering, for

Methodology to Enable Pervasive Enterprise Models;

 Hongguo Xu, KU Mathematics for Numerical Methods for Algebraically Structured Eigenvalue Problems.

Mini Awards were made to:
Tatsuji Ebihara, KU Civil and Environmental Engineering; Adolpho Matamoros, KU Civil and Environmental Engineering; Jeffrey Olafsen, KU Physics and Astronomy; Mark Schneegurt, WSU Biological Sciences; and David Steward, KSU Civil Engineering.

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