

FOCUS



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NAS PRESIDENT LOOKS AT REINVENTING SCIENCE EDUCATION

Reinventing Science Education:

Why An Ability to Think Like

A Scientist will be Important for

All Americans In the New Century

Understanding the world... predicting the future... managing dramatic advancements every day for great human benefit...each of these are phrases that should inspire both the students of science and the teachers of science, according to Bruce Alberts, President of the National Academy of Sciences as he addressed the Statewide EPSCoR Conference in Manhattan on April 26.

“Science is a special way of knowing, and it becomes a more and more vital and exciting area to work in every day,” he added.

For more than 100 years, the Academy has served as a bridge between the government and its people by providing a wide range of studies and reports that document changes in the world. During the last few years, the Academy has focused on the National Science Education Standards and developed a framework for curriculum development.

It’s their assessment that science is for everyone and should be a core class in every year. Science teaches problem solving and thinking skills, and takes a student’s innate curiosity and maintains it through the years.

Alberts is quick to note that the problem arises in elementary school where most teachers do not know how to teach science. Consequently, the Academy has developed a series of studies and resources that helps educators learn how better to teach. The resources include: “Starting Out Right,” “How People Learn, Improving Student



BRUCE ALBERTS
PRESIDENT, NATIONAL
ACADEMY OF SCIENCES

Learning,” and “Brain, Mind, Experience, and Schools.” These publications are among the 1,700 publications available at the Academy’s website: www.nas.edu.

Alberts is a respected biochemist

recognized for his work in both biochemistry and molecular biology. His commitment to the improvement of science education includes serving on the advisory board of the National Science Resources Center—a joint project of the National Academy of Sciences and the Smithsonian Institution working with teachers, scientists, and school systems to improve the teaching of science. Alberts is known for his involvement in innovative projects such as City Science, a science teaching program in San Francisco schools.

KANSAS NSF EPSCoR FIRST AWARDS JUMP START CAREERS

Designed to help faculty begin research programs early in their careers, First Awards may be given to those who have never served as a Principal Investigator on a federal agency research grant. Grants are awarded in amounts up to \$50,000.

Between 1995 when the program was established and 1999, 44 faculty have been funded for a total of \$1.66 million. As a result of the First Awards Program, these faculty have garnered more than \$21.2 million in external grant awards and are now competitive in other NSF programs.

Following are awards made to date in 2000.

WICHITA STATE UNIVERSITY



Wan Yang, geology, studies limestones and shales of the Oread cycle in eastern Kansas. Resulting data will expand information regarding interactions among the earth’s geologic and climactic processes.

UNIVERSITY OF KANSAS



Yaozhong Hu, mathematics, studies the application of probability theory to various fields such as finance and engineering.



Susan Stagg-Williams, chemical and petroleum engineering, examines the production of synthesis gas in an attempt to develop processes which are more economical, efficient, and environmentally beneficial.



Linda Olafsen, physics and astronomy, looks at the fundamental physical properties of layered, antimonide-based semiconductor materials, specifically for use in pollution monitoring.



Bruce Lieberman, geology, studies the long-term ecological and evolutionary impact of modern invasive species. This may help quantify and predict the long-term envi-

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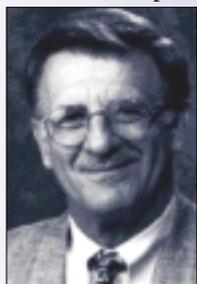
FROM THE DIRECTOR

Dear Colleagues:

As many of you know, Ted Kuwana has served as the Project Director of Kansas NSF EPSCoR since its inception in 1991. During this time, he has skillfully guided the program to the excellent status that it enjoys today. After a short stint as Associate Director, I became Project Director in February of this year. The transition has been smooth with no interruption in our service despite moving the program office from Youngberg Hall to Strong Hall.

EPSCoR was created by Congress in 1980 to increase the competitive research base, build a strong scientific infrastructure, and improve the technology enterprise in those states receiving only a small fraction of the annual federal R&D investment. Each dollar from NSF is provided on a competitive peer- or merit-reviewed basis and requires a matching state or private dollar. We are fortunate to have the Kansas Technology Enterprise Corporation (KTEC) as our state partner in EPSCoR. From 1995 through 1999, Kansas NSF EPSCoR, through its First Award program, awarded \$1.66 million to 44 junior faculty to enhance their research competitiveness. Using these funds, Kansas researchers have obtained more than \$21.2 million in additional external funding.

We are currently in Year 2 of our Phase III Cooperative Agreement with the NSF, and our request for competitive proposals calls for First Awards, Special Initiative Awards, and Planning Awards. More information about these proposals appears in this newsletter. Sometime this fall, we will solicit new proposals that will begin the development of our next cooperative agreement with the NSF and carry Kansas NSF EPSCoR from 2002-2005. Your assistance in this process is critical if Kansas researchers are to continue to develop the scientific enterprise and leadership that is fundamental to the technological and economic development in the state. I look forward to working with you in the months and years ahead.



THOMAS N. TAYLOR,
PROJECT DIRECTOR

FUNDING OPPORTUNITIES COME IN THREE TYPES AND SIZES

Opportunities to help tenure track faculty at Kansas State University, Wichita State University, and the University of Kansas become more competitive for research funding come in three types and sizes from Kansas NSF EPSCoR this year.

PLANNING AWARDS

Activities that lead to the development of a multi-disciplinary and/or multi-investigator proposal, or a proposal in response to a major National Science Foundation initiative are eligible for Planning Awards in the amount of \$2,000 to \$10,000. Examples include planning workshops, consultant fees, visits to federal laboratories, and technical assistance. Submissions for Planning Award proposals may be made at any time through January 1, 2001.

FIRST AWARDS

Designed to help faculty begin research programs early in their careers, First Awards are due by October 16, 2000. A faculty member who has never served as a Principal Investigator on a federal agency research grant may receive up to \$50,000.

According to Thomas N. Taylor, Kansas

Project Director, "First Awards help faculty members become competitive early in their careers by encouraging them to write proposals and by providing the resources to begin building research programs. Additional assistance in the lab, a few more supplies, or a piece of equipment can make a difference to new faculty. Many previous First Awardees now have major funding from the NSF."

SPECIAL INITIATIVE AWARDS

To provide "venture capital" to start or enhance research projects likely to attract long-term support, members of the graduate faculty and academic administrators may apply for Special Initiative Awards in the \$100,000 to \$200,000 range.

Key characteristics may include: unique linkages with industry in science and technology areas strategic to the state; unusually large, cooperative projects; multi-investigators in the research; and/or Kansas universities working with other institutions on a regional or national basis. Proposals are due September 5, 2000.

The Request for Proposals describing these funding opportunities is available at <<http://www.nsfepscor.ukans.edu>>.

OFFICE LOCATION AND STAFF CHANGES

The Kansas NSF EPSCoR office and staff underwent changes this year that you may want to note.

In May, the NSF EPSCoR office moved back to the University of Kansas' main campus at 222 Strong Hall, 1450 Jayhawk Boulevard. The phone and fax numbers remain the same. The e-mail address is nsfepscor@kucr.ukans.edu and the URL is <<http://www.nsfepscor.ukans.edu>>.

Staff changes occurred as well.

Thomas N. Taylor, Professor and Chair of the Department of Ecology and Evolutionary Biology, took over leadership of the program on February 1. Ted Kuwana, who served as Project Director since its establishment in 1991, now serves as a Special Advisor to the Vice Chancellor for Research at the University of Kansas.

Barbara Paschke was promoted to Assistant Director on July 1.

Doug Byers assumed the duties of Budget and Accounts Administrator on August 1.

In addition, EPSCoR's key contact at the Kansas Technology Enterprise Corporation (KTEC) changed. Mike Wojcicki moved out of state in April, and was replaced in June by Beth Brough, as Vice President of Research. Brough has more than 20 years business consulting experience and most recently served as Investment Manager for KTEC's Applied Research Matching Program.

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THREE-STATE CEREALS RESEARCH CONSORTIUM FOCUSED ON PRODUCTIVITY AND PROFITABILITY



GRADUATE STUDENT IN PLANT PATHOLOGY PREPARES PLANT DNA SAMPLES FOR ANALYZING BY DNA SEQUENCER. THE SEQUENCER IS AVAILABLE FOR LABORATORY USE THANKS TO THE KANSAS WHEAT COMMISSION.

Researchers from the largest grain-producing states in the country have joined hands this year to create the Great Plains Cereals Biotechnology Consortium (GPCBC). It isn't surprising that Kansas, Nebraska and Oklahoma are collaborating on the effort, and it isn't surprising that the National Science Foundation has funded the consortium with \$750,000.

Professor Robert Zeigler, principal investigator on the project, explained that the consortium combines a wealth of resources that go beyond what any one institution could bring together. The project aims to be cost-effective and cover a broader research domain in greater depth. Members each have specific expertise to contribute, but the overriding goal is to understand the molecular basis of cereals and their reaction to biotic and abiotic stresses. With this understanding, researchers hope to manipulate the defense and disease mechanisms, improving not only productivity but also profitability.

The two-year NSF EPSCoR grant is basically start-up funding to allow the group to become more competitive with national funding bodies, and to begin

Oklahoma. The universities are committed to \$311,486 in matching funds.

The consortium will develop a common research agenda, share information, and eventually create a shared graduate education program. Zeigler noted that outstanding graduate study programs in cereal grains currently are found at Cornell, Washington University, University of Illinois, North Carolina State and Texas A&M. With the GPCBC in place, the Plains States will offer programs of equal or superior caliber.



DR. ROBERT ZEIGLER, PRINCIPAL INVESTIGATOR ON THE GPCBC, EXAMINES ONE OF HUNDREDS OF CORN SEEDLINGS BEING STUDIED IN THE PLANT PATHOLOGY LABORATORY.

In September, the consortium will acknowledge its first year of progress with a symposium in Kansas City featuring presentations by individuals representing the National Academy of Sciences, the cereal grain industry, and academia. Over 50 participants from the consortium are expected at the meeting.

For more than two decades, Zeigler has worked in cereals research, including seven years with the International Rice Research Institute in the Philippines. He returned to the US and Kansas 18 months ago to serve as head of KSU's Department of Plant Pathology, and Director of the Plant

showing research results. Proposals seeking on-going funding have been submitted to a number of sources including the USDA and NSF.

The Noble Foundation, a philanthropy dedicated to plant science and agricultural programs of Ardmore, OK, is a partner in the project just as the land grant institutions of Kansas, Nebraska and

Biotechnology Center. The proposal to fund the GPCBC was already in its early stages when Zeigler arrived on the K-State campus. Notification of the award came in June 1999 and the effort was underway by August 1999.

Zeigler said he will consider the GPCBC a success if the group: establishes a shared graduate education program that provides a superior education in cereal production, genetics and molecular biology; creates disease and insect resistant strains of wheat, maize and sorghum; and eliminates barriers to institutional collaboration.

**BETWEEN 1992 AND 1996,
THE NSF EPSCOR INVESTMENT
IN KANSAS HAS LEVERAGED
MORE THAN A FIVE-FOLD
RETURN IN AWARDS.**

KANSAS NSF EPSCOR FIRST AWARDS JUMP START CAREERS

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ronmental effects of the biodiversity crisis and its impact on agriculture and other sectors of the economy.

KANSAS STATE UNIVERSITY

 Xiaoyan Tang, plant pathology, examines how plants recognize invading diseases and physically begin the process of disease resistance.

 Scott Todd, biology, studies how novel genes in the tetraspanin family help communicate environmental information to the cell.

 Jyoti Shah, biology, studies a new, environmentally sound, and economically feasible alternative to combat plant diseases.

 Lauren Ritterbush, sociology, anthropology and social work, researches a new approach to cultural developments, interaction and mobility in the Central Plains region during the Late Prehistoric period (ca. AD 1000-1500).

 Stephen Gao, geology, examines seismic conditions across northeast Kansas, with emphasis on earthquakes.

CO-FUNDING INITIATIVE PRIORITIZES PROPOSALS FROM “FIRST-TIME” INVESTIGATORS

In 1997, NSF piloted a new initiative designed to move researchers from EPSCoR states into the mainstream of federal research support. This Co-Funding Initiative is an internal mechanism allowing the NSF EPSCoR Office and other NSF research directorates to jointly fund a proposal from an EPSCoR state. By increasing the pool of money available to make awards, co-funding enables an NSF Program Officer to fund more proposals from researchers in EPSCoR states.

NSF EPSCoR gives co-funding priority to proposals from “first-time” investigators. Although proposals from individual investigators who have received significant amounts of research support from the NSF are not a priority, the NSF will con-

sider their proposals if the award is likely to result in broad institutional improvements.

In addition to the NSF’s priorities, each EPSCoR state has priority areas for co-funding. In Kansas, these are telecommunications and high performance computing; materials and chemical sciences; biological sciences; physics and astronomy; and engineering, design and computations especially research related to aviation.

Members of interdisciplinary research clusters developed through EPSCoR also have priority.

For the NSF to co-fund a proposal, the state must complete a process called “Certification for Co-Funding.” After the Principal Investigator writes the proposal,

the proposal preparation staff will forward the proposal to the Kansas NSF EPSCoR Project Director for review. If the director certifies the proposal, the Kansas NSF EPSCoR staff will send the certification to the NSF via FASTLANE.

While certification may make a proposal eligible for co-funding, it does not guarantee it. A certified proposal, like all NSF proposals, will receive merit review. Depending on the outcome of the review, the proposal may be funded entirely by a directorate, co-funded with NSF EPSCoR, or declined. Co-funding enables a program to fund a proposal that reviewed well but just missed the funding cutoff.

To date, Kansas NSF EPSCoR has certified 254 proposals.

KU CONFERENCE EXAMINES ACCESS GRID, THE NEW INFORMATION INFRASTRUCTURE

If you think of it as a virtual network that connects some of the world’s most powerful computers in distant locations, you may come close to understanding Access Grid, the prototype of the 21st century’s information infrastructure.

The Access Grid and its benefits for science, business, education and government were the main features of the Chautauqua Conference hosted at the University of Kansas August 1-3. The Alliance Chautauqua is a series of conferences organized by the

National Computational Science Alliance.

The KU conference was the fifth in a two-year series of conferences that are designed to introduce new audiences to the Access Grid, which features high speed capabilities linking powerful computers and bringing researchers in distant locations together into virtual workspaces. At the cutting edge in developing digital communication and collaboration techniques, the Alliance shares these developments with university researchers and educators to stimulate growth of a national

digital research community.

The Lawrence site was linked for interactive participation with the Alliance Center for Collaboration, Education, Science and Software in Arlington, VA; the Argonne National Laboratory in Illinois; the Maui High Performance Computing Center in Hawaii; and universities in the states of Massachusetts, Kentucky, Georgia, Illinois, and New Mexico.

The University of Kansas, the National Computational Science Alliance and Kansas NSF EPSCoR were sponsors of the event.



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