FOCUS

KANSAS EPSCOR NSF PARTNERS IN SCIENCE & TECHNOLOGY

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KEGA Poised to Change Economic Landscape

State Representative Kenny Wilk (R-Lansing) noted his special affection for EPSCoR and the "unique role that scientists will play" in the expansion of the bioscience industry in Kansas.

State Senator Nick Jordan (R-Shawnee) reported that economic development "has always been a heartbeat of mine" as he described the Kansas Economic Growth Act.

The Kansas Legislature took a bold step in passing HB2647 during the 2004 Legislative Session. HB2647 is the Kansas Economic Growth Act (KEGA) and all indicators point to a ten-year economic development vision that will reap great dividends for the State of Kansas.

State Senator Nick Jordan (R-Shawnee) and State Representative Kenny Wilk (R-Lansing) presented the opening session of the 2004 Kansas Statewide EPSCoR Conference, Sept. 8 in Manhattan at the KSU Alumni Center to nearly 170 participants. They reminded the audience that key to KEGA's success is Kansas' universities, scientists, and researchers.

KEGA is a complex and integrated package of economic development initiatives focused on adding a fourth leg to the traditional underpinnings of the Kansas economy. The fourth leg will be the development of a biosciences industry to work along with Kansas' traditional agriculture, oil and gas

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Fall 2004, New Requests for Proposals

Kansas NSF EPSCoR is pleased to announce two requests for proposals. Many early career faculty at KSU, KU and WSU are eligible to apply for First Awards that invest in new faculty research and pave the way for expanded funding by NSF.

The First Award program requires faculty to submit a proposal to the NSF, improves the quality of the proposal and accelerates the pace of research. Funding can provide supplies, equipment, research assistants, postdoctoral fellows and other items that strengthen the research objectives.

For this round of First Awards, a letter of intent was due in the EPSCoR Office by Friday, October 8th, and full proposals are due December 2nd.

Proposal Planning Workshops are intended to assist faculty in the development of large, collaborative, interdisciplinary proposals to NSF. Faculty at KSU, KU, and WSU may submit proposals through December 10th for planning meeting and workshop grants in amounts up to $15,000.

The requests for proposals are available at the Kansas NSF EPSCoR website: http://www.nsfepscor.ku.edu

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From the Director

Dear Colleagues:

Kansas NSF EPSCoR (KNE) is making a real difference in building and shaping the research infrastructure in the state. Articles in this newsletter point to the extraordinary progress Kansas researchers are making at various levels of inquiry. The recent Statewide EPSCoR Conference received an enthusiastic response from NSF EPSCoR in Washington as have the annual reviews of the ecological genomics and lipidomics projects. We continue a successful partnership with KTEC, and the increasing collaboration among researchers is leading to new approaches that put Kansas at the cutting edge of many disciplines.

I have served as KNE Director since 2000. During this time I have viewed the program in context with other state EPSCoR programs, and although just slightly biased, I see a strong program and nothing but success for the Kansas research community in the future. In July 2005, Kansas will submit the next Research Infrastructure Improvement (RII) proposal to NSF, so now is the appropriate time for me to pass the program to someone who will plan and submit the next proposal. I am delighted that Kristin Bowman-James, Professor of Chemistry at the University of Kansas, has agreed to serve as Director beginning January 1, 2005. Kristin has a wealth of experience with NSF and the appropriate background and administrative talent to lead the next RII award.

KNE works because the research enterprise in Kansas is collaborative, focused, and committed to increasing research competitiveness at all levels. I have enjoyed working with all of you to expand the research agenda in Kansas, and know that you will cooperate with Kristin in the months and years ahead. Barbara Paschke, Pat Schmidt and Doug Byers will continue to provide the same high level of professional support that has been a hallmark of our program. KNE has stimulated competitive success in the Kansas research community, and it will continue to play that role in the future.

Thomas N. Taylor,
Project Director

Ecological Genomics Symposium Attracts Researchers

The emerging links between ecology and genes continue to attract attention in the scientific community prompting Kansas NSF EPSCoR and the Kansas Technology Enterprise Corporation to sponsor the second *Genes in Ecology, Ecology in Genes* symposium.

Held on October 2-3, 2004, at the Corporate Woods Doubletree Hotel in Overland Park, the meeting's agenda featured lectures by scientists on the leading edge of ecological and evolutionary functional genomics and poster presentations on Kansas ecological genomics projects.

Keynote speakers:

Joy Bergelson, University of Chicago, "The evolution of disease resistance in *Arabidopsis*"
Hopi Hoekstra, University of California-San Diego, "Genetic architecture of adaptive coloration in beach mice"
Robert B. Jackson, Duke University, "Ecological genomics and ecosystems"
Michael Lynch, Indiana University, "The origins of genome complexity"
Allison E. Murray, Desert Research Institute, "Microbial genomics goes to the environment—where some like it hot, and others like it cold"
Michael Purugganan, North Carolina State University, "Ecological genomics of *Arabidopsis* flowers"
W. Kelley Thomas, Hubbard Center for Genome Studies, University of New Hampshire, "*Daphnia:* An emerging model system for ecological and evolutionary genomics"
Thomas G. Whitham, Merriam-Powell Center for Environmental Research, Northern Arizona University, "Community and ecosystem genetics: A consequence of the extended phenotype"

More than 115 people attended this year's event. The first symposium, held in 2003, attracted more than 100 researchers from three states and was termed "a tremendous opportunity for scientists, graduate students, undergraduate students, post-doctoral scholars, NSF program officers, and invited speakers to make important contacts to jumpstart this new discipline of ecological genetics."

Kansas Welcomes NSF Visitor

Dr. Judith Ramaley, Assistant Director of Education and Human Resources at the National Science Foundation, met with faculty and staff from KU, Emporia State University (ESU), and Haskell Indian Nations University (HINU) during a special visit to Kansas Sept. 20-21. She met with project directors of the NSF-funded education and human resource development projects that are expanding science and math education opportunities.

Dr. Ramaley discussed the Quark Education Project and the Center for Science Education at KU, visited HINU to learn about KU's American Indian Outreach Programs and work with the Great Plains Native American Tribal Colleges, and advised leaders of ESU's programs for middle school girls on ways to obtain more secure funding for these important initiatives.

Dr. Ramaley, who was in Kansas to attend a Biosciences Summit at KU's Dole Institute of Politics, also visited the Kansas NSF EPSCoR Office where she learned about current and planned research infrastructure improvement projects.

In Memorium

Fred Samson, M.D., Ph.D., passed away on April 15, 2004, at age 85. The EPSCoR community mourns the loss of Dr. Samson who served as the first director of the NIH EPSCoR program in Kansas.

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Kansas Statewide EPSCoR Conference

Sam Campbell, president of Criti-Tech, Inc.; Tracy Taylor, president of the Kansas Technology Enterprise Corporation; and Ron Samson, president of NISTAC, were three of the panel members presenting the "Developing the Links in Biosciences Value Chain" discussion.

Ethan Baughman, KSU undergraduate researcher in the Kansas Lipidomics Research Center, tied for a $500 first prize in the student poster contest, for "Tandem Mass Spectrometry Based Triacylglceride Analytical Methods as a Tool in Lipid Metabolomics."

Christen Buseman, KSU graduate research assistant in the Kansas Lipidomics Research Center, won the $400 second prize in the student poster contest, for "New Lipids."

Maneesha Arashanapalli and Lu Li, KU graduate research assts. in mechanical engineering, won the $300 third prize in the student poster contest, for "Occupational Vibration and Position Sense."

Conference participants view posters and meet researchers from other campuses.

Clint Springer, KU postdoctoral researcher in Biological Sciences, tied for a $500 first prize in the student poster contest, for "Plant Response to Elevated CO2: Linking Physiological Responses with Gene Expression."

Howard Mossberg, KU vice chancellor for research emeritus, studies one of the 37 posters exhibited at the conference.

James A. Roberts, KU vice provost for research, and Olga Koper, vice president for technology and technical services at NanoScale Materials, Inc., provided valuable insight to research and industry development in a session that focused on "Developing the Links in Biosciences Value Chain."

Gerald "Skip" Loper was recognized for his leadership, advocacy, and service in building the state's research infrastructure. Kansas NSF EPSCoR presented the award on behalf of the research community.

Loretta Johnson, KSU associate professor of biology, and Ron Trewyn, KSU vice provost for research, share ideas at the conference break.

Alice Bean, KU professor of physics and astronomy, won first prize in the faculty poster contest, for "The Quark Education Project."

Faculty Receive Funds for Multi-User Equipment

What do a low-energy wireless ad-hoc sensor networks test-bed, an ultra-low freezer, and a specially designed airboat have in common?

All three items are research equipment purchased with funds awarded in the Spring 2004 Multi-User Equipment competition sponsored by Kansas NSF EPSCoR.

The low-energy wireless ad-hoc sensor networks test-bed will provide researchers and collaborators with opportunities to validate theoretical concepts in energy-efficient communications, signal processing and coding, and cross-layer optimization research. The new test-bed facility will expand opportunities among researchers in mechanical, electrical and computer engineering, and aviation. WSU assistant professor Sudharman Jayaweera is leading this project.

The ultra-low freezer will be used to preserve samples needed to obtain enzyme electophoretic (isozymes) and/or DNA data. The freezer and a compound microscope equipped with a digital camera will capture images of chromosomes. KU assistant professor Mark Mort submitted the proposal.

And the specially designed airboat will be used for research in sand-bed prairie rivers and reservoirs to study major aquatic ecosystems in the Great Plains. KU professor James Thorp and a team of aqautic ecologists and engineers at KU and KSU submitted the proposal.

Learning what genes control the changes in cell shape is an important concept that undergraduate student Tammy Tolliver learned from KU faculty member Rob Ward last summer by attending the Summer Research Program underwritten by Kansas NSF EPSCoR.

Brandon Gordon was one of seven undergraduate students who participated in the first Summer Research Program sponsored by Kansas NSF EPSCoR. Here he works with Jerry James, KU faculty in Electrical Engineering and Computer Science, to improve a computer program.

Summer Research Program Promotes Human Infrastructure

New to the list of programs for Kansas NSF EPSCoR is the Summer Research Program that targets students from underrepresented groups who plan to pursue graduate school and careers requiring advanced science and technology degrees. During the summer of 2004, seven students sponsored by Kansas NSF EPSCoR were hosted at KSU, KU, and WSU. The eight-week program underwrites: research and laboratory experience with university faculty, GRE preparation, weekly colloquia and research seminars, individual advising and mentoring, assistance with the graduate school application process, travel to research conferences, and housing at the host institution. Eligibility is determined by a student's grade point average (3.0 minimum) and by an interest in research and a career in the sciences, engineering or mathematics. Participants must be U.S. citizens or hold permanent resident status, and be a student from an underrepresented group in the sciences.

First Awards Jumpstart New Faculty Research

Since 1996, the Kansas NSF EPSCoR program has encouraged and funded early career faculty research through a program called "First Awards." Designed to help new faculty become more competitive for extramural grants, the awards fund laboratory supplies and equipment, underwrite travel, and support graduate students and other personnel needed to develop a successful research program.

In April 2004, Kansas NSF EPSCoR funded six First Awards, totaling $295,536. Faculty at KSU, KU, and WSU are eligible for the program.

Each winning proposal has a significant component that targets educational opportunities for students.

Spring 2004 First Award recipients and their research focus are:

Coskun Cetinkaya, WSU Electrical and Computer Engineering, explores the possibility of forming dense wireless sensor networks and wireless ad hoc networks, and hopes to integrate findings into a new curriculum for students.

Sharon Billings, KU Ecology and Evolutionary Biology, investigates the ecosystem based on changes in land use such as expansion of housing developments and the effects that trees and woody plants have on the ability of soils to process carbon and nitrogen. The resulting work will help scientists estimate how different ecosystems contribute to large-scale problems like carbon dioxide build-up in the atmosphere and nitrogen accumulation in soils and aquatic areas.

Kristan Corwin, KSU Physics, investigates the accuracy and portability of optical frequency references. The goal is the improvement of optical frequency standards that will support the rapidly expanding telecommunications industry.

Milena Stanislavova, KU Mathematics, investigates partial differential equations and their applications in nonlinear optics.

Christian Wolf, WSU Mathematics, studies dynamical systems which have applications in other scientific areas such as physics, economics, astronomy and biology.

Xue-Wen Chen, KU Electrical Engineering and Computer Science, seeks to develop novel computational methods that analyze microarray data that contain thousands of genes expressions. Specifically he hopes to identify informative cancer genes for early detection of the disease.

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production, and aviation industries.

Jordan and Wilk are considered the architects of this legislation that took nearly a year to develop. The foundation of the package is the creation of a Bioscience Authority that will identify and recruit eminent and rising star scholars who will spur scientific discoveries in the biosciences. The Bioscience Authority also will oversee the transformation of research discoveries into commercial enterprises.

"People asked us if it wasn't risky. We said the risk of doing nothing is so much greater than doing this."

Funding for the expansive move into biosciences will actually come from state taxes paid by bioscience companies. Estimates indicate that more than $500 million in tax revenue could be generated over the next 11 years, adding more than 100 new companies, and more than 40,000 new jobs to the Kansas economy.

Additional focus will be on entrepreneurship opportunities that can be encouraged in rural communities. More than $1 million will be available regionally to jump-start new companies and coupled with tax incentives to support new ventures.

"We had to think big and bold," Sen. Jordan explained, "and find a way to continue to leverage what Kansas already has."

Rep. Wilk added, "It's about wealth creation and jobs. Our objective was to create a whole new major sector of the Kansas economy."

"People asked us if it wasn't risky," Wilk noted. "We said the risk of doing nothing is so much greater than doing this."

The Kansas Legislature fully agreed. The legislation passed the House by 121-2 votes; and the Senate by 38-2 votes.

EPSCoR Succeeding in Kansas

Karen Sandberg, NSF Program Officer for the Research Infrastructure Improvement grant to Kansas, addressed the NSF Breakout attendees at the Statewide EPSCoR Conference, Sept. 8 in Manhattan. She cited the excellent conference program, the wide range of poster presentations, the successful First Award program, and numerous other exciting developments in Kansas that made her visit to the state enjoyable.

Sandberg outlined three EPSCoR strategies for helping states become more competitive for NSF funding:

Outreach visits to EPSCoR states by NSF program and professional staff to acquaint researchers with NSF programs, priorities, and policies.

Co-funding to help fund proposals from researchers in EPSCoR states to NSF's ongoing grant programs.

Research Infrastructure Improvement grants to strengthen an EPSCoR state's research enterprise.

She noted that Kansas researchers submit more proposals to NSF and receive more awards since the state joined EPSCoR.

Words of encouragement for graduate students and new faculty attending the meeting included a recommendation to persevere in submitting proposals to NSF. She also suggested volunteering to serve as a reviewer for NSF in order to gain exposure to well-written proposals and learn more about promising research areas.

Karen Sandberg, NSF Program Officer for the Kansas Research Infrastructure Improvement grant, praises speakers and participants for the high quality program presented at the 2004 Statewide EPSCoR Conference.

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