Clough advises Congress on federal research funding

Last fall, the President’s Council of Advisors on Science and Technology (PCAST) reported that research and development funding was becoming dangerously imbalanced, and recommended that the funding levels for the physical sciences and for engineering be enhanced and that funding levels be brought to parity with the life sciences. Recently, President Wayne Clough, who chaired the Council, was invited to Washington, D.C., to address these findings.

Speaking to the Energy and Natural Resources Subcommittee of the Senate Energy Committee on July 29, Clough was asked to discuss the role of the Department of Energy’s Office of Science in supporting research in the physical sciences, an office that currently provides 10 percent of federal funding for basic research.

Together with Herman Grunder, director of the Argonne National Laboratory, and Burton Richter, a Nobel laureate in physics, Clough outlined three main points for a balanced “national investment portfolio” in research and development.

“If we want to maintain our standard of living and our position of world leadership,” he said, “it is crucial that we invest in long-term, fundamental research, which is conducted largely at universities and national labs; that we maintain a balance across the disciplines so that they move forward together; and that we pay attention to the education of the next generation of scientists and engineers.”

One indicator that the United States is in danger of slipping in its global leadership role in science research is the decrease in the number of doctoral degrees awarded in these fields. The number of Ph.D.s awarded in the United States in the sciences peaked in 1998. Engineering Ph.D.s peaked in 1996 and had declined by more than 15 percent by 1999.

Federal funding of university research is seen by graduate students as an indicator of career opportunities. As the financial support erodes, so do the number of potential researchers in the United States.

“The federal government’s a key to sustaining the research that we do at universities and encouraging our collaboration with private industry,” Clough said. “The one single difference between the research private industry would do and research universities would do, other than what my colleagues have said, is we educate the workforce of the future.

“When we do research, we are educating young people, we’re preparing them to take important roles in society, and if we’re not doing that, you’re going to lose the seed corn for the future.”

A new approach to introductory computing for non-CS students

Emphasizing communication rather than computation

Joy Weeks
College of Computing

Most Tech students will tell you that introductory computer science (CS) courses are not considered “user-friendly” — especially for non-CS and non-engineering majors. Non-CS majors in particular have voiced concerns about the relevance of introductory CS content to their diverse fields of study. In fact, CS programs nationwide have witnessed dramatically low retention rates and failure rates as high as 50 percent.

Recent studies by the American Association of University Women show that the kinds of concerns voiced by Georgia Tech students have had an especially negative impact on female participation in CS courses.

One course offered as a pilot this spring in the College of Computing (CoC), however, may forever change the landscape for non-CS majors. Titled “Introduction to Media Computation,” the pilot offering of the course included 120 students, two-thirds of whom were women. The course uses “computation for communication” as a guiding principle.

CS 1315 students study and create programs that manipulate sound, images and movies.

Specialized technology for the course was developed by a team of undergraduate students and includes an environment for programming and a suite of applications that support an exploration of media.

“The technology built for the course was more effective than we anticipated, given the pilot nature of the course and the software,” said Associate Professor Mark Guzdial, who created and taught the pilot course. “The results in our first offering of the course have been remarkable.”

Doctoral student and research assistant Andrea Forte said, “While we are still in the process of exploring its effectiveness as a learning environment, I think the simplicity of design contributed to students’ success.”

By drop day, only three students out of 120 had dropped the class.
"They bring a different perspective (which is a benefit to us) — a fairly broad and diverse group of students in the class. It’s an education for students to learn from different cultures."

—Ann Johnston Scott, director of graduate programs at the DuPree College of Management, on Tech’s effort to attract more international students to learn from diverse cultures.

Students and instructors have begun to take advantage of the warm hospitality and cool technology available to them at Georgia Tech’s Global Learning Center (GLC), now open for business in Technology Square. The GLC has more than 25,000 square feet of meeting space, which includes three 75-seat amphitheaters, a 125-seat amphitheater and another 250-seat amphitheater. Each classroom offers leading-edge technology that allows instructors to broadcast their programs anywhere in the world. At right, Professor Phillip Allen teaches a course in circuit design.

More information, including interactive floor plans for the GLC, can be found at www.glc.gatech.edu.
“Kevin treated his graduate students as if they were his own offspring, and they in turn held him in the highest esteem,” said Russell Callen, an ECE professor and longtime friend. “He was an inspiration to everyone around him.”

Yang Wang and Nabih Mansour studied with Brennan in the early- to mid-1990s. “Kevin was an excellent teacher and also a good friend to all of us. He was not only intelligent, professional, and knowledgeable, but also patient and caring with his students,” said Wang. “His rigorous style in scientific research and optimistic attitude in life will benefit me forever.”

Mansour said, “Kevin’s interest in his students went beyond research and technical publications. He had unlimited support and always had words of encouragement for his students. Our success was his primary objective.”

Brennan specialized in in-depth theoretical analysis of semiconductor devices and materials at the submicron level and developed superlattice devices for electroeluminescent displays, like those that glow on car dashboards, and infrared detectors, such as those used in night vision goggles. He also created computer simulations of high-speed, high-frequency transistors. His specialty was modeling wide-band gap semiconductors for future high-power, high-frequency, and high-thermal-resistance applications such as automobile and jet engines and power amplifiers for wireless communication systems.

Brennan served on several federal government defense strategy groups, primarily having to do with advancing the state of the art in military defense technologies while trying to reduce operation and support costs. “Kevin was a superb scientist,” said Robert J. Trew, former research director with the U.S. Defense Department (DoD) who now heads the Department of Electrical and Computer Engineering at North Carolina State University. “I sought him out to work on some projects for the DoD. He was able to solve some very difficult and intricate problems and add new understanding as to how things functioned and operated.”

In 2002, Brennan received the ECE Distinguished Professor Award and the Georgia Tech Vice Provost for Research Special Recognition Award for Graduate Education and Research Scholarship. In 2003, he received the highest honor that a Georgia Tech faculty member can attain — the Class of 1934 Distinguished Professor Award.

“Kevin was truly a talented and dedicated professor,” said Roger Webb, chair of ECE. “Distinguished is an inadequate descriptor which does not capture the courage that enabled Kevin to remain an outstanding contributor to the very end. His interests outside of Tech were as multifaceted as he was — from various outdoor activities to reading American and scientific history. He joyfully shared his love of life with his students and colleagues alike. “It is a great privilege to have been a close friend of this outstanding and remarkable man,” Professor Calien said. “He was an accomplished researcher, a dedicated educator, an avid outdoorsman and a true friend.”

Brennan is survived by his wife and Georgia Tech employee, Lea Mcleese; his mother, Rita Brennan of Ocala, Fla.; his brother, Gregory Brennan of Brick, N.J.; and his mother-in-law, Norna J. Mclees of Auburn, Ga.

A celebration of Dr. Brennan’s life will be held in the Student Center Ballroom on Aug. 29, from 11 a.m. - 1 p.m. For details, refer to www.ece.gatech.edu/brennan.html.

Software rating puts ELSYS in elite company

The Georgia Tech Research Institute’s Electronic Systems Laboratory (ELSYS) has been independently rated as a Software Engineering Institute (SEI) Capability Maturity Model (CMM) Level 3 organization.

The CMM rating puts the Georgia Tech Research Institute (GTRI) ELSYS laboratory among the top 20 percent of software development organizations in the world, said Jean Swank, Quality Assurance and Process Manager in ELSYS.

Developed and administered by the Software Engineering Institute at Carnegie Mellon University, the Software CMM has become the de facto standard for assessing and improving software processes. ELSYS began working toward the Level 3 CMM compliance seven years ago.

“Our customers expected us to have this rating, and it will help us be more competitive in winning new contracts,” Swank said.

Bill Rogers, director of ELSYS, praised the lab’s CMM team and its researchers for their hard work in obtaining the prestigious rating.

“Receipt of this rating is truly a milestone that will help our lab reach its potential as a developer of electronic systems for both military and civilian uses,” he said. “We’re very proud of this rating.”

Alternative transportation

As part of “Let’s Do Downtown,” the Downtown Transportation Management Association (TMA) will be highlighting five transportation alternatives in Woodruff Park from noon until 1 p.m. on August 25-29. Each day, the TMA will have a different theme and will be giving away prizes and promoting commute options into downtown.

For more information, visit www.atlantadowntown.com.