Simulation-based training, education facility to focus on power industry

John Toon
Research News

As utility company executives make plans to meet the growing electricity needs of the Southeast, they’re also watching their most experienced personnel approach retirement age. Finding enough skilled personnel to operate complex power-generation facilities poses one of the most critical challenges facing the industry today.

Collaboration between Baltimore-based GSE Systems and Georgia Tech offers one solution: a new way of learning that combines traditional classroom training with hands-on experience using advanced computer simulations of complex industrial facilities. Simulations have long been used to train pilots, but are relatively new to other types of industrial training.

This “learning by seeing and doing” offers utility companies a way to more rapidly meet their most critical human resources needs.

“One learns by seeing, experiencing and actually doing something,” explained Eric Johnson, senior operations training specialist for GSE Systems. “We can reinforce what students have learned in class by allowing them to interact with a simulation of a facility. The simulation allows them to gain experience without actually having to be in a real plant, and that helps new employees become productive faster.”

To provide that innovative learning environment, GSE has built a multi-million-dollar simulation and education center at the Global Learning Center in Technology Square. The company officially opened the facility — the first of its kind in the United States — during a ceremony last week. The center includes more than a dozen LCD panels driven by a powerful computer to simulate the many key systems operated from the control room of an electric generating plant. Student operators can adjust controls and immediately see the effects of their actions not only on the system they are controlling, but also on the rest of the plant. Realistic warnings indicate potentially dangerous conditions to which the students must respond. Three-dimensional models show the systems and exact components being controlled.

“Every complex entity — airports, seaports and large production facilities — is going need simulation training to improve the work force,” said Michel Krause, director of university programs for GSE. “I believe that with this collaboration, we are headed toward a new dimension in training and education.”

Georgia Tech is contributing $10 million to the project.

New GT-Edison Fund guided by ethos of famed inventor

Dan Treadaway
Institute Communications and Public Affairs

Thomas Edison tested more than 3,000 filaments before he came up with his version of a practical light bulb. Even before this early stage of development, the light bulb was nothing but an idea in Edison’s mind — a concept that might or might not be technologically or commercially viable in the real world.

The Georgia Tech faculty is brimming with modern-day Thomas Edisons, and the Institute strives to encourage their Edisonian sense of intellectual adventure and entrepreneurial risk-taking.

That goal will be much easier to realize thanks to a new initiative dubbed the Georgia Tech-Edison Fund, which is designed to provide “pre-natal care” for the ideas of Georgia Tech faculty during their very earliest stages. The GT-Edison Fund was established through a new grant from the Charles Edison Fund, based in Newark, New Jersey.

The multi-year grant established the GT-Edison Fund in Tech’s VentureLab. Part of Tech’s Enterprise Innovation Institute, VentureLab helps transform innovations into early-stage companies by assisting in business plan development, connecting innovators with experienced entrepreneurs, locating sources of early-stage financing and preparing new companies for the business world.

The GT-Edison Fund will provide vital support for this work by helping faculty members develop their ideas for new technologies into marketable products or processes.

“This is a novel idea that I don’t think has been tried before,” said Georgia Tech-Edison Fund director Dan Treadaway.

Prashanth Irudayaraj, who earned his mechanical engineering undergraduate degree in May, works on the climate control system of Georgia Tech’s entry in the Solar Decathlon, the international competition sponsored by the U.S. Department of Energy. The project, to construct an 800-square-foot home that is both energy efficient and innovatively designed, has been under way for nearly 20 months and will be on display with the other entries on the National Mall in Washington, D.C. next month.

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Beloved Tech family endows women’s tennis scholarships

Dan Treadaway
Institute Communications and Public Affairs

One of the most inspiring success stories to emerge from Georgia Tech’s athletic program in recent years is the dramatic national championship victory of the women’s tennis team last spring. This represents the first ever NCAA national title in the Institute’s storied athletic history.

While Coach Bryan Shelton and his players have much to be proud of, the last thing they want to do is rest on their laurels. Shelton is looking to continue building on the momentum he has already established and spur the team on to even greater accomplishments.

Thanks to a significant gift from a beloved Georgia Tech family, Shelton will have additional resources to take his team to the next level of excellence. The family of the late William E. “Bill” Moore — widow Desiree B. “Dec” Moore, daughter Chris McCall, and son William Moore II — has made a seven-figure gift to establish the Moore Family Scholarship Fund for Women’s Tennis. Income from the endowment will fund Moore Family Scholarships for members of the women’s tennis team in perpetuity.

“The Georgia Tech community has benefited from the generosity of the Moore family for many years,” said Shelton. “I am so grateful for Mrs. Moore’s confidence in our talented and driven athletes. This endowment is a long-term investment in our team that will allow us to attract women students who are highly skilled and competitive tennis players and top-notch scholars.”

The Moore family has a long history of supporting Tech student life and athletics. In the early 1990s, Bill Moore’s seven-figure gift to his alma mater resulted in the naming of the Bill Moore Student Success Center, which houses the offices of Admission, Student Financial Aid, Career Services and the President’s Scholarship Program.

In addition to his leadership gift for the Student Success Center, Moore also provided the funding for what would ultimately be named the Bill Moore Tennis Center. Upon hearing of the tennis team’s victory clinching the national championship, Mrs. Moore exclaimed, “Hooray for our side!”

“I am very pleased to be able to continue Bill’s support of Tech athletics, especially our wonderful women’s tennis team,” Mrs. Moore continued. “Bill so enjoyed competing on the tennis court in his student days, and he was passionate about leaving behind a legacy that Tech tennis players could benefit from for many years to come. I know that he would be so proud of Tech’s national championship team, and I think this gift is a fitting tribute to his passion for Tech athletics.”

Members of the Georgia Tech women’s tennis team celebrate after clinching the first NCAA national title in the history of the Institute. The team has also won three consecutive ACC Championships and owns the National Indoor Championship title.

Milken speaks about future of health care at Petit event

Megan McRae
Morgan McRae
Institute Communications and Public Affairs

Influential financier and philanthropist Mike Milken was the featured speaker at the Special Friends of Petit Breakfast held earlier this month by the Parker H. Petit Institute for Bioengineering and Bioscience (IBB).

Milken, one of America’s leading health care philanthropists for more than three decades, is passionate about accelerating the search for solutions to all life-threatening diseases and is a leading advocate of nutrition, prevention and wellness programs to help employers improve the health status of their employees.

Milken’s talk, called “Improving the Quality of and Length of Life,” focused on how unhealthy populations and rising health care costs directly affect a nation’s ability to compete in a competitive global economy. According to Milken, America spends around $2.77 trillion each year on health care, the largest portion of the U.S. (and world) economy. But the total cost of U.S. health care climbs to about $1 trillion when the lost productivity of sick workers is included.

The key to turning the tide of rising health care costs that burden the United States economy, Milken said, is investing in technologies and programs that prevent disease and unhealthy behavior before they strike. About 70 percent of health care-related expenses can be attributed to lifestyle choices (lack of exercise, poor diet, smoking, etc.).

In particular, investing in comprehensive health programs for the very young would be a cost effective way to repair the ailing health care industry and, in turn, gradually improve the health of the world’s population, Milken said.

For more information:
Parker H. Petit Institute for Bioengineering and Bioscience
www.ibb.gatech.edu
Award creates center to study physics of MEMS devices

Rick Robinson
Research News

Researchers at Georgia Tech have received a Defense Advanced Research Projects Agency (DARPA) award to participate in a multi-university research center that will develop a computer-aided design (CAD) environment for micro-electromechanical systems (MEMS) and nano-electromechanical systems (NEMS).

The new research center will be led by the University of Illinois at Urbana-Champaign and will include teams from Purdue University and Lehigh University as well as Georgia Tech. A consortium of companies will also participate financially with DARPA in the center.

Tech’s share of the research will be conducted by a team associated with the School of Electrical and Computer Engineering (ECE).

The research will seek to develop CAD systems that are based on physical models and therefore can conclusively predict the behavior of MEMS devices. Eventually engineers developing systems with MEMS devices could use a simple drag-and-drop interface to simulate not only the electrical effects of MEMS usage, but also thermal, mechanical and reliability aspects as well.

“With this kind of predictive capability could greatly increase the speed with which MEMS-enabled microsystems can be developed,” said John Papapolymerou, an associate professor in ECE.

Although MEMS-enabled microsystems have the potential to revolutionize communications, sensors and signal-processing, he said, their capabilities have been limited by a lack of understanding of how physical phenomena govern MEMS-device functionality. It’s particularly unclear how much performance is degraded when MEMS devices are exposed to the operating conditions of an integrated circuit.

“When we have a better understanding of the fundamental physics of MEMS devices, we can then proceed to the higher-order models and leverage that is required to develop a CAD program,” Papapolymerou said.

The ultimate goal of the center, he said, will be to promote the availability of these devices in military and commercial applications.

“This is meant to be a dynamic center,” Papapolymerou said. “The idea is going to be to expand this in the future, so we can also expand the number of research problems that we understand.”

Micro-electromechanical systems (MEMS) are difficult to design, in part because the physics of their tiny moving parts is not fully understood.

John Keegan, chairman and president of the Charles Edison Fund. “What makes it novel is that it provides support to faculty members whose ideas are literally in the pre-natal stage, before the concept is developed enough to take to a venture capitalist to seek funding.”

Keegan said the grant will be especially helpful to faculty who are not familiar with the commercialization process, who are unable to pursue commercialization because of time constraints, who lack adequate business expertise and those who need assistance in crossing disciplinary boundaries to make an idea more commercially viable.

“We hope the GT-Edison Fund will result in Georgia Tech being much better equipped to retain its best faculty, because these highly sought after scholars will realize how much the Institute and the Charles Edison Fund care about developing their careers and their ideas,” Keegan said. “We also expect these activities to attract high-caliber faculty from other institutions to Georgia Tech.”

Alumnus Edward Allman, a longtime member of the Charles Edison Fund Board of Directors, played a key role in advocating for the funding to establish the GT-Edison Fund.

“I firmly believe that the GT-Edison Fund will be the starting point for some of our nation’s most promising new technologies,” said Allman. “Georgia Tech was founded on a tradition of taking theory and applying it in the real world in ways that make people’s lives better. Thomas Edison once said that genius is 1 percent inspiration and 99 percent perspiration, which reminds me of what life was all about at Tech. I am thrilled to be a part of the joining of these organizations and look forward to great progress.”