Computer networking is the glue that holds people, information and services together so that teaching, learning and research can happen.

With a $1.176 million award from the National Science Foundation, Kansas NSF EPSCoR scientists are building a faster and more stable shared-data network connecting Kansas’ education institutions.

Three universities—Kansas State University, The University of Kansas and Wichita State University—have collaborated on the project, Prairie Light: Next Generation Networking for Mid-Continent Science. By also partnering with KanREN, the Kansas Research and Education Network, Prairie Light has already significantly increased the network bandwidth (see illustration). The “backbone” (represented by the oval connecting all of the hubs) has increased from 2 to 10 Gbps.

This is a significant step for research in Kansas. Scientific inquiry depends on advanced data communications, and the upgrades will help scientists acquire and analyze large data sets and also collaborate over wider geographic areas. There are many teams of NSF EPSCoR scientists spread throughout the state and even Oklahoma whose ability to share data has been vastly improved.

For example, some of the climate scientists working on the major initiatives Climate Change and Energy: Basic Science, Impacts and Mitigation and also Oklahoma and Kansas: A cyberCommons for Ecological Forecasting, rely on the instrument data constantly being gathered at the Konza Prairie Biological Station near Manhattan, Kansas.

Moving and managing the ever-growing amounts of data from scientific instruments is an immediate challenge that we are now able to address with Prairie Light.

The initial upgrades have been completed. Now, the co-principal investigators for the project (Daniel Andresen, K-State; Donald F. (Rick) McMullen, KU; and Ravi Pendse, WSU), are working to get the word out about the upgrades, and plan to host educational sessions at each of the institutions on the Prairie Light backbone.

“We want to get the word out to the network people and also the end users at each institution on the backbone. We want people to know that this is there and they can be thinking a lot bigger than they could in the past,” said McMullen, director and senior scientist for research computing at the University of Kansas.

Their first opportunity to talk with a large audience of network people came on April 7, at the KanREN Annual Meeting at Johnson County Community College. McMullen addressed an audience primarily of network administrators, discussing the network’s enhanced capabilities.

“We are unable to make meaningful scientific progress without research and education networks,” said McMullen. “Strong computing networks are essential for communication, collaboration, community and competitiveness.”
K-State scientists awarded funds for climate science education

Climate science can be a challenge to teach, in part because it is very complex and involves many scientific disciplines, and also because the research findings are rapidly evolving.

To remedy this problem, the National Science Foundation last fall launched the Climate Change Education Partnership, funding 15 climate education centers throughout the United States, including the Central Great Plains Climate Change Education Partnership (CGP-CCEP) based at Kansas State University.

Charles (Chuck) Rice, University Distinguished Professor of Soil Microbiology at K-State, and John Harrington, Jr., professor of geography at K-State, are among the principal investigators for the CGP-CCEP. This was a natural and important extension of the work Rice and Harrington are doing on the Climate Change and Mitigation project that is part of the Climate and Energy initiative at Kansas NSF EPSCoR. Their work on both of these projects is inter-related and will help accomplish the goals of each.

The CGP-CCEP will target agricultural and rural communities in Kansas and also the broader region. In addressing a major world center for producing food (both grains and livestock), the CGP-CCEP will identify ways climate change will impact rural communities. CGP-CCEP scientists are developing educational programs that will help prepare rural residents for increasingly variable and extreme weather, as well as take advantage of mitigation opportunities related to farming and ranching.

John Harrington, Jr., has been named to the new position of project manager at Kansas NSF EPSCoR. Harrington is a professor of geography at K-State and he conducts research on multiple aspects of the human dimensions of global change. As project manager, Harrington will be responsible for increasing collaborations and communications between the Climate and Energy teams that are part of the Climate and Energy initiative.

HERS graduate receives prestigious NSF Graduate Research Fellowship

Michael Dunaway, a former Haskell Indian Nations University student who is now a graduate student in geography at the University of Kansas, has received an award from the National Science Foundation. He is one of five KU students and one of only 12 social science geographers in the nation to be offered an award from the prestigious NSF Graduate Research Fellowship Program (GRFP).

The award includes a stipend of $30,000 per year and will be funded for three years, although he can use the stipend for any three of the next five years.

Through the Haskell Environmental Research Studies (HERS) Institute, Kansas NSF EPSCoR has provided mentoring for tribal college students. One of the goals of Kansas NSF EPSCoR is to provide opportunities for future science leaders to conduct research and earn advanced degrees.

Dunaway, a member of the Oklahoma Choctaw Nation, was a HERS intern in 2009 and in the summer of 2010, and prior to beginning his graduate studies, he was a Research Experiences for Undergraduates (REU) student in the lab of Judy Wu, University Distinguished Professor of Physics at KU. Wu is leading the Nanotechnology for Renewable Energy team that is part of the Climate and Energy initiative at Kansas NSF EPSCoR.

His progress, in particular, is a tremendous success story because he wasn’t sure he would pursue his graduate studies and did so after he was encouraged by Joane Nagel, University Distinguished Professor of Sociology at KU, and Dan Wildcat, Dean of the College of Arts and Sciences at Haskell. Nagel and Wildcat co-direct the HERS Institute. Another strong proponent for Dunaway is his advisor, Jay Johnson, assistant professor of geography at KU.

“For many students who are the first in their families to pursue graduate degrees, a graduate education is a question of imagining the possible,” said Nagel. “Speaking from my own experience, looking at college and graduate school from the outside, it looks like a big, black box—it’s not clear how you get in or how you navigate it once you’re inside. The HERS Institute is intended to provide a window into that box with some friendly familiar faces inside welcoming new students in.”

With some solid mentoring and encouragement, HERS students are walking through the doors of graduate departments and finding their way to further their education.

As a HERS intern, Dunaway began studying the practices of modern industrial corn cultivation and problems that will occur with climate change. In Wu’s lab, Dunaway began researching solar-powered biodiesel refining. He plans to pursue his graduate research by identifying Native American reservations that have the strong potential for both solar density and ideal corn growing conditions, as well as good roads for transporting the biomass and biofuel. This GIS-based “suitability map” will help Native American communities cope with climate change and also be part of the solution to the energy challenge.

The stipend, said Dunaway, will help immensely in supporting the costs of his research, including travel to various reservations. This research will be the basis of his master’s thesis. Dunaway wants to earn his Ph.D. and become a professor in the emerging field of Indigenous geography.

He is quick to offer credit to his mentors and Kansas NSF EPSCoR. “This was not just me, I had a lot of help and encouragement along the way, through HERS and EPSCoR,” said Dunaway. “Some great people believed in me and now I believe this is possible.”
Ad Astra Kansas, a science education organization in Hutchinson, is releasing a set of 150 trading cards featuring Kansas scientists (past and present) to celebrate 150 years of Kansas statehood.

So far, four scientists affiliated with Kansas NSF EPSCoR have been featured: Kristin Bowman-James, University Distinguished Professor of Chemistry at KU and also Kansas NSF EPSCoR project director; Charles Rice, University Distinguished Professor of Soil Microbiology at K-State; Judy Wu, University Distinguished Professor of Physics at KU; and Samantha Wisely, associate professor of wildlife biology at K-State.

Following are the cards, which are meant to be printed with the scientist photo on the front and the rest of the information on the back.

Ad Astra is making PDFs of the cards available to K-12 students and also the public. For more information, visit www.adastra-ks.org.
Charles RICE
Agronomy
Kansas State University

Charles current
- Observes the millions of micro-organisms, many too small to see with the naked eye, that live in soil, to explain how they work together to make good soil that grows healthy plants. Healthy plants release oxygen into the air.
- Studies how soil, plants and low-till farm practices help store one of the global warming gases, carbon dioxide, in the soil instead of the air.
- Researches how agriculture can adapt and provide a solution to climate change.

EXTRA COOL: Rico was a member of a United Nations Intergovernmental Panel on climate change that received the 2007 Nobel Peace Prize.

Judy Z. WU
Physics / Astronomy
University of Kansas

Judy current
- Fell in love with physics and math in seventh grade.
- Wu is a University Distinguished Professor at KU and is leading a NanoTechnology for Renewable Energy Team.
- The team is devising improved and less costly solar panels and cells for capturing the sun’s energy.
- By working with the atoms and molecules that make up materials, the goal is to make materials that will better hold on to the sun’s energy so it can be used to light our homes or provide other power in the future.

EXTRA COOL: Received a KU Kemper Award for Teaching Excellence in 2006.
RESEARCH NOTES

KU and Haskell students look at Arctic issues at Alaska workshop
A workshop over spring break, from March 22 to 24, 2011, in Juneau, Alaska, which focused on rapid environmental and social change in the Arctic, was attended by KU graduate students and also undergraduate students from the Haskell Environmental Research Studies (HERS) Institute. HERS is supported by Kansas NSF EPSCoR as a part of the Climate and Energy initiative.

The graduate students are affiliated with an Integrative Graduate Education and Research Traineeship (IGERT) program at KU, directed by Joane Nagel, University Distinguished Professor of Sociology. The students are studying climate change, humans and nature in the global environment and they mentor the undergraduate students from Haskell Indian Nations University. Because the partnership of graduate students and tribal college undergraduate students is unique, it was the basis for discussion at several of the Alaska workshop sessions.

In Alaska, four IGERT programs were represented, and the students and their advisors began a dialogue across research disciplines and also cultures.

Haskell student honored by White House for environmental work
Ma’Ko’Quah Abigail Jones, a Haskell Indian Nations University student and member of the Prairie Band Potawatomi Nation, who has participated for the past two summers as an intern at the Haskell Environmental Studies Research (HERS) Institute, was honored recently at the White House.

Jones arranged a Listening Session workshop at Haskell for President Obama’s America’s Great Outdoors project. Staff from the U.S. Department of the Interior went to Haskell last summer, led workshops and asked for the students’ ideas and input for the Great Outdoors project.

On Feb. 16, Jones and other volunteers from across the country were invited to hear Obama’s speech, in which he reported on the America’s Great Outdoors project, followed by a reception.

For more information, and to read the America’s Great Outdoors report, visit www.greatoutdoorsamerica.org.

EPSCoR research featured on journal cover
Research led by Francis D’Souza, professor of analytical and supramolecular chemistry at Wichita State University, was highlighted as the cover article in the September 2010 Journal of Physical Chemistry Letters.

D’Souza is part of the Nanotechnology for Renewable Energy project of the Climate and Energy initiative at Kansas NSF EPSCoR. His research on single-wall carbon nanotubes (SWCNTs) is exploring how they assist in light-energy harvesting assemblies, for use in harnessing solar energy.

EPSCoR nanotechnology research featured in talk to Kansas legislators Legislative Luncheon
Judy Wu, University Distinguished Professor of Physics at KU and one of the lead scientists on the EPSCoR initiative Climate and Energy, spoke to Kansas legislators as part of a Legislative Luncheon series recently.

The “Science Serving Kansas” Legislative Luncheon series featured four KU researchers, who spoke on four different occasions, introducing the legislators to various aspects of research at KU.

Wu spoke to the legislators about Nanotechnology and Renewable Energy, highlighting the EPSCoR research that is investigating how photosynthesis, the biological process that converts sunlight to energy, works in nature. Her team is designing molecules and extended molecular frameworks to replicate photosynthesis and develop more efficient photovoltaic cells and solar fuels. (See more on Wu’s research on page 4.)

Blogging research adventures from Norway
Paula Smith, a KU graduate student in geography and mentor for the Haskell Environmental Studies Research (HERS) Institute, is in northern Norway to conduct research for her thesis, Climate Sovereignty, Sami Reindeer Herding, and the Rights of Indigenous People.

Smith, a member of the Sisseton-Wahpeton Oyate Nation, is writing a blog, at ireswb.cc.ku.edu/~crgc/cgi-bin/blog/?cat=14.

Here is a selection from one of her posts: “I have had the opportunity over the last two days to talk with key people on traditional knowledge and climate change. It seems climate change is interconnected in all levels of their conversations.”
**EPSCoR staff host Statewide Conference and assist with “NSF Day”**

In October, the Kansas NSF EPSCoR statewide conference was held on the day prior to an “NSF Day” at the University of Kansas. This worked out well for several people who traveled to Lawrence, as they stayed for both days of meetings.

Nearly 100 people attended the statewide conference on Oct. 4, many of them representing the four universities in the Kansas NSF EPSCoR initiative, **Climate and Energy:** Kansas State University, The University of Kansas, Wichita State University and Haskell Indian Nations University.

The conference, **Energy, Climate and the Future: The Role of Kansas**, featured talks by nationally-recognized experts Linda Mearns and George Crabtree. Mearns, a climate expert, is director of the North American Regional Climate Change Assessment Program at the National Center for Atmospheric Research; Crabtree, an energy expert, is senior scientist in the Materials Science Division at Argonne National Laboratory.

Throughout the day, several Kansas NSF EPSCoR scientists spoke as part of panel discussions. The morning panelists updated the attendees on the four projects within the **Climate and Energy** initiative; and the afternoon panel discussed how to further build linkages among the four projects.

The following day, Kansas NSF EPSCoR assisted in hosting about 200 people at the National Science Foundation “NSF Day” workshop. The participants represented more than 20 colleges and universities in Kansas and Missouri.

Staff from seven NSF directorates and the Office of International Science and Engineering made presentations on their programs and spent time talking with participants about potential research projects.

Kansas NSF EPSCoR hosted a lunch at the event, where Kristin Bowman-James made a presentation on Kansas NSF EPSCoR projects.

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### National Science Foundation Science Becoming the Messenger workshop

**Scientists learn to communicate with variety of media channels**

Most people do not grasp basic scientific information. So, when scientists explain their findings, or even what they are researching, many people do not understand. This disconnect could explain why the public simply “tunes out” science, which is a problem because we increasingly need people to “tune in” to science, a catalyst for solving many of the world’s most pressing problems.

Scientists can do a great deal to address this communication problem, though, if they can explain their research and their scientific findings in a way that the public will more easily grasp.

About 130 Kansas scientists and research communicators learned more effective ways to explain complex scientific research at a **Science Becoming the Messenger** workshop hosted by the National Science Foundation in Lawrence on January 27. The workshop will travel to all 29 EPSCoR jurisdictions. Kansas was the first to host the workshop.

Chris Mooney, a science blogger for Discover magazine, and Joe Schreiber, a freelance television producer, were the workshop facilitators. They talked with the scientists about how to frame their research in a way that is more readily understood by non-scientific audiences, encouraging the scientists to think about the impact of the research and then find a more simple way to explain it.

Mooney and Schreiber also stressed the importance of reaching out to the public through new media, such as Facebook and Twitter, because so many people get most of their information from online sources. In separate sessions, the scientists and research communicators also practiced writing blogs and made short videos, using inexpensive equipment.

Over lunch, a panel of journalists spoke with the participants about what they need to know when it is time to share a research story with the public. The media professionals were Todd Cohen, director of University Relations at KU; Meryl Lin McKean, WDAF 4, Kansas City; Jessica Schilling, Lawrence Journal-World, Social Media; and Bryan Thompson, Kansas Public Radio.

About 18 scientists returned for a second day of intensive training. These participants practiced taping an on-camera interview and they also hosted mock press conferences, each of them taking a turn at explaining their research and taking questions from the audience.

**Some comments from the participants:**

“I liked the introduction to new media - I probably would not have looked as deeply into these topics on my own.”

“The Q&A with journalists was helpful. As a communicator, it is good for me to hear what they need to know from me and my colleagues.”

“The ‘Creating and Distilling Your Message’ session was very useful in getting me focused on the context of my message.”

“Video usage – I would have never considered it, but now seeing the ease of it, I’ll definitely consider it in the future.”