

# Science & Technology

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Advocate staff photo by Kerry Maloney

Dr. Nicolas Bazan, director of the Neuroscience Center of Excellence at LSU Health Sciences Center, is leading an effort to use particles just above the atomic level in size to carry medicine to precise areas of the body such as the brain, spinal cord and back of the eye. He hopes his work will help the military treat soldiers with severe head injuries and pain in general, and protect them against laser-induced damage to the retina.

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By JOE GYAN JR.  
New Orleans bureau

NEW ORLEANS — A consortium of Louisiana universities involved in 21st century nanotechnology research shares a common thread with the original "Star Trek" television series of the 1960s.

Capt. James T. Kirk and his crew on the futuristic space ship Enterprise were charged to "boldly go where no man has gone before."

Dr. Nicolas Bazan, director of the Neuroscience Center of Excellence at LSU Health Sciences Center in New Orleans, says the nanotechnology research consortium on which he serves as a team leader likewise is striving to "push the limits and the frontiers of science."

But unlike "Star Trek," the consortium's efforts are not science fiction.

Bazan, for example, is working on three projects of vital importance to the military that involve traumatic head injury, retinal protection against laser-induced injury, and pain management.

Bazan is collaborating with the University of New Orleans' Advanced Materials Research Institute (AMRI) and LSU's Center for Advanced Microstructures and Devices (CAMD) in Baton Rouge. The Defense Department's Defense Advanced Research Projects Agency (DARPA) is funding the research.

AMRI director Charles O'Connor, a UNO chemistry professor, said the DARPA funding is a "direct outgrowth" of Louisiana's participation in the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR).

A consortium of nine Louisiana universities — including UNO's AMRI, LSU's CAMD and LSUHSC's Neuroscience Center of Excellence (NCE) — received a three-year, \$9 million National Science Foundation grant in 2001 to conduct micro- and nano-scale science and technology research. The grant was awarded to the state Board of Regents. The grant money runs out in March.

EPSCoR, set up in 1978, is a federal-state partnership program designed to build and expand the science and engineering research, education and technology capabilities in states that have historically received lesser amounts of federal research and development funding.

In August, O'Connor, Bazan and CAMD director/LSU physics professor

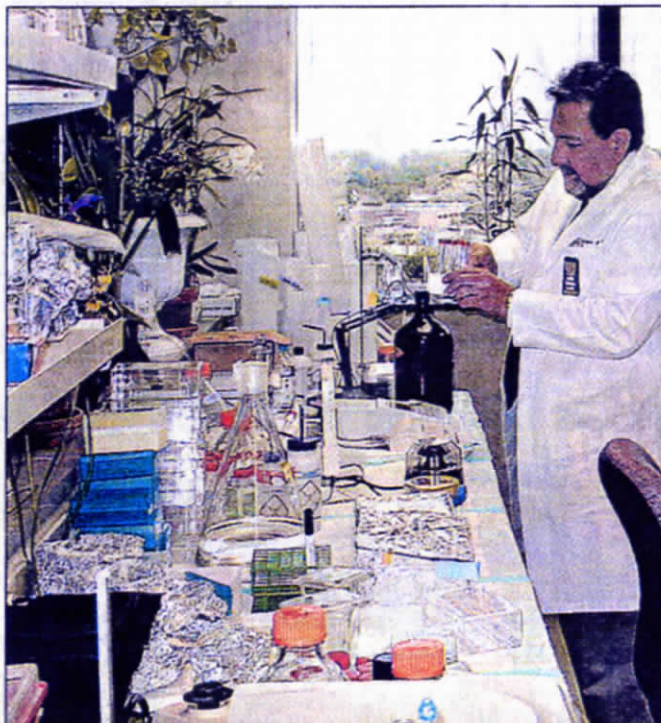


Photo courtesy LSU Health Science Center

Dr. Nicolas Bazan works in his lab at the LSU Health Sciences Center Neuroscience Center of Excellence in New Orleans. He has discovered critical mechanisms that lead to brain damage from stroke and other neurologic diseases.

Josef Hormes announced the receipt of \$1.5 million in DARPA funding and said the AMRI-CAMD-NCE team hopes to receive a total of \$7.8 million over the next five years from the Defense agency.

The team will use nanomaterials, biotechnology and microfabrication techniques and expertise that have been developed in recent years by the nine-university consortium.

Nanotechnology is a hypothetical method or process of creating micro-miniature equipment by manipulating atoms and molecules as if they were parts of a machine. Nanotechnology involves the use of particles — called nanoparticles — just above the atomic

level in size.

In his work involving head injury, retinal protection and pain management, Bazan is trying to determine how those microscopic particles can be used to carry medicine to specific areas of the body.

The Argentina-born Bazan, in collaboration with scientists at the University of Alcalá in Spain, patented an experimental drug earlier this year that he says can protect the retina against damage from bright light, such as lasers used in the military to guide weapons and mark targets.

It is difficult to protect the retina from such light using glasses, Bazan said, and laser-caused retinal damage typically is

irreversible.

"DARPA is very excited," he said. "It can help the soldiers in the field."

The dilemma, Bazan said, is figuring out how to deliver the medicine to the target organ.

"That's the big challenge in ophthalmology — how to deliver drugs selectively to the retina," he said.

Bazan hopes to chemically bind the drug to a nanoparticle that would carry the medicine to the back of the eye.

"A new idea like this may work," he said. "It's a new concept we need to explore."

Bazan said the patented experimental drug, called LAU 0901, is "an outcome of the EPSCoR NSF program." LAU stands for Louisiana Alcalá universities.

The same experimental drug also shows promise as a "neuroprotective compound" in cases of traumatic head injury, Bazan said. When the head suffers trauma, he said, there is a resultant shortage of blood getting to the brain, and severe disabilities often follow.

"You have a very short window to neuroprotect," he said, adding that the drug — which would be delivered to the brain — would need to be available to medics and medical personnel in the field.

Bazan called the experimental drug "the first line of defense to prevent massive damage to the brain."

"We are very excited about this," he said. "Now we have pieces of the puzzle that we need to put together."

Bazan also has a patent pending on a new pain killer that he says would greatly benefit soldiers.

"In the military, pain is a major issue," he said.

Bazan said the Food and Drug Administration approved the drug, named SCP-1, for investigational use last year.

Three dozen volunteers have taken the drug in a clinical trial and have suffered no side effects, he said. The drug is delivered to the spinal cord.

SCP stands for St. Charles Pharmaceuticals, a fledgling New Orleans firm founded by Bazan to keep the drug discovery technology in Louisiana. Historic St. Charles Avenue is near his home.

Bazan's work on new pain killers earned him the moniker "Dr. Feelgood" in a Forbes magazine article in December.