

Delaware's EPSCoR program, aimed at developing competitive research, draws national and state leaders at third annual meeting

Delaware's statewide Experimental Program to Stimulate Competitive Research (EPSCoR) held its third annual meeting on February 15 at Delaware State University's MBNA Hall. 104 scientists, government officials, and private industry representatives gathered to network and assess EPSCoR's progress in Delaware, where the program is managed by the Delaware Biotechnology Institute (DBI) at the University of Delaware.

EPSCoR has been a boon to Delaware since the program began here in 2003, helping researchers land more than \$25 million in research and education grants. EPSCoR has also helped the state's colleges and universities attract talented new faculty members, improve research labs and launch new science programs. The National Science Foundation (NSF) established EPSCoR in 1979 in response to a Congressional



Lance Haworth, Director of the NSF Office of Integrative Activities spoke of the importance of EPSCoR to the nation.

requirement to assist states that have historically received less federal funding for research and development but are committed to developing their research initiatives and institutions. By promoting partnerships among state universities, industries, and government in science and technology, EPSCoR's major goal is to maximize each state's resources and drive economic growth.

A diverse network of scientists, businesses, and educators

Attendees at the meeting emphasized that the diversity of Delaware's EPSCoR network, which includes 4 colleges and universities, is key to the program's success. "The collaboration among the University of Delaware, Delaware State University, Delaware Technical & Community College, and Wesley College is an impressive interaction among organizations," said Lance Haworth, Director of the National Science Foundation Office of Integrative Activities.

Keynote speaker Larry Robinson, former Chief Executive Officer of Florida A & M University (FAMU) and Advisor to the United States Department of Agriculture's Cooperative State Research, Education, and Extension Service (CSREES), said that partnerships are the best way to leverage scientific resources. "EPSCoR tries to level the playing field by bringing resources, facilities, world-class faculty, students, and programs together to improve national production. No one can argue that EPSCoR isn't good for the nation," said Robinson, who credited EPSCoR with moving the country toward more diverse networks of high-quality research.

Donald L. Sparks, a partner in Delaware NSF-EPSCoR who is also the S. Hallock du Pont Chair of the University of Delaware's Department of Plant and Soil Sciences and the Director of the University of Delaware's Center for Critical Zone Research, agreed with Robinson that the collaboration fostered by EPSCoR has been overwhelmingly positive. "We've built some really exciting



Donald L. Sparks, Chair of the Department of Plant and Soil Sciences, University of Delaware, leads the research effort in the NSF EPSCoR Research Infrastructure Improvement program.

networks with our teams across the state. We've had frequent meetings to look for ways we can enhance our interactions across the network, like new faculty start-up, seed grants, core facility enhancement around the state, seminars, workshops, meetings, and sponsorships.”

Sparks is responsible for the development and execution of research in the network's Research Infrastructure Improvement (EPSCoR RII) grant. He said the interface among different disciplines is an important component of high-quality research and that networking and building partnerships with Delaware State University, Delaware Technical & Community College, and Wesley College have been the highlights of the EPSCoR program. “Without the formation of the EPSCoR program, I'm not sure these collaborations would have occurred, but because of it, we've already established some exciting new research directions. The future is very bright,” said Sparks.

Venugopal Kalavacharla, an Assistant Professor in the Department of Agriculture and Natural Resources at Delaware State University, and EPSCoR faculty leader at his institution said the nation's future depends upon research collaborations. “These relationships are critical for us in the long-term, so we can do cutting-edge research,” said Kalavacharla, who pointed out that most of his collaborative research grants have come directly from EPSCoR, like the seed grant he shares with Nicole Donofrio, Assistant Professor of Plant and Soil Sciences at the University of Delaware, with whom he formed a partnership at last year's EPSCoR meeting.

Tom Hanson, an Assistant Professor of Marine and Earth Studies at UD, said an EPSCoR lunch led to a seed grant he shared with materials scientists at UD. “Given our success there, we applied to the NSF Nanoscale Engineering Research program to get the grant that we are now working on,” added Hanson. “That grant, then, is a result of that one conversation at an EPSCoR lunch.”



Venugopal Kalavacharla, of Delaware State University, spoke of new research collaborations launched through EPSCoR.



Clytrice Watson, (left) Assistant Professor of Biological Sciences at DSU, with student researcher Jasmine Meade. Watson conducts a research program for high school students each summer.

Education is key

Other scientists noted the importance of sharing information with K-12 educators in the state. Harsh Bais, Associate Professor of Plant and Soil Sciences at UD, who said EPSCoR has enhanced his publication record markedly in the past year, cited Delaware Biotechnology Institute Assistant Director Jeanette Miller's guidance in helping him translate his research for teachers. "With the help of Jeanette, we've been able to move our story from labs to K-12 schools and inspire students to study plant biology," said Bais.

At Delaware Technical & Community College, the EPSCoR-funded "Pathways to the Future" program brings 7th and 8th graders to DTCC on "Science Saturday" and in the summer for a weeklong camp to familiarize them with science.

Kelli Martin, an Education Associate for Science at the Delaware Department of Education, said that the EPSCoR grant, along with support from DuPont has allowed 60-80 biology teachers to attend a workshop each October held at the Delaware Biotechnology Institute. "Teachers observe, first-hand, the research going on in labs and attend symposium sessions that extend concepts learned in science to current research," said Martin. Teachers also attend a 90-hour biology course facilitated by Bill Hall of the College of Marine and Earth Studies at UD. "K-12 science benefits greatly from the RII grant," said Martin.

Undergraduate students who have had the opportunity to conduct research funded by EPSCoR have had their eyes opened to the collaborative research opportunities available to them in Delaware and beyond. Dover High School Junior Jasmine Meade presented her poster at the annual meeting, fielding questions from science professors.

“I was looking at bacteria under microscopes, learning new scientific techniques, and no one in my school could say they did the same thing, of which I'm very proud,” said Meade of her summer job. “I'm super excited to come back to Delaware State's campus this summer and start a new project.”

“I love working with high school kids,” said Meade's advisor Clytrice Watson, an Assistant Professor in DSU's Biology Department, who studies microbial food safety and microbial interactions. Watson believes the best time to hook students in is when they're in high school. “Imagine telling your friends, ‘I spent the summer out in Delaware Bay, tagging sharks.’ I am so impressed with our high school students and look forward to involving more of them in research.” More information on EPSCoR outreach is available online, at <http://www.epscor.dbi.udel.edu/outreach/index.php>

Innovative environmental research

In Delaware, the collaborative research funded by EPSCoR targets the environmental stressors faced by the state's natural environment. According to Sparks, Delaware's major environmental challenges include marsh decline, fish kills and algal blooms, climate change, water quality, soil contamination, and air quality. “Of course, all of these have an impact on human health and economic development,” said Sparks.

According to Sparks, future research efforts are quite focused. “We're now trying to look at sub-themes of a broader theme that we're calling ‘biogeochemical processes in the critical zone,’” said Sparks. “We're going to focus on particle transport and release, environmental observation and sensing, and microbe-metal interactions.”

The Center for Critical Zone Research, which Sparks directs, was established at UD in October 2006 as a spin-off of Delaware NSF-EPSCoR. “It brings together faculty, students, and policy makers to discuss environmental issues and devise ways to reach out, network, and help address some of the important issues we face in the state, in terms of the environment,” said Sparks. “We obviously want to conduct world-class research focused on the earth's life-sustaining, near-surface environment—the complex interactions of rock, soil, water, air, and living organisms that regulate and populate the natural habitat.”

Other new initiatives resulting from EPSCoR include plans for a Center for Integrated Biological and Environmental Research (CIBER), the Science, Ethics and Public Policy Program (SEPP), the Ethics Resource Site, the Center for Spintronics and Biodetection (CSB), and the new NASA EPSCoR program. A major goal going forward is to expand center initiatives, said Karl Steiner, the Associate Director of DBI and a co-PI of the EPSCoR RII grant.

Research leads to economic growth

A major goal of EPSCoR is to help the state's economy, in addition to improving its natural environment. Delaware State University President Allen Sessoms said DSU is adding doctoral programs and relying on its partnerships with the University of Delaware, Wesley College, and Delaware Technical and Community College to ensure that research efforts in the state continue to grow. "There is great enthusiasm in the state for research," Sessoms said.



Delaware Lt. Governor John Carney spoke of his involvement with Delaware EPSCoR since its inception. Carney chairs the state's Science and Technology Council.

David Weir, Director of the Delaware Biotechnology Institute (DBI), concurred, pointing out that Delaware's successful bid to keep the pharmaceutical company AstraZeneca in Delaware was followed by the creation of DBI and the state's successful bid for EPSCoR status. "We went down to Washington, talked with NSF, and told them what we were doing. They supported our bid for EPSCoR status, and we won our grant and just submitted a second application," said Weir.

Delaware Lieutenant Governor John Carney said the best way to spur economic development in the state is to concentrate on scientific education and research. “The building of academic capacity is really important, but at the end of the day, it’s about creating new businesses and jobs for the people in our state,” said Carney. “As the first state, we’d like to be first in science and innovation, and we’d like to be the first state to graduate from EPSCoR.” Carney chairs the Delaware Science and Technology Council, formed in 2006 to identify and advance critical initiatives in science and technology, and he cited the council as a positive outgrowth of EPSCoR.

Delaware EPSCoR’s Research Infrastructure Improvement program has produced significant results. In the past three years, UD, DSU, and Wesley brought 6 new faculty members on board. 48 papers were published, and research teams were awarded a total of 21 seed grants for nearly \$4 million. The seed grants then catalyze new research.

Qiquan Wang, and Assistant Professor of Chemistry who joined the DSU faculty in 2006, said he published 3 papers in the past year and has another 3 in review, thanks to EPSCoR. He credits his funding with his ability to gather enough preliminary data to apply for additional grant monies. “I really appreciate the opportunity,” said Wang.

Keka Biswas of Wesley College, the newest EPSCoR faculty member and the first research faculty member at Wesley College, has 3 students in her research group collaborating with CCZR and DSU. “Without EPSCoR, it would not be possible for a small college like Wesley to conduct such research,” Biswas said.

Gulnihal Ozbay said EPSCoR directly and positively affected her professional development. “I’ve been part of 3 seed grants from EPSCoR monies,” said Ozbay. “I hired 3 grad students and a technician, and several papers came out of our work. I then was able to get USDA and NOAA grants and two undergraduate interns from the Delaware Water Resources Council, which led to more presentations and papers.”

State EPSCoR Director Stephen Borleske noted how far the state has come since being granted EPSCoR status. “EPSCoR is a catalyst that has worked successfully in Delaware. At the end of this month, we will complete our first major NSF infrastructure improvement program,” Borleske said, noting that the state hopes to make all of its programs sustainable and ultimately graduate from EPSCoR.

For more information on Delaware’s EPSCoR program, visit <http://www.epscor.dbi.udel.edu>.

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