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THE WHISTLE

FACULTY/STAFF NEWSPAPER VOLUME 28, NUMBER 26 • AUGUST 18, 2003 THE GEORGIA INSTITUTE OF TECHNOLOGY

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 40 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. All of these things on which the well-being of future generations depends are essentially in the hands of Congress."

From left, Hermann Grunder, Burton Richter and Wayne Clough address a Senate subcommittee on basic research in the physical sciences.

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,

CS 1315 continued, page 3

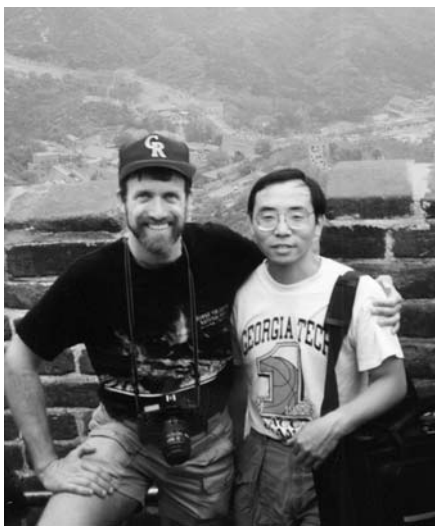
Kevin Brennan, 46, distinguished professor and friend

Jackie Nemeth
Electrical and Computer Engineering

When Kevin F. Brennan died at the age of 46 after a tough and determined three-year battle with pancreatic cancer, he left a legacy that will never fade. A professor in the School of Electrical and Computer Engineering (ECE), he set the bar high for what a faculty member can achieve, while retaining the respect, support, and camaraderie of his colleagues, practically all of whom he counted as friends.

Born October 18, 1956, in Elizabeth, N.J., Brennan received his bachelor's degree in physics from the Massachusetts Institute of Technology in 1978 and his master's and doctoral degrees in electrical engineering from the University of Illinois at Urbana-Champaign in 1980 and 1984, respectively.

Upon graduation, he joined Georgia Tech as an assistant professor in ECE. At Tech, Brennan was among the first faculty members chosen as Institute Fellows. In 2000, he was named the Byers Professor in Microelectronics.



Brennan, left, with former doctoral student Yang Wang, at the Great Wall of China in 1993.

Considered among the best of ECE's classroom teachers, Brennan taught both graduate and undergraduate students with equal ease and enthusiasm. His influence is fondly remembered by his Ph.D. alumni.

Brennan continued, page 3

"QUOTE–UNQUOTE"

"(They) bring a different perspective (which) is a benefit to us to have — 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.
(Atlanta Journal-Constitution)

"The investment plan creates programs that not only will engage our research universities, but also will involve less research-intensive institutions with predominantly minority enrollments, an important aspect for our future."
—President Wayne Clough, speaking to the Energy and Natural Resources Subcommittee on the need for creating a balanced "investment portfolio" in basic scientific research. [See article, page 1]
(Federal News Service)

Georgia Tech and the Center for the Enhancement of Teaching and Learning (CETL) would like to extend a warm welcome to all new faculty members.

Aerospace Engineering
Carlo Bottasso

Air Force ROTC
Terrance McCarthy

Applied Physiology
Young-Hui Chang

Architecture
Wayne Chung
Jerry Ulrich
Gil Weinberg

Army ROTC
David McMickle

Biology
John Cairney
Michael Goodisman
Christopher Klausmeier
Kirill Lobachev
Gerald Pullman
Stephen Spiro

Biomedical Engineering
Ravi Bellamkonda
Larry McIntire
Niren Murthy
Yadong Wang

Computing
Brian Cooper
Merrick Furst
Subhash Khot
Gabriel Loh
Ralph Merkle
Michael Niemier
Milos Prvulovic

Civil and Environmental Engineering
Joe Hughes
Michael Hunter
Marc Stieglitz

Chemical and Biomolecular Engineering
Suji Banerjee
Victor Breedveld
Yulin Deng
Jeff Empie
Jan Gooch
Sankar Nair

Chemistry and Biochemistry
Bridgette Barry
Jean-Luc Bredas
Uwe Bunz
Facundo Ferndandez
Seth Marder
Joe Perry
Arthur Ragauska

Earth and Atmospheric Sciences
Kim Cobb
Emanuele DiLorenzo
Jean Stieglitz

Electrical and Computer Engineering
Oliver Brand
Gee-Kung Chang
Russell Dupuis
Gregory Durgin
Fred Juang
Bernard Kippelen
Chin Lee

Economics
Minjae Song

GTREP
Ghassan Al Regib
Hermann Fritz
Kevin Haas
Benjamin Klein
Paul Yoder

International Affairs
Edward Keene
Allison Macfarlane
Sylvia Maier

Industrial and Systems Engineering
Stephen Cross
Roshan Vengazhiyil
Jeff Wu
Joseph Wu

Literature, Communication and Culture
Hamilton Carroll
Narin Hassan
Andrew Hebard
Cynthia Klestinec
Srikanth Mallavaruapu
Michael Mateas
Ben McCorkle
Laura McGrath
Petra Schweitzer
Robert Stalker
Colleen Terrell
Mary Wearn

Library and Information Center
Catherine Jannik
Lori Ostapowicz-Critz
Patricia Phipps
Tyler Walters

Management
Lee Caldwell
Stuart Graham
Rank Rothaermel
Koert van Ittersum
Dongjun Wu

Mathematics
Igor Belegradek
Ernest Croot
Plamen Iliev
Thang Le
Heinrich Matzinger
Ronghua Pan
Anurag Singh
Houmin Zhou

Mechanical Engineering
Frederick Ahrens
Cyrus Aidun
Cassiano de Oliveira
Srinivas Garimella
Samuel Graham
Robert Mahan
David Orloff
Timothy Patterson
Wayne Whiteman

Modern Languages
Stuart Goldberg

Materials Science and Engineering
Famid Garmestani
Roger Narayan
Kenneth Sandhage
Preet Singh
Robert Snyder

Psychology
Howard Rollins

Physics
Martin Jarrio
Alex Kuzmich
Michael Pustilnik
Elisa Riedo

Public Policy
Jason Borenstein
Glenn Cassidy
George Dougherty
Hugh Gusterson
Diana Hicks

Georgia Tech

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Georgia Tech is a unit of the University System of Georgia.

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**.

photo by Nicole Cappello

Brennan, cont'd from page 1

"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 Nabil 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 electroluminescent 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 Callen 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 McLees; his mother, Rita Brennan of Ocala, Fla.; his brother, Gregory Brennan of Brick, N.J.; and his mother-in-law, Norma 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.** ❐

For those who wish to commemorate Dr. Brennan's life, donations may be made to the Kevin F. Brennan Memorial Scholarship Fund. To contribute, make checks payable to the Georgia Tech Foundation, indicating the name of the fund. Donations may be sent to: The Georgia Tech Foundation, 760 Spring Street NW, 4th Floor, Atlanta, GA 30332-0182.

CS 1315, cont'd from page 1

resulting in one of the highest retention rates in CoC history for an introductory programming course for non-majors.

"Many students run in fear of CS 1321, and it is a lot of pressure for non-CS majors," said Guzdial. "So we decided to develop a pilot course (CS 1315) that was less intimidating, but equally challenging."

CS classes traditionally emphasize issues such as speed of solutions because historically computers were slow in solving generalized problems. Instead, CS 1315 emphasizes real-world applications of computing and creative social experiences with computing. Students learn to program in the context of learning how to use computers for communication, as opposed to calculation.

Response to the pilot course indicated that a large majority of students (including non-CS majors) find it relevant to their other studies and their career plans.

Tech requires all students to take an introductory course in computing, including programming skills. The course has been one of the most unpopular courses on campus, especially among non-CS majors. Results from the pilot course, however, indicate that the new approach appeals to liberal arts majors and yet retains a focus on programming.

"Programming and computation will inevitably become part of a general liberal education," said Guzdial, "but computing courses will need to continue evolving for this to happen."

Results of a survey of Media Computation students indicate that they appreciated the relevance of the course and even found computer science interesting. Students wrote eight programs (six collaboratively and two individually) involving the creation or manipulation of pictures, sounds, HTML pages and movies, with some of their programs reaching more than 100 lines of code. Some students reported that they did programming on their own time "just for fun."

Other colleges and universities have taken notice of the pilot's success and some have started implementing the approach. Gainesville College started a Media Computation class this summer with 12 students (nine female). Other schools in the University System are talking with Guzdial about how to adapt the approach for their curricula as well. ❐

For more information...

Introduction to Media Computation
coweb.cc.gatech.edu/cs1315

IN BRIEF:

Jacket fans swarm Bobby Dodd

Tech's first football game of the season may not be a home game, but that won't stop loyal Yellow Jacket fans from filling Bobby Dodd Stadium on Aug. 28 to watch Tech beat Brigham Young University on the Jumbotron. Student Chris Horner put the plan into motion when he sent President Wayne Clough an e-mail asking him to open the stadium to the public. The Ramblin' Reck club, which had already planned an outdoor viewing at the Campanile, will move their festivities to Bobby Dodd, giving the public a front-row view of Tech traditions. The concession stands will be open and the first 1,000 students will receive a free hot dog and drink. Gates will open at 8:30 p.m. Kickoff is at 9:30 p.m. Admission is free.

New library policy

In response to student concerns, a cell phone policy has been enacted for the Library. Members of a Library West Commons work group have developed a policy that establishes new etiquette: phones should be set to "vibrate" mode while in the Library, and conversations are to be limited to the rotunda or vending tunnel.

Signs in the rotunda, at elevators and at major "intersections" in the Library will advertise the policy, which goes into effect Aug. 18.

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. 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**.