

Looking For Answers

BY KATHLEEN THAMES

"IT IS NOT THE FRUITS OF SCIENTIFIC RESEARCH THAT ELEVATE MAN AND ENRICH HIS NATURE. BUT THE URGE TO UNDERSTAND, THE INTELLECTUAL WORK, CREATIVE OR RECEPTIVE."

Albert Einstein, American theoretical physicist

Across the curriculum, UL Lafayette faculty are driven by what Einstein described as the "urge to understand." • Some of their work may receive more media attention than others. Dr. Karl Hasenstein's research concerning plants' response to gravity, for example, was one of about 80 projects from around the world that were aboard the Space Shuttle Columbia. (See related story, page 28.) But every day, scholars at the University of Louisiana at Lafayette are applying their intellect and skills to valuable research. *La Louisiane* offers a peek at some of their projects.

BIOLOGY

Dr. Darryl Felder

MARINE BIOLOGIST DARRYL FELDER and doctoral student Rafael Robles retrieved another plug of sea floor material from more than 500 meters below the Gulf of Mexico's surface.

They were aboard a research vessel, about 60 miles south of the Louisiana shore. An hour earlier, they had sent down a box core sampler to burrow deep into the Earth. Now, with it back on deck and open for inspection, they could see "globes of crude oil" floating on top of their sample.

"We thought, 'This is going to be a waste. Nothing could live in this muck.'"

But something *was* living in the oily muck.

As the scientists sifted through it, they found some "animals" that closely resemble shoreline crustaceans Felder has studied for 30 years. "I looked at Rafael and said, 'That species is new science. I can tell you that right now. That shouldn't be here.'"

"Here" was in the muds surrounding a deep-water hydrocarbon cold vent, or "seep." It's where methane gas and rich sources of sul-

fides have accumulated below the ocean floor and sometimes percolated to the sea floor surface, along with pockets of crude oil. Actually, not all methane there is gas. Some is a "gas hydrate," sort of like dry ice.

"In this environment, it's a rich resource for animals," Felder explained. "They live below the level where photosynthesis occurs, so it's a totally different system of existence." Instead of relying on sunlight, colonies of "chemosynthetic" bacterial organisms derive energy from chemical processes that depend upon the presence of sulfide and hydrocarbons. Other organisms then live off these bacteria.

Several of the crustacean species Felder and Robles collected that day are completely new to science.

A deep ocean seep was about the last place Felder would have expected to find them. The closest relatives of the most abundant crustaceans they retrieved are in deep waters of the western Pacific Ocean.





Dr. Magdy Bayoumi

CACS IS WORKING WITH THE ELECTRONICS Institute in Cairo, the top research center in Egypt, to find a way to better process compressed digital video and images without losing quality.

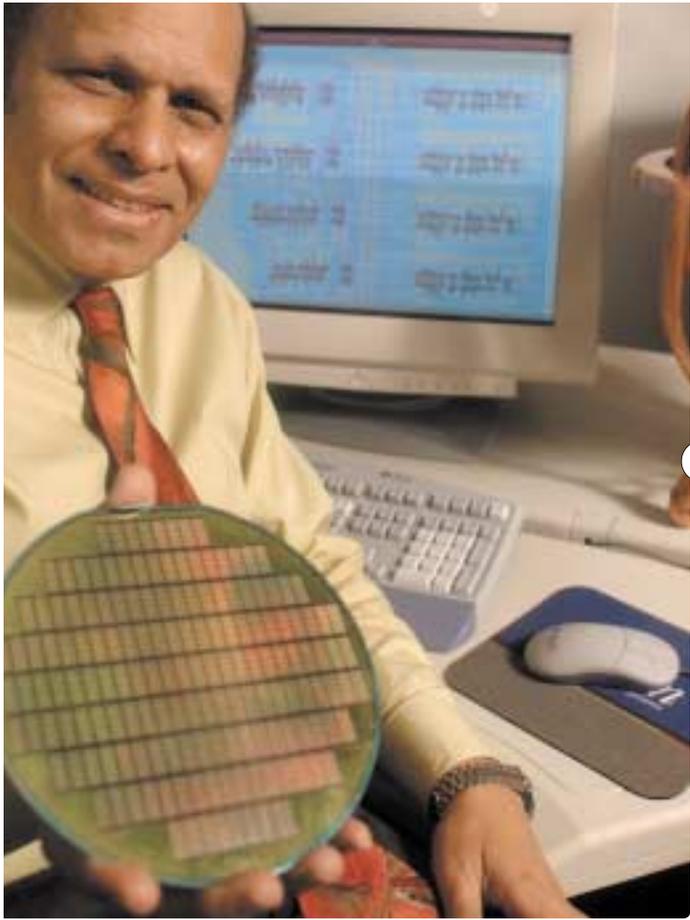
Now, sending quality data via video compression uses a large bandwidth (the amount of data that can be passed along a communications channel in a given period of time.) Large bandwidths can be costly. Sending compressed video on a smaller bandwidth reduces the expense, but also lowers the quality of the video.

This new project would develop a less expensive way to send compressed video, without a loss of quality.

This type of transmission could be used in a range of fields where lots of data needs to be transmitted, such as medical applications, government programs and digital libraries.

"The research we will conduct will lead to better technology than what we have now," said Dr. Magdy Bayoumi, director of CACS. "Research leads to evolution."

He added that CACS has a long history of relationships with other countries that includes exchange students and faculty, as well as research.



TERRI FENSEL

DIETETICS

Dr. Bernice Adeleye

WHAT ROLE DOES NUTRITION PLAY IN THE management of Sickle Cell Disease?

A study under way by Dr. Bernice Adeleye, a professor of dietetics, could someday help some of the more than 70,000 Americans who have the disease. She is collaborating with a group of physicians at University Medical Center in Lafayette that specializes in the inherited blood disorder.

"We know that nutrition plays major roles in wellness, disease prevention and disease management," Adeleye said. "For example, nutrition is important in the management of chronic diseases, such as cardiovascular diseases, some cancers and diabetes."

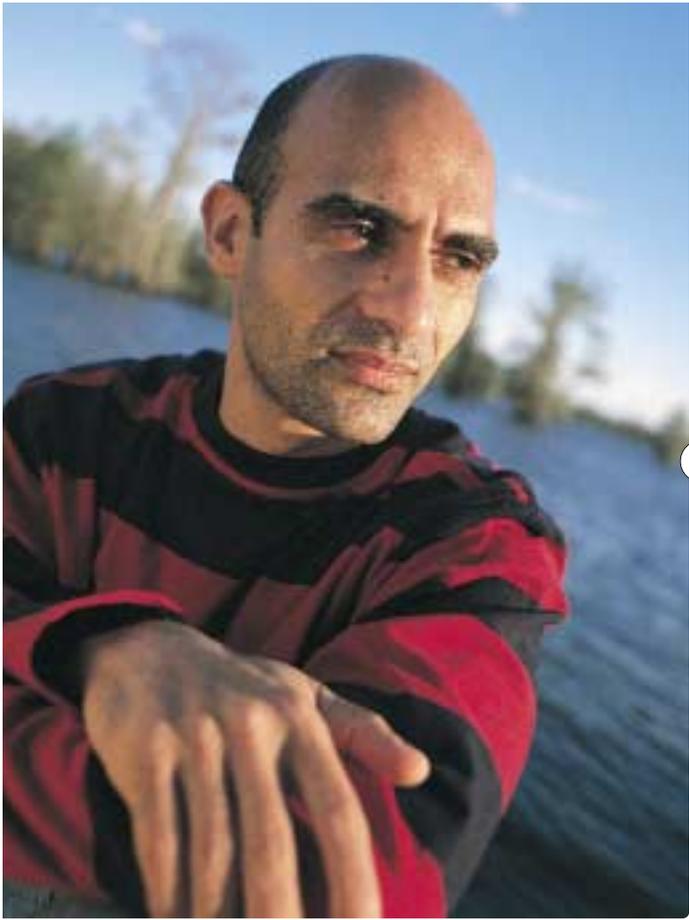
But there is no standardized nutrition protocol for the management of Sickle Cell Disease.

Red blood cells of Sickle Cell patients contain an abnormal type of hemoglobin and are sometimes sickle-shaped. Because of their shape, some cells have difficulty passing through blood vessels and can eventually block normal blood flow to tissue. That blockage can result in inflammation, excruciating pain or tissue damage.

There is no cure for Sickle Cell Disease.



TERRI FENSEL



CIVIL ENGINEERING

Dr. Ehab Meselhe

THE MISSISSIPPI RIVER ONCE NOURISHED most of coastal Louisiana on its naturally shifting course toward the Gulf of Mexico. Now, a levee system that controls the river's path has deprived coastal wetlands of much-needed sediment, freshwater and nutrients.

One possible way to bring ailing wetlands back to good health is to divert fresh water and sediment from the Mississippi River, suggests Dr. Ehab Meselhe, an associate professor of civil engineering at UL Lafayette. But scientists should first consider the impact any such action would have on the river, as well as the wetlands.

Meselhe is developing a three-dimensional numerical model for a portion of the Lower Mississippi River, from Baton Rouge to the river mouth, to help researchers fully understand the dynamics of the river, from water, salinity, sediment, and water quality points of view.

"It will also be used to evaluate and quantify the impact of diversion projects on the river itself and its dynamics, determine the best strategy for diverting river water, determine optimum locations for diversions and quantify available fresh water and sediment at each diversion (existing or potential) site," Meselhe said.

DOUG DUGAS

RENEWABLE RESOURCES

Dr. Lora Lana Goodeaux

UL LAFAYETTE'S MODEL SUSTAINABLE Agricultural Complex in Cade, La., is the site of a multifaceted study that will examine how "best management practices" can affect water quality improvement.

Dr. Lora Lana Goodeaux, a professor of reproductive physiology, is principal investigator of a project that will:

- compare two cattle grazing methods to determine their impact on pasture runoff;
- compare three methods of managing sugarcane residue to evaluate their influence on water quality;
- study two methods of water conservation and three forages grown in crawfish ponds in St. Martin Parish, which has the largest concentration of crawfish ponds in Louisiana; and
- examine the use of a strip of vegetation to remove pollutants from sugarcane field runoff.

The diversity of soils and land uses at the complex makes it an ideal setting to also assess innovative technologies and sustainable farming practices that are intended to reduce pollutants discharged into the Gulf of Mexico and bodies of water in Louisiana.

DOUG DUGAS

