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Experimental Program to Stimulate Competitive Research

Researchers' Vision Evolves into Statewide Biomedical Research Network

(The following is the second in a two-part series on the Louisiana Biomedical Research Network.)

An initial step by a small group of university researchers envisioning a statewide biomedical research network has evolved into a giant leap forward for Louisiana.

Using a $3.85 million grant from the Board of Regents Health Excellence Fund, in 2000 the scientists transformed their visualization into reality - the beginning of what is now the statewide Louisiana Biomedical Research Network (LBRN).

Fast forward to 2005: the National Institutes of Health has awarded a $16.9 million continuation to expand and strengthen the network.

Under the latest award, Louisiana Tech University and Louisiana State University in Shreveport are being linked with LBRN collaborators at Louisiana State University and A&M (LSU), the lead institution; LSU Health Sciences Center (LSUHSC), Southern University and A&M (SUBR), and University of Louisiana at Monroe (ULM).

"Additionally, all institutions of higher education are automatically LBRN outreach institutions," says Dr. Harold Silverman, LBRN principal investigator and LSU Interim Vice Chancellor for Research and Graduate Studies.

"As the network encompasses all of the State's major metropolitan areas and institutions from all three major university systems, it services virtually every student, rural or urban, enrolled in Louisiana's higher education system.

"Molecular/cell biology and bioinformatics/biocomputing, the areas in which LBRN investigators are concentrating, were selected on the basis of existing strengths and potential growths within Louisiana universities," he adds.

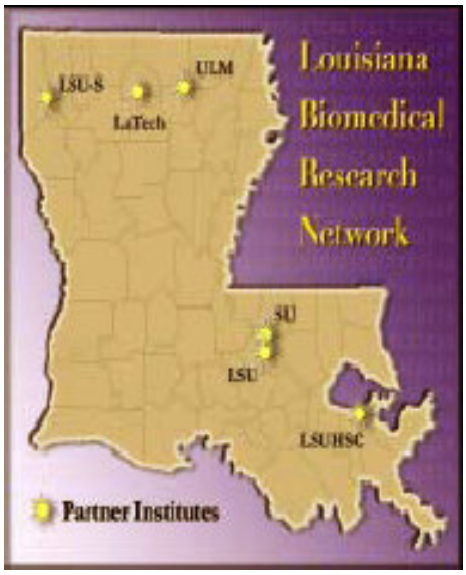
"The efforts and accomplishments of the participating institutions and researchers laid the ground for each succeeding award and the accompanying expansion and strengthening of the network that will allow Louisiana to enhance its biomedical research and training."

"One of LBRN's strongest features is its requirement for collaborations between faculty at primarily undergraduate institutions with those at research universities," notes Dr. David Roane, who heads the ULM biology department. "It fosters the development of productive relationships that extend beyond the grant. I know this has been true for me, other members of our faculty and our students."

"Generating a critical mass of biomedical investigators in Louisiana is integral to the network," says Dr. Michael Khonsari, LA EPSCoR Project Director and Board of Regents Associate Commissioner for Sponsored Programs Research and Development. "The rapid growth of the biomedical and bioinformatics field is unprecedented. It is imperative that our newest researchers have access to state-of-the-art infrastructure and qualified, experienced mentors."

The recruitment and research participation of faculty and qualified students, particularly from under-represented groups, is an LBRN goal and strength. During 2002-04, of the 85 undergraduates supported by LBRN, 37 (43.5%) were from under-represented groups; of the 31 graduate students, 15 (48.3%); and of the 41 faculty, 16 (39%).

Noting that the Louisiana Optical Network Initiative (LONI) has positioned the State in the national lead in optical network, Dr. Les Guice, LONI Management Council Chair and Louisiana Tech's Vice President for Research and Development says that "LBRN positions Louisiana to participate in the cutting edge growth of selected areas of biomedical research."



LBRN Research Collaborations Targeting Myriad of Healthcare Problems

Diabetes, obesity and glaucoma are just three of the targets of researchers with the Louisiana Biomedical Research Network. The following are highlights of LBRN research being conducted throughout the State.

- Investigators from the University of Louisiana at Monroe (ULM) and the Pennington Biomedical Research Center are investigating mechanisms involved in the brain's ability to detect and respond to changes in glucose levels.

  The research, which is particularly relevant to diabetes and obesity, is also testing the hypothesis that anti-diabetic drugs may be acting on the brain.

- The ULM and the LSU School of Veterinary Medicine (LSUVM) researchers studying how brain cells change when chronically exposed to high levels of glucose are working on a model for brain-related changes that occur during the development of obesity and diabetes.

  The model will lead to a better understanding of why it is so hard to lose weight as we get older.

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- Extracting and isolating compounds from marine sponges from the Red Sea with the promise of antibiotics and/or anti-cancer agents is the focus of a team of researchers from ULM, LSUVM, and Louisiana State University and A&M College.
- The genetic mechanisms involved in the reproduction of Herpes Simplex Viruses are being investigated by researchers from Southern University and the LSUVM. The objective is the development of effective strategies to combat the viruses.
- A computer and software system architecture, parts of which are in service, is being developed to address the problem of an increasing number of diabetics and too few retinal specialists. The system allows physicians at remote clinics to send patient data and retinal images to a central facility where retinal specialists look for signs of diabetic retinopathy, a potentially blinding eye disease.

  The ultimate goal is to automate the detection and assessment of features characteristic of diabetic retinopathy, combine the results with patients' electronic medical records, and determine by computer analysis those at highest risk for the disease.
- When pressure in the eye increases, as in glaucoma, the optic nerve head is pushed outward, damaging the retina's blood vessels and nerves. Left untreated, blindness may follow. The strength of the optic nerve head tissue is being studied by engineers in much the same way that they might study the strength and pliancy of steel beams in buildings or bridges. Models of forces on each small unit of material are assembled into an overall model representing the behavior of the entire structure.

  Such models can lead to direct diagnostic methods, allow detailed and accurate predictions of failure, and the course of glaucoma at its earliest stages, even prior to its onset.
- Based on biomedical data collected by two recently retired LSUHSC ophthalmology professors, an LSU mechanical engineering researcher is using engineering techniques to generate predictive models of the flow of fluid in front of the eye and behind the cornea.

  The results could aid in the design of more effective and comfortable contact lenses, surgical and drug approaches to the treatment of glaucoma, drug delivery systems for the eye, and development of refractive surgery methods to correct eyesight permanently without glasses or contact lens.
- Biomedical data can be very complex. It is sometimes impossible to manually identify either individual elements or groups of elements that behave similarly. Researchers from LSU-Shreveport (LSU-S) and LSUHSC in Shreveport (LSUHSC-S) are developing a set of tools and techniques as a software package coupled with additional visualization techniques and interfaces to aid in the exploration and identification of patterns in such large data sets.
- A new approach to organizing scientific data that also uses visual techniques to harness an experimental scientist's intuition is the focus of a group of researchers from LSU-S/LSUHSC-S devising tools that will enable scientists seeking data to utilize multiple clustering methods and analyze the results.

Speaking of Science Speakers Bureau

Louisiana EPSCoR's Speaking of Science (SoS) Speakers Bureau, jointly funded by the Board of Regents and the National Science Foundation since 1996, provides speakers for K-12 schools, colleges and universities, and community organizations.

In 2005, 28 SoS presentations have been given to a combined audience of over 860.

The program's objectives are to spark the interest of students in the science and engineering disciplines; to increase public awareness of exciting research and development in Louisiana; and to showcase the State's leading scientists and their cutting-edge research. The program's 49 speakers include science, mathematics, engineering, and technology faculty from Louisiana's public and private universities.

Information is available at http://laregents.org. Questions should be directed to Ms. Jernigan at (225) 342-4253.

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