

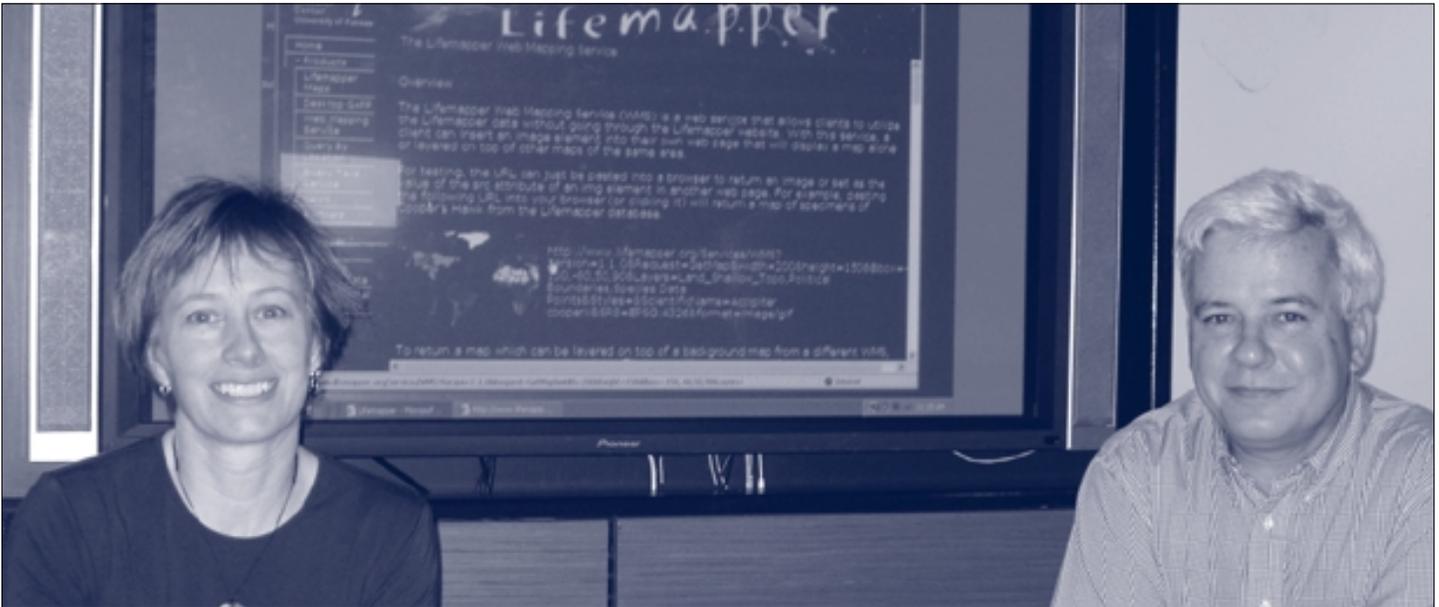
FOCUS



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BIODIVERSITY SOFTWARE LINKS DATA WORLDWIDE



SENIOR SOFTWARE DEVELOPER AIMEE STEWART AND ASSISTANT DIRECTOR OF THE BIODIVERSITY RESEARCH CENTER JAMES H. BEACH ARE DEVELOPING COMPUTER SOFTWARE SEARCH TOOLS TO GATHER BIOLOGICAL DATA WORLDWIDE FOR INTEGRATION AND ANALYSIS.

Managing to stay ahead of the curve in research these days is a challenge of immense proportion, although it appears that several Kansas scientists are up to the task.

Assistant Director of Informatics James H. Beach and his associates at the University of Kansas Biodiversity Research Center are currently collaborating to refine computer software tools to access and integrate biodiversity information for scientific use in much the same way a search engine might work on a computer network. The team at KU has been a global leader in the development of software architecture and tools for biodiversity and environmental analysis thanks to significant funding from national as well as international sources.

Simply put, "our mission is to make data associated with museum specimens, which document the diversity and distribution of life on earth, more meaningful and useful in predicting the future of species and the bio-

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FIRST AWARDS ACCELERATE NEW FACULTY RESEARCH

Encouraging early career faculty to become active and successful in research endeavors is an important goal of Kansas NSF EPSCoR.

The First Award program, established in 1995, helps new faculty become competitive for National Science Foundation and other federal agency funding by accelerating the pace of their research and the quality of their proposals. First Awards provide funds for supplies, equipment, research assistants, and

summer salary.

Eleven faculty members at Kansas State University (KSU), the University of Kansas (KU), and Wichita State University (WSU) received First Awards totaling \$502,561 in March 2005. Each awardee received up to \$50,000 from the program.

To assure the best projects are selected, the American Association for the Advancement of Science (AAAS) provided three peer reviews and recommendations for improving each proposal. Then in a second round of review, a distinguished panel comprised of representatives of KU, KSU, WSU, and the Kansas Technology Enterprise Corporation (KTEC) discussed the AAAS reviews and made final recommendations for funding.

Award recipients and their research area include: *(continued on page 2)*

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FROM THE DIRECTOR

Dear Colleagues:

It is indeed a pleasure to write this letter as the new Director of the Kansas NSF EPSCoR, as I take over the helm from Tom Taylor. Tom is now enjoying a somewhat belated sabbatical leave, well-deserved after the hard work and dedication he brought to this position.

Although having only been on board a short time, I am very pleased with the enthusiasm and support I have received from KTEC and the administrators and faculty at KSU, WSU, and KU. I am also very fortunate in having a dedicated group of associates in the EPSCoR office, Barbara Paschke, Doug Byers, and Pat Schmidt, who continue to keep the program running efficiently and effectively.

April 1 marked the start of the third and final year of Phase IV of the project and was fully funded for \$3 million from the NSF. These funds continue to support the major initiatives in the life sciences that were implemented during this phase, and additionally will be used to fund new proposals for equipment and education initiatives.

Our major challenge, however, is planning and writing the renewal for Phase V of NSF funding from 2006 through 2009. The focus will be on the biosciences in keeping with the Kansas Economic Growth Act Bioscience Initiative. The strategy for the next phase is to take research competitiveness in Kansas to the next level by proposing to fund multi-institutional and multi-disciplinary efforts that will ultimately lead to major center development.

Two National Science Foundation Centers were recently funded in Kansas and provide models for the types of projects we are seeking, the Center for Environmentally Beneficial Catalysis and the Center for Remote Sensing of Ice Sheets. Initiatives such as these bring national and international visibility,



KRISTIN BOWMAN-JAMES
PROJECT DIRECTOR

recognition, and respect to the research enterprise in Kansas. I consider it a privilege to be part of these efforts, and I look forward to working with researchers throughout the State as we plan for the future.

FIRST AWARDS ACCELERATE NEW FACULTY RESEARCH

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STEFAN H. BOSSMANN, KSU, CHEMISTRY, studies isolated channel proteins to be used as a bio-tool for the design of functional nanostructures on gold electrodes. Ultimately, this research may lead to better methods for treating mycobacterial infections.

TERRY CLARK, KU, ELECTRICAL ENGINEERING AND COMPUTER SCIENCE, studies the ability to dynamically load and integrate data with new relationships into object-oriented data warehouses for genomic data. The research may provide greater functionality to genome-analysis research and development.



CHRISTOPHER T. CULBERTSON, KSU, CHEMISTRY, explores the use of new materials for the fabrication and coating of microfluidic devices. These modified devices may eventually

solve a wide variety of complex separation and assay challenges in the life sciences.

JOSEPH DIEN, KU, PSYCHOLOGY, studies semantic processing in schizophrenia patients, and hopes to measure event-related potential and use the information to determine the functional significance to specific cognitive processes.

SOREN KOLD HANSEN, KSU, MATHEMATICS, explores the topology/geometry of links in 3-space and of 3-dimensional manifolds by studying the quantum invariants of links and 3-manifolds.

GERALD HOEHN, KSU, MATHEMATICS, studies the generalized Kac-Moody Lie algebras arising from string theory by combining methods of the vertex operator theory of algebras, three-dimensional topological quantum field theory, Lie theory, finite group theory, and the theory of automorphic forms.

SUDHARMAN K. JAYAWEEERA, WSU, ELECTRICAL AND COMPUTER ENGINEERING, investigates the development of robust techniques to build an inexpensive, low-power distributed ad-hoc network consisting of many small, wireless image/video sensor units for remote monitoring and surveillance.

THALIA D. JEFFRES, WSU, MATHEMATICS

AND STATISTICS, explores the phenomenon of capillarity and the differential equations that describe it. The work will extend techniques of geometric analysis to nonlinear problems.

KIRSTEN JENSEN, KU, ECOLOGY & EVOLUTIONARY BIOLOGY, seeks to develop new baseline taxonomic data and to investigate the use of elasmobranch tapeworms as biological tags.



DANNY MARFATIA, KU, PHYSICS AND ASTRONOMY, explores how unconfirmed properties and unknown parameters of the neutrino sector of the Standard Model of particle physics can be determined using solar and supernova neutrinos.

JACOB MOSKOVITZ, KU, PHARMACOLOGY AND TOXICOLOGY, studies the role of protein-MetO in the process of protein aggregation in vivo. The research may suggest new strategies for reversing post-translational modification in age-associated diseases.

KANSAS JOINS CANCER RESEARCH

A new "super-cell" may soon join the fight against cancer thanks to a collaborative effort between researchers at the Kansas Lipidomics Research Center (KLRC) and researcher Dr. Chien-An Hu at the University of New Mexico.

Dr. Hu received funding from the National Institutes of Health and the National Cancer Institute for his project entitled "Novel Proapoptotic BH3-Only Proteins in Cancer Apoptosis." The project employs the services of the EPSCoR-funded KLRC at Kansas State University (KSU).

"We are pleased that the analytical capabilities of the KLRC are generating new collaborative efforts between EPSCoR states," said Ruth Welti, head of the KLRC and professor of biology at KSU.

The project may eventually have a role in cancer biology and treatment.

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NATIONAL, INTERNATIONAL INTEREST IN UNMANNED AIR VEHICLES CONVERGE WITH CIVS

Opening new avenues of communication and sharing of research data can perhaps lead to the greatest opportunities for advancement of science. A \$7,000 planning grant from Kansas NSF EPSCoR to Richard Colgren, associate professor of aerospace engineering at the University of Kansas, is providing surprising new collaborative efforts on uninhabited or unmanned air vehicles (UAV).

One year after starting the wheels turning on the creation of an international, interdisciplinary learning lab called the Center for Intelligent Vehicle Systems (CIVS), regional,

national and some international interests are converging.

Initially, the planning grant led to the formation and operation of the Kansas UAV Consortium which is a working partnership between UAV researchers, developers, regulators and users. Members meet monthly at KU to discuss UAV issues and to examine grant and other funding opportunities. The meetings have expanded and spawned multiple proposal submittals and plans for future proposals, discussions regarding airspace issues with U.S. Senator Pat Roberts' office and the Kansas Adjutant General, as well as discus-

sions about Homeland Security surveillance in Kansas and on the U.S. borders.

Dr. Colgren also has traveled to several national conferences to meet with potential NSF, NASA, and DoD customers and other UAV center supporters.

Members of the UAV consortium include representatives from KU, K-State, Pittsburg State, Honeywell, DAR Corporation, Kohlman Systems Research, KalScott, Aero Fiber Products, Gut Works, Mustang Aero Projects, the FAA, the U.S. Air Force, the U.S. Army, U.S. Sen. Pat Roberts' office, the City of Lawrence, and the Lawrence Airport Board.

ADVISORY COMMITTEES TO PROVIDE ADDITIONAL EVALUATIONS OF RESEARCH PROGRAMS

Success in the stock market is pretty easy to track through listings in the daily newspaper or by checking financial web sites on the internet. Assessing how the state's investment in research is doing requires a different approach.

In order to track major research investments, Kansas NSF EPSCoR (KNE) has appointed two scientific advisory committees to monitor large initiatives in ecological genomics and lipidomics.

KNE project director Kristin Bowman-James recognizes the need for advisory committees. "The ecological genomics and lipidomics projects are building new and impressive research capacity in the biosciences. Advisory committees provide a national perspective on the research efforts in Kansas and help our researchers develop niche strengths that will make them more competitive for federal research funding."

Each advisory committee meets with researchers to examine current activities, review research goals, consider competitiveness of the research, and determine if resources are adequate for achieving university and state goals.

The Ecological Genomics Advisory Committee includes Dr. Martin Feder, Dept. of Organismal Biology & Anatomy, the University of Chicago; Dr. Barbara A. Schaal, Dept. of Biology, Washington University; and Dr. Jack C. Schultz, Professor of Entomology, Penn State University.

The Committee met in October 2004 and submitted a favorable report. Comments



MEETING WITH RESEARCHERS GIVES ADVISORY COMMITTEE MEMBERS A SENSE OF GOALS, OBJECTIVES AND PROGRESS, AND ALLOWS THE COMMITTEE TO PROVIDE VALUABLE INPUT ON RESEARCH EFFORTS. IN A RECENT LAB VISIT, COMMITTEE MEMBERS BRUCE WHITAKER (LEFT) AND LAURA JENSKI (SECOND FROM LEFT) INTERACT WITH POST DOC SHIVAKUMAR DEVAIAH (CENTER), KLRG RESEARCH SPECIALIST AND LAB MANAGER MARY ROTH (SECOND FROM RIGHT), AND JIAN ZHAO, POST-DOC (RIGHT BACKGROUND).

included "...the EcoGen program has performed 'splendidly'...successful projects are underway...the program's visibility is excellent...its web presence is strong, and name recognition is growing."

The Lipidomics Advisory Committee includes Dr. Laura J. Jencki, Professor and

Head of Biological Sciences, Marshall University; Dr. Bruce D. Whitaker, Plant Physiologist, USDA-ARS, Beltsville, MD; and Dr. John M. Dyer, Research Chemist, USDA-ARS, New Orleans, LA.

The next lipidomics committee report is expected in May 2005.

BIODIVERSITY SOFTWARE LINKS DATA WORLDWIDE

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logical diversity on earth,” explained Dr. Beach. “It’s a big project with mushrooming outcomes.”

In the Kansas EPSCoR-funded project, environmental and computer scientists, engineers, mathematicians and others are building knowledge bases and data integration architectures that will bring research data and analytical algorithms into common computing environments. The process of locating and searching biocollections and associated data housed in biological museums and herbaria are enormous. In fact, the body of information documents biodiversity knowledge amassed during the past 300 years of biological exploration of the planet.

Applied studies using these data can predict the impacts of climate change, loss of biodiversity, spread of invasive species, and emerging diseases.

Scientists will update and make more user-friendly software tools for biological collection data integration and analysis. This will provide a foundation for a new, pluggable, extensible architecture that will tie together the services, functions and methods of each application. The new generation of software tools will generalize and deploy communication and computational capabilities so the tools are more relevant and will have more impact to a broader and larger scientific audience. The end result will improve quality of data collected and provide new support to researchers in studying species’ actual and potential distributions.

KANSAS RESEARCHER TAPPED FOR NSF CAREER AWARD

Kansas State University assistant professor of physics Kristan Corwin works in a research arena that is considered “faster than the speed of light.” It appears that her research career is moving just as fast.

Less than one year after receiving a Kansas NSF EPSCoR First Award, Corwin received notification from the National Science Foundation that she has also been awarded an NSF Career Award of \$400,000 for her research on fiber-based optical frequency standards.

Corwin’s work with optical frequency combs may eventually help create radio frequencies more stable than those of quartz oscillators. The telecommunications industry currently relies on vapor cells with absorption features approximately 1 GHz wide to calibrate wavelength measuring devices. The research proposed by Corwin may allow higher accuracy of optical frequency standards that will fill the accelerating demands brought on by increasingly dense wavelength channel packing.

“The Kansas NSF EPSCoR First Award has been valuable in starting up my lab, allowing me to purchase equipment essential for acquiring preliminary data that strengthened my NSF proposal,” Corwin said. “The recognition from the First Award gave me hope and confidence, and provided the momentum which helped in securing long-term support.”

Corwin’s NSF Career Award runs through February 2010.



The KU Biodiversity Research Center is an international leader in the development of software tools and protocols for the management, discovery, retrieval, integration and analysis of biological museum information. During the past five years, the group has led the development of a number of tools universally used in the retrieval, collection, and analysis of data for mammal, herpetological, ornithological and ichthyological collections for museums around the world. In addition, the group is studying the potential distribu-

tion of invasive species that would be threats to US agriculture and national human health.

Educational partnerships are on the horizon for the group as well. When implemented in the classroom, the new interactive software tools will enable university students to undertake “what if” thought experiments.

“The results will point to the interrelatedness of biological diversity and human impacts on the global environment,” Beach added.

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