



LINKing Opportunities to Katrina

(The following is the second in a two-part series on the Louisiana EPSCoR LINK program, which provides funds for university researchers to visit and train at research facilities and was adapted to help science and engineers uprooted by Hurricane Katrina.)

Sometimes opportunity does more than knock. Sometimes it literally beats down your door and doesn't remotely resemble an opportunity. And sometimes advantageous opportunities spring from even the worst of disasters.

Such was the case for some university researchers, graduate students and post-doctoral researchers from New Orleans. Like hundreds of others, their research laboratories had been either devastated or made inaccessible by Hurricane Katrina.

Yet they were able to take advantage of LINK, a Louisiana EPSCoR program to facilitate science and engineering research, education, and training opportunities for faculty, post-doctoral researchers and graduate students.

LINK provides travel and subsistence funding of up to \$7,000* for faculty, who may also sponsor post-doctoral researchers and graduate students, to visit and train at a research facility for anywhere from two to 12 weeks.

The objective of the Links with Industry, Research Centers, and National Labs (LINK) program is the development of partnerships and alliances between Louisiana researchers and collaborators at those facilities.

"Post-Katrina, there was an added objective: to help some researchers rebuild

**It provides, per person, up to \$1,000 for round-trip travel to the facility and up to \$500 per week for meals and lodging, subject to the provisions of State travel regulations.*

Queen Bee Supercomputer 23rd Most Powerful in World

Louisiana's supercomputer Queen Bee is the 23rd most powerful supercomputer in the world and fourth among U.S. universities according to the annual Top500 Supercomputer Sites released in early July.

The 50-teraflops machine is the centerpiece of LONI (Louisiana Optical Network Initiative), a high-speed fiber optics



Dr. Ricardo Cortez, Tulane Associate Professor of Mathematics, with Svetlana Thupova at her May 2007 Ph.D. graduation. Louisiana EPSCoR funded Dr. Cortez's proposal for her visit to the Cystic Fibrosis Center Applied Math Group, University of North Carolina at Chapel Hill.

or continue their investigations at research facilities throughout the nation," says Dr. Michael Khonsari, Louisiana EPSCoR Project Director.

As of mid-January 2006, 23 Katrina-specific LINK awards totaling over \$141,000 had been granted in support of 18 faculty and 17 graduate students and post-doctoral researchers approved by out-of-state reviewers. The awards were funded by the National Science Foundation's Louisiana EPSCoR program.

Through LINK, Louisiana EPSCoR has agreements with the Argonne and Oak Ridge National Laboratories, which also offer stipends and mentors to guide participants in the completion of research

network that connects supercomputers at Louisiana's major universities.

The network led to the Board of Regents granting the LONI universities funding under the Post-Katrina Support Fund Initiative to create the LONI Institute. A \$15 million state-of-the-art collaborative of researchers creating a multi-disciplinary

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projects related to their academic goals and the laboratory missions. The Argonne program is also open to undergraduates.

Highlights of 10 Katrina-specific LINK awards include the following:

Dr. Huimin Chen, a **University of New Orleans** (UNO) Assistant Professor of Electrical Engineering, and a graduate student traveled to Intelligent Automation, Inc. (IAI), a high technology company in Rockville, MD with a track record in commercializing research products and collaborating with universities, including UNO. There, they and IAI investigators developed a robust, adaptive and innovative target estimator for a hit-to-kill interceptor for threats from, for example, rockets, artillery, and mortars.

The main objective of the award to **Dr. Lucy Zhang** was bringing together a group of nanotechnology experts from academic and industry research labs to study nano-surface interactions. For that, the **Tulane University** (TU) Assistant Professor of Mechanical Engineering went to the General Electric Global Research Center, one of the world's most diversified research centers. There, she and her fellow investigators studied the interactions of a droplet on nanopatterned surfaces. The basic physics governing the dynamics of water droplets is extremely rich; understanding these events at microscopic, even nanoscale levels, has important scientific and technological consequences.

Dr. Shunmugham R. Pandian, a **TU** Assistant Professor of Electrical Engineering and Computer Science, visited the Florida Institute for Human and Machine Cognition. There, he continued his research on the design and development of unmanned mobile robots, both underwater and ground vehicles, and intelligent prosthetic devices for soldiers, the disabled and elderly. The collaboration resulted in joint research grant proposals on military robotics to federal agencies.

Recovering and/or rebuilding the molecular

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modeling resources of his lab and continuing his research were the objectives of **Dr. Thomas C. Bishop**, a **TU** Assistant Professor in Environmental Health Sciences. He visited the University of Illinois at Urbana-Champaign Beckman Institute where he was provided direct access to the resources of the Institute's Theoretical and Computational Biophysics Group (TCBG), a National Institutes of Health Resource for Macromolecular Modeling and Bioinformatics. There, he recovered all data from his file server, secured a backup at the TCBG, and improved the performance of a molecular graphics script by a factor of 150,000.

Dr. Suresh K. Alahari, an Associate Biochemistry Professor at **LSU Health Sciences Center - New Orleans**, and his University of Pennsylvania Weaver Laboratory collaborators demonstrated that a novel binding protein inhibits cell migration and the invasion of human breast cancer cells. He also learned several novel methods of studying breast tumorigenesis, the formation or production of tumors.

TU Assistant Professor of Chemistry **Dr. Alexander L. Burin** extended his research to the new area of doped semiconductors at the University of Minnesota School of Physics and Astronomy. He collaborated with a research group headed by one of the world's leading scientists in the area of theoretical thermodynamics and kinetics of complex disorder media.

Dr. Daniel De Kee and his collaborators at the National Institute of Standards and Technology dealt with flow properties of suspensions. A joint grant application was completed for research focused on understanding and characterizing the rheological behavior of viscoelastic systems that have broad applications in a



The aisle between two of Queen Bee's four rows. Note the massive amount of overhead interconnect cabling.

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researchers creating a multi-disciplinary environment among the six LONI sites, the Institute will facilitate joint applications tackling complex scientific research problems.

LONI Institute researchers will initiate projects in cooperation with industry to advance Louisiana's economic development and work toward creating university-industry research centers. Among industries depending on computational advances for their competitive edge are pharmaceutical, petrochemical, aerospace, and manufacturing.

The six LONI institutions are: Louisiana State University, Louisiana Tech University, Southern University, Tulane University, University of Louisiana at Lafayette, and the University of New Orleans.

wide variety of technological processes. A Professor of Chemical and Biomolecular Engineering, Dr. De Kee is also Associate Dean/Director of the **TU** Institute for Macromolecular Engineering and Science.

Dr. Heike Gabrisch, an Assistant Professor of Chemistry with the **UNO** Advanced Materials Research Institute, used instrumentation at the Lawrence Berkeley

National Laboratory and the Argonne National Laboratory to complement her existing studies: the application of transmission electron microscopy techniques in the study of electrode materials in rechargeable Lithium-ion batteries commonly used in consumer electronics. Because of their high energy density, these types of batteries are growing in popularity with the defense and aerospace industries. A post doctoral researcher and a graduate student accompanied her.

Dr. Maureen Shuh, a **Loyola University** Assistant Professor of Biological Sciences, traveled to the Microbiology and Immunology Department of the Emory School of Medicine's Rollins Research Center, where she continued her virology research in a different direction. Dr. Shuh, who lost her entire collection of cells and perishable reagents, also began rebuilding her laboratory.

TU Chemistry Professor **Dr. Mark Fink**, was accompanied by a graduate student and a post doctoral researcher when he visited the Washington University Center for Biomedical and Bioorganic Mass Spectrometry (St. Louis). The complementary approaches of the two institutions in their investigations of reactive gas phase species will lead to fundamental understanding of new chemical bonding modes and reactivity as well as applications to materials synthesis and an on-going collaboration.

Five principal investigators were also awarded grants on behalf of four graduate students and two post doctoral researchers, who visited facilities without their faculty advisors.

"In the long term, the LINK program will benefit Louisiana by strengthening its research capacity," says Dr. Khonsari.



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