Virtual Advantage

High-tech tools link university, military training centers

IT LOOKS LIKE A WAR zone in the University of Louisiana at Lafayette's Abdalla Hall. Actually, special 3-D glasses are needed to see the battle because it's a virtual war zone.

Dr. Carolina Cruz-Neira, the W. Hansen Hall professor in Computer Engineering, and a team of university researchers built a cave-like environment that takes users into a virtual dimension. Giant screens form a backdrop for an oversized treadmill that is capable of moving in all directions.

"It's kind of like a prototype for a Star Trek holodeck," said Cruz-Neira, a pioneer in the virtual reality realm. "The screens immerse you in a world generated by computers and you have 3-D perception just as if you were watching a 3-D movie or an IMAX movie."

It's the only one of its kind on a university campus; others are on military bases.

Three projection screens surround the omni-directional treadmill, while eight high-definition cameras mounted on the screens capture the user's movement. Projectors display computer-generated environments on the screens. While wearing 3-D glasses, users are immersed in a virtual reality world.

That world can resemble any location, from the Sahara Desert to the streets of Paris. It can also mimic environmental conditions. "We can create simulations of various situations from heavy winds to earthquakes," Cruz-Neira said.

'These immersive simulators provide for repeatable, event-driven research scenarios where soldiers can be placed in stressful or seemingly dangerous operational situations with no risk to their safety. We can see the effects of both the cognitive and the physical workload on human performance.'

KATHY KEHRING
U.S. ARMY RESEARCH LABORATORY

The 12-foot-tall by 9-foot-wide contraption resembles a three-sided box, with one wall left open to enable a person to step onto the treadmill.

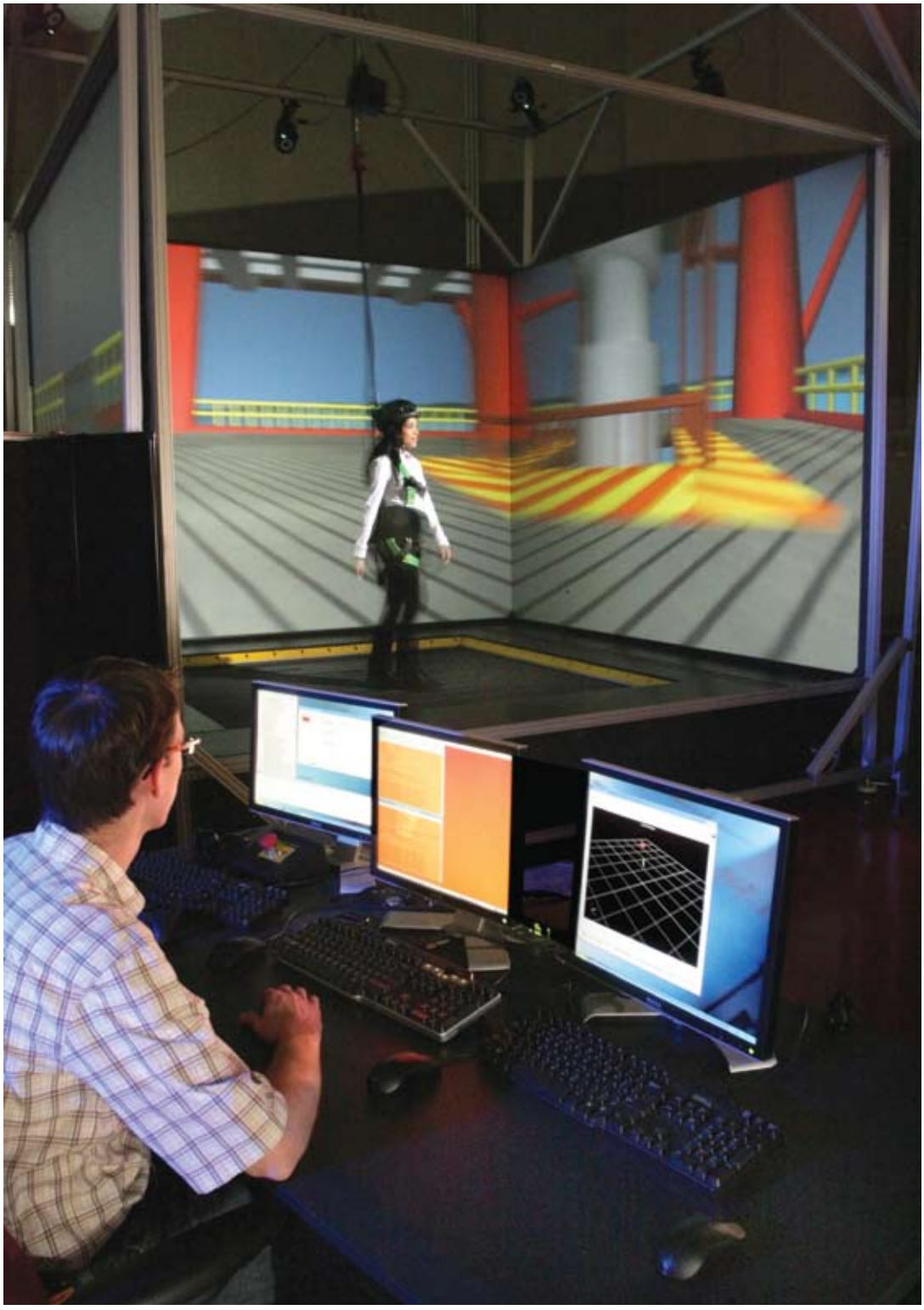
UL Lafayette acquired the treadmill and designed and built the projection chamber around it to create a virtual environment to enter simulated worlds that can be explored by walking. UL Lafayette received $3.1 million in federal funds for a research project for the U.S. Army Research Laboratories in Maryland.

"Specifically, we are conducting research on the levels of stress on foot soldiers on a battlefield. We're developing scenarios that would be comparable to what they would find in battle and we are measuring their reactions and their mental abilities in these environments," Cruz-Neira said.

Soldiers participating in the study will wear sensors to monitor their brain activity and temperature as they move through the virtual war zone.

These environments could include sniper gunfire, car explosions or hand grenades. "They will experience things just as if they are in a war. They will have to react quickly and computers will record their responses," Cruz-Neira explained.

Researchers are developing these scenarios with actual testing on soldiers set to begin by year's end. Software applications are also being developed to connect the



DOUG DUGAS

University of Louisiana at Lafayette research scientists test the omni-directional treadmill in Abdalla Hall. Dioselin Gonzalez is walking in the virtual environment. Carsten Neumann monitors computers used to collect data.

military's treadmills with UL Lafayette's treadmill, so soldiers can virtually travel together through battlefields.

Kathy Kehring is the tactical environment simulation facility manager at the U.S. Army Research Laboratory in Durham, N.C., which houses another omni-directional treadmill. Three more are in place at the U.S. Army's Maneuver Battle Lab in Fort Benning, Ga.

"These immersive simulators provide for repeatable, event-driven research scenarios where soldiers can be placed in stressful or seemingly dangerous operational situations with no risk to their safety. We can see the effects of both the cognitive and the physical workload on human performance," Kehring said.

Earlier versions of the treadmill fell short of creating the kind of virtual environment researchers were looking for. Today's treadmill has a larger working surface and its design "enables the soldiers to go prone or crawl. These factors, and others, all contribute to increased physical immersion into the environment and more realistic effects from the physical workout," Kehring continued. "You would not see the same realistic effects from the physical workload and fatigue using a joystick or game controller to move through a simulated environment."

According to Kehring, researchers can measure a wide variety of factors, such as "biomechanical motion, time to complete a task, path traveled, target acquisition and identification, virtually anything occurring in the environment."

Dr. Robert Stewart, vice president for Research and Graduate Studies at UL Lafayette, said the treadmill could have additional applications in the future.

"The omni-directional treadmill is a very important piece of equipment as we develop research programs relating to 3-D and visualization. These programs could include training for emergency responders or even mobility help for the elderly."

Stewart noted that multiple disciplines on campus could take advantage of the treadmill. "I would envision faculty from the College of Sciences, College of Engineering and College of Education benefiting from research opportunities that arise with this treadmill.

"It's an amazing piece of equipment."

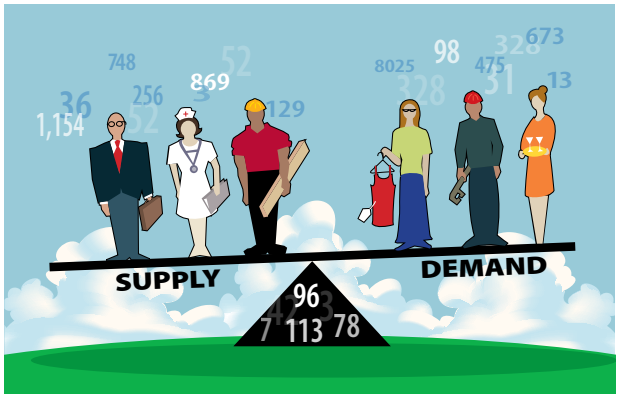
Work In Progress

SUPPOSE AN AUTOMOTIVE MANUFACturer in north Louisiana cuts 400 jobs, while a seafood processing company expands, creating 200 jobs.

What is the overall effect on the Louisiana workforce? How can educational institutions prepare graduates whose knowledge and skills match available jobs?

These are the kinds of questions UL Lafayette researchers will consider. The Louisiana Workforce Commission (formerly the Department of Labor) has signed a three-year, $6 million contract with a UL Lafayette research consortium made up of the Cecil J. Picard Center for Child Development, the Center for Business and Information Technologies and the B.I. Moody III College of Business Administration.

"Business and industry are the consumers of the workforce we provide," said Dr. Ramesh Kolluru, director of CBIT. "The Workforce Commission has done a phenomenal job of finding out what kinds of jobs are being created and what business and industry say they need. That's the demand."



ANNE DARRAH

The UL consortium will help make job forecasts more accurate by including supply-side information, which Dr. Billy Ray Stokes, executive director of the Picard Center, calls "the educational pipeline." Stokes said UL Lafayette is uniquely positioned to provide that information through the work of the Picard Center.

To make all that information user-friendly, CBIT is developing a computer-driven workforce impact simulator. "It will allow you to ask 'what if' questions," Kolluru said. "What kinds of businesses do we want to keep? What kinds of businesses do we want to strategically recruit?

Meanwhile, the supply side – education – can provide strategic guidance and direction. "What kinds of talents and skills and economic training and educated workforce do we provide and build up, so that the state remains viable? Not just today, but 10 years from now, 25 years from now.

"To us, it represents more than just a project. It is a great opportunity for the university to make meaningful contributions to the community and to the state," said Kolluru.

CAJUN AMBASSADORS RECEIVE HONORARY DEGREES


George Rodrigue

Artist George Rodrigue, known best for his Blue Dog paintings, is the latest to earn an honorary doctorate from the University of Louisiana at Lafayette. He was honored during the Graduate School's commencement in May.

Rodrigue follows Cajun musician Zachary Richard, who was presented an honorary doctoral degree in fine arts in December.

Rodrigue, a native of New Iberia, La., attended UL Lafayette for six semesters in the mid-1960s before transferring to the Art Center College of Design in Los Angeles.

Rodrigue's most famous series of paintings began when he painted his interpretation of a mythical *loup-garou*, or werewolf. He found inspiration in photos of his studio dog, Tiffany, who had died several years before. He painted the *loup-garou* as a pale grey-blue dog and gave it red eyes. Over time, he changed its eyes to yellow, creating a friendlier image.

In October 2008, Gov. Bobby Jindal declared Rodrigue as the artist laureate for Louisiana.


Zachary Richard

Richard, a native of Scott, La., is an internationally acclaimed singer-songwriter and poet. He is especially popular in France and Canada. His Canadian album releases have earned gold and platinum status and he has won two Felix awards, the French-Canadian equivalent of the Grammy Award.

An award-winning author, Richard has published three volumes of poetry and three children's books. He is also a film producer. In 2000, he produced, narrated and scored "Against the Tide," a television documentary detailing the history of the Cajun people.

Throughout his career, Richard has maintained strong ties to Louisiana. He is a founding member of Action Cadienne, a volunteer organization dedicated to the promotion of the French language and the Cajun culture of Louisiana.

Richard has been honored by the French and Canadian governments. In 1997, he was decorated Officier de l'Ordre des Arts et Lettres de la République Française. That same year, he was initiated into the Ordre des Francophones d'Amérique by the government of Quebec.