

Technological CONVERGENCE

By G.K. Sharman

MEDICAL SIMULATION, BIO-PHOTONICS AND ROBOTICS ARE JUST SOME OF THE HYBRID INDUSTRIES EMERGING RIGHT HERE IN CENTRAL FLORIDA.

» Synergy, by definition, is work by two or more entities that results in more than the sum of the individual parts. In Central Florida, such convergence not only brings larger than expected results, it often goes in unexpected directions.


Life science, simulation and photonics are particularly fertile fields for industry and research collaboration, and Central Florida, with strengths in all three realms, is a particularly fruitful location for technological convergence.

Take the growing field of medical simulation, for example. The University of Central Florida's (UCF) Institute for Simulation and Training (IST) is a national leader in this emerging field. In one current project, IST is working with the Army and Chi Systems, a high-tech research and engineering company, to train soldiers in basic battlefield first aid. IST has developed what director Randall Shumaker calls "serious video games" as part of the training.

The goal is to make the experience as realistic as possible, something IST accomplishes by bringing together game developers, computer coders, creative writers, robotics experts, scientists and other experts — a process that distinguishes the "serious games" from more common entertainment-based video games.

In one scenario, a soldier has to save a buddy whose hand has been blown off. On the computer screen, blood spurts from the arm. Gunfire can be heard in the background, as well as the screams — and sometimes curses — of the victim. The trainee applies a tourniquet to a robotic arm wirelessly connected to the computer screen to stop the bleeding.

"Everything you do is reflected in the game," Shumaker says. So when



The Institute for Simulation and Training (IST) at UCF prepares students for jobs in Central Florida's high-tech industries.

COURTESY IST



COURTESY IDEAS

Last year, *60 Minutes* utilized animation produced by local company IDEAS in a story about cold fusion.

the trainee tightens the tourniquet, the blood flow on the computer stops — but it can start again as the fibers of the tourniquet loosen, just as they would in real life, which teaches the trainee to pay attention.

In addition to the noises, the simulation also can include smells — everything from vomit and bowel odors all the way to burned uniforms, burned flesh and decomposition. They make the simulation more realistic, Shumaker says, and also serve as a diagnostic tool: with a stomach wound, for instance, the smell can be a clue to the location of the injury.

Not all simulations are so intense. Elsewhere on the UCF campus, tools are being developed to allow soldiers to “train” at a forward lookout post and teachers-to-be to learn how to best interact with students.

“Real life is 360°,” says Eileen Smith, associate director of the Media Convergence Laboratory at IST, pointing out that the simulations are often so realistic that people forget they’re virtual. One teacher-training participant yelled at the “students” on the screen for several minutes, she says. Better to do that in the lab than in a classroom.

Elsewhere in the lab is a prototype of another game — the test subject wears a headset and interacts with a scenario projected onto a green-screen-type curtain — that would let military medical personnel diagnose cognitive function in soldiers with brain injuries. Instead of being discharged, as is routinely done now, Smith says, this advanced diagnoses could lead to soldiers being

placed in other, less stressful positions for which they remain well suited.

Another Central Florida simulation collaboration got some serious TV time last year when it was featured as part of a report on CBS’ *60 Minutes*.

IDEAS, a digital media production company based in downtown Orlando, was hired by Rick Kramer Media to create a Website and several high-end animations for Energetics Technologies’ use in explaining its SuperWave™ Fusion, or “cold fusion” process, says the company’s vice president for innovation, Duncan Kennedy.

“The scientists and physicists working on the SuperWave™ Fusion research at the main laboratory facility in Israel



COURTESY IST

UCF’s IST uses robotic arms in medical simulation exercises.

were blown away by the animation and extremely excited about how it clearly explained and visualized an extremely complex and still not completely understood scientific phenomenon,” he says.

Kennedy produced the project, wrote the script and worked closely with IDEAS motion-graphics artist Greg Roux to make sure the animation was scientific

“THE GOAL IS TO MAKE THE EXPERIENCE AS REALISTIC AS POSSIBLE, SOMETHING IST ACCOMPLISHES BY BRINGING TOGETHER GAME DEVELOPERS, COMPUTER CODERS, CREATIVE WRITERS, ROBOTICS EXPERTS, SCIENTISTS AND OTHER EXPERTS.” — RANDALL SHUMAKER

cally accurate. When the *60 Minutes* story — titled “Cold Fusion Is Hot Again” — aired on April 19, 2009, it used an amazing 30 seconds of animation in the 12.5 minute feature.

GROWING BIO-PHOTONICS

Another emerging “hybrid” field that builds on Metro Orlando’s established strengths is bio-photonics. The genesis

of this industry was the funding of CREOL, UCF’s College of Optics and Photonics, which 20 years ago spawned related industries and “enabling technology” that’s hard to find in places where technology is not in the forefront, says James Pearson, executive director of the Florida Photonics Cluster.

Today at CREOL, researchers are working on a number of projects relating to biophotonics, or “how we apply light in its many forms to biological applications,” Pearson says.

Among them is cutting-edge nanotechnology to treat cancer. Light can be used to stimulate nanoparticles in certain applications. Nanoparticles also can be heated with a laser to destroy cancer cells — techniques of interest to the Cancer Research Institute, part of the M.D. Anderson Cancer Center-Orlando, which is part of the Orlando Health system.

One measure of the growing presence and reputation of biophotonics in Central Florida is the fact that the medical imaging meeting put on by SPIE, an international photonics and imaging society, is going to be held in Orlando in odd-numbered years. Last year was the first time this major meeting was held outside southern California, where the organization began more than 50 years ago.

The power of converging industry is also being felt in the field of robotics, which is a focus at Florida Hospital’s Nicholson Center for Surgical Advancement. Known worldwide for its robotics

surgery, the Nicholson Center recently received a \$4.2 million Department of Defense grant to focus on tele-surgery, tele-monitoring and tele-broadcasting. This research investment is intended to revolutionize civilian and military capabilities in surgical robotics.

From robotics to medical simulation, when it comes to emerging technologies, Central Florida is at the forefront of new partnerships and industries. ✕