LA EPSCoR Receives $9 Million NSF Grant

The following is the first in a series on the new National Science Foundation $9 million Research Infrastructure Improvement (RII) grant to the Louisiana EPSCoR program. Upcoming issues will highlight the funded project's WorkPackage building blocks, their associated science drivers and respective lead scientists.

A $9 million National Science Foundation (NSF) grant to a team of researchers from nine Louisiana universities to develop new cyber tools enabling significant advances in science and engineering has been announced by the Board of Regents.

With matching funds of $3 million from the Board of Regents Support Fund and $3.2 million from the participating institutions, the total of the three-year award is over $15.2 million.

"This grant will allow Louisiana university researchers to capitalize on the State's recent investments in cyberinfrastructure," said Commissioner of Higher Education E. Joseph Savoie. "They will be taking full advantage of the Louisiana Optical Network Initiative (LONI), the high-speed optic network that connects supercomputers at our major universities and research centers and links Louisiana to the National Lambda Rail, one of the nation's most advanced grid-based, distributing and computing infrastructures."

Elevating Louisiana's Future Research and Development Enterprise

Dr. Michael Khonsari, project director of the Louisiana EPSCoR program and the Research Infrastructure Improvement (RII) award, said that the RII will develop new cyber tools for high-performance computing, advanced networking and data management capabilities that will further advance the capabilities of the State's university researchers.

"It will give the investigators greater access to an advanced research tool that will allow them to conduct many more tests in a much shorter period of time and with better results than traditional screening techniques," he added.

According to Dr. Ed Seidel, the project's lead scientist on cyberinfrastructure and director, LSU Center for Computation and Technology, a critically important feature is the recognition that the cyber tools cannot be built in isolation from the scientific projects they are designed to aid.

"We will be targeting studies of biotransport phenomena; the simulation, design and manufacturing of biosensing devices; and forecasting catastrophic environmental events such as storm surges caused by hurricanes. We will also support applications in many other disciplines in science and engineering," said Dr. Seidel.

CyberTools Lead Scientist World Renown Physicist

Dr. Ed Seidel working on black hole collision visualization, which is part of his world-renowned work in numerical relativity research.

Dr. Edward Seidel, one of the Lead Scientists of the NSF EPSCoR Research Infrastructure Improvement CyberTools project, is a physicist recognized worldwide for his work in high-performance and grid computing as well as in numerical relativity.

Recruited in 2003 to lead LSU's investment in the Governor's Information Technology Initiative, he became director of the university's newly formed Center for Computation and Technology (CCT).

CCT has state-pledged funding of over $9 million a year for investments in computation- and technology-related LSU activities that support higher education, research and economic development in Louisiana. Its mission is to advance computational sciences and cutting-edge technology while promoting innovative collaborations between academic and industry.

Dr. Seidel is also LONI's Chief Scientist and the LSU Floating Point Systems Professor in LSU's Departments of Physics and Astronomy, and Computer Science. He earned his Ph.D. from Yale University in relativistic astrophysics.

"The biosensing research will develop better geno/immuno sensors and more effective small molecule sensors that can be used for disease diagnosis, population screening and environmental monitoring and as a valuable detection tool in the nation's efforts to counteract bioterrorism," he explained. "Biotransport research involves molecular dynamic simulations and computational fluid mechanics of transport processes.

"Through the LONI network, scientists will also employ these advanced tools to focus on the urgent problem of emergency storm-surge forecasting during approaching hurricanes."

The RII cyber tools and science projects will be developed in tandem by close-knit teams from the nine participating institutions: Louisiana State University (LSU), LSU Health Sciences Center-New Orleans, Louisiana Tech University, Southern University-Baton Rouge, Tulane University, Tulane University Health Sciences Center, University of Louisiana-Lafayette, University of New Orleans, and Xavier University.

Dr. Seidel will oversee the development of the cyber tools and their integration into the science and engineering projects, which will be led by Dr. Steven Soper, director of Louisiana's Center for BioModular Multi-Scale Systems, housed at LSU, and Dr. Ricardo Cortez, director, Tulane University Center for Computational Science, in collaboration with Dr. Donald Gaver, chair of the Tulane biomedical engineering department.

Four complementary WorkPackages, the NSF EPSCoR project's basic building blocks, will implement cyber tools supporting the research with data management and scheduling services needed to support the science projects; information services and portals; simplified interfaces enabling non-expert users to take advantage
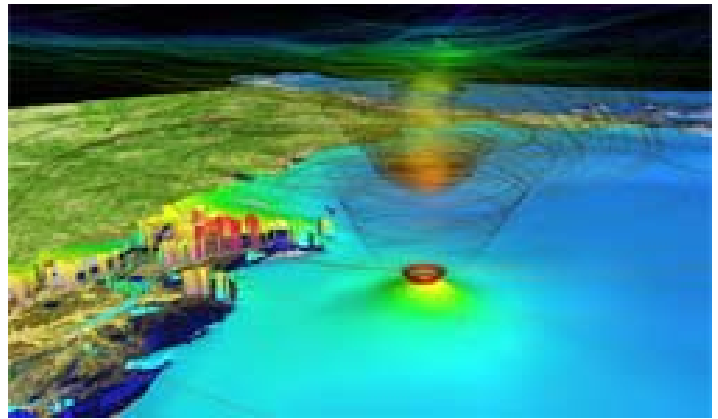
Multilayer visualization of wind and storm-surge simulations of Hurricane Katrina approaching the New Orleans area. RII researchers will automate creation of such visualizations over LONI for many applications.

of the cyberinfrastructure; visualization services; and the development of codes for all science projects.

"In addition to conducting research, the NSF EPSCoR project will integrate faculty development activities within the science drivers and work packages," noted Dr. Khonsari. "In addition, it will assist in developing the knowledge, skill-sets and careers of a wide spectrum of individuals, ranging from post-doctoral fellows to junior faculty and undergraduate to graduate students. Outreach activities for K-12 students and the public will be offered, too.

"The State's EPSCoR leadership strongly believes that this comprehensive, ambitious project will serve as the catalyst through which post-Katrina/Rita Louisiana can regain and elevate the trajectory of its research and development enterprise," concluded Dr. Khonsari.

As a professor at the Max-Planck-Institut fur Gravitationphysik (Albert Einstein Institute or AEI) in Germany from 1996-2003, he founded and led AEI's numerical relativity and e-science groups, which became leading worldwide forces in distributed and grid computing and in using large scale computers in solving Einstein's equations.

An innovator in the fields of grid computing and high performance computing, Dr. Seidel was awarded the 2006 Institute of Electric and Electronics Engineers Sidney Fernbach Prize. He has been the recipient of a number of other prestigious awards as well, is the author or co-author of over 150 publications, and serves on numerous national and international committees and advisory boards.

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