

NANOTECHNOLOGY - THE NEXT REVOLUTION

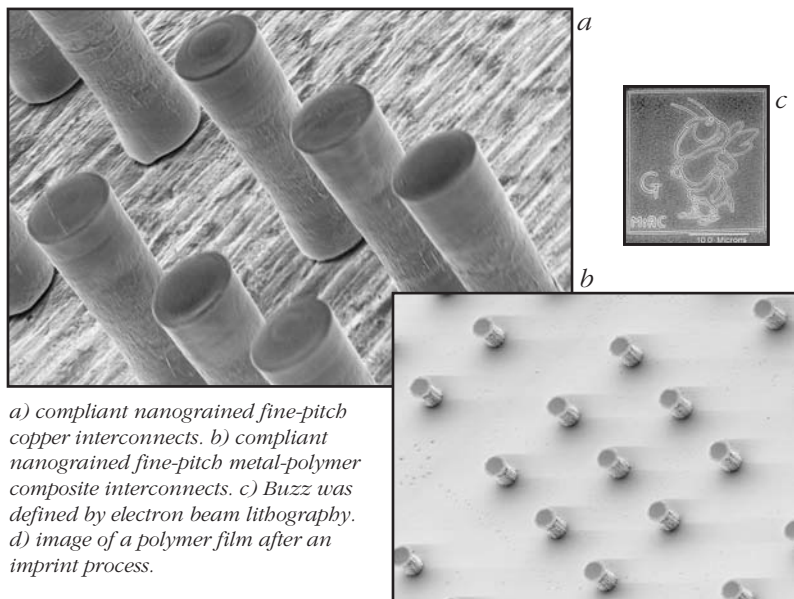
The Industrial Revolution, driven by a 50-fold improvement in productivity that machines enabled, heralded profound and pervasive societal transformations. It changed the nature of work and play; transformed commerce, education, medicine, government, and religion; and led to new forms of art, literature, and political theory.

We are now on the threshold of a second revolution. This one is fueled not by simple machinery, but by new phenomenon known as nanotechnology. According to John Marburger, director of the Office of Science and Technology Policy in the Executive Office of the President of the United States, "Nanotechnology refers to a set of capabilities at the atomic scale that grew steadily over the past half century...into the basis for a true technology revolution in our society."

Our entire material existence is made of atoms. At the 2003 National Science Foundation (NSF) Workshop on Nanoscience and Nanotechnology, it was stated that "we have known in principle for nearly 50 years how to calculate with exquisite precision, many of the properties of matter, given certain input information and enough computing power. In recent years, we have acquired both the instruments that are capable of making atomic level measurements and the computing power to exploit this knowledge." The conclusion was clear, and the implications enormous. As everything is made of atoms, the capability to measure, manipulate, simulate, and visualize at the atomic scale potentially touches every material aspect of our interaction with the world around us.

In the Interagency Working Group on Nanoscience, Engineering, and Technology report, "Shaping the World Atom by Atom," it is stated: "The emerging fields of nanoscience and nanoengineering are leading to unprecedented understanding and control over the fundamental building blocks of all physical things. This is likely to change the way almost everything—from vaccines to computers to automobile tires to objects not yet imagined—is designed and made."

The report further states, "Never has such a comprehensive technology promised to change so much so fast...It no longer seems a question of whether nanotechnology will become a reality. The big questions are how important and transformative nanotechnology will be-



a) compliant nanogained fine-pitch copper interconnects. b) compliant nanogained fine-pitch metal-polymer composite interconnects. c) Buzz was defined by electron beam lithography. d) image of a polymer film after an imprint process.

come...As we enter the 21st century, nanotechnology will have a major impact on the health, wealth, and security of the world's people."

This is why it is a revolution, like the industrial revolution, and not just another step in technological progress!

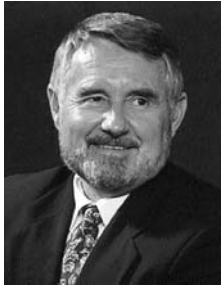
The science plans for every developed nation have a strong nano focus, and all of these countries are investing heavily in this area of research. The U.S. has been a world leader in the development of the underlying science infrastructure for this revolution and the development of nanotechnology has become a national priority.

In keeping with its tradition of leadership and innovation, ECE is a major player in this new and dynamic field. James D. Meindl, director of the Microelectronics Research Center and Joseph M. Pettit Professor in ECE, was named as Georgia Tech's lead figure in the extensive 13-member National Nanotechnology Infrastructure Network (NNIN). When ECE Professor Russell D. Dupuis

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Chair's Corner



Roger P. Webb
Steve W. Chaddick
School Chair

I recently bought and installed an autopilot in an experimental airplane that I co-own with a friend. The unit cost about \$1,200. Exclusive of the control surface actuator, the unit, including gyro control and guidance interface circuitry, mode switches and readout weighs less than one pound and fits in a standard three inch panel mount. For guidance, it is interfaced to a GPS (global positioning system) of about the same dimensions. The experience made me think about my first job out of college, where I participated in the design of an autopilot for a guided missile. That autopilot used vacuum tube electronics requiring $\pm 200\text{v}$ power supplies. Exclusive of actuators, it consumed about six cubic feet of space and weighed over 100 pounds. For guidance, it interfaced with an inertial navigation system of about the same dimensions. Functional capability was about the same as for the unit that I recently installed. I wouldn't hazard a cost comparison, but guess the cost ratio would be in the ball park of one thousand.

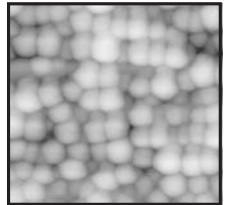
So what has that reminiscence to do with anything? In my mind, it has to do with the main focus of this issue of *ECE Connection*, nanotechnology and with the justification of investments that Georgia Tech and ECE is making in nanotechnology. My autopilot reminiscence is but one of the countless ways to illustrate the rate of technological change and the functional impact of that change. Nanotechnology is the name of the future evolution of technology. The Nobel physicist, Richard Feynman, generally regarded as a founding pioneer of nanotechnology, envisioned systems of molecular machines directing chemical reactions to produce atomically precise products. Whether that vision will prevail and be realized is unclear. However, several things are clear: 1) There is underway a national nanotechnology initiative, NNI, with huge sums of money being invested in nanotechnology research; 2) Much of the NNI work that will be done will not be true nanometer scale stuff but just linear down scaling of current technology; 3) At some point down scaling won't be linear, the behavior of matter at the atomic level will have to be accounted, and the mathe-

matical and physical models employed at micro scale will not suffice. It follows closely that the education of engineers prepared to work in this realm is also not a linear extrapolation from the present. Thus, it seems evident that to be true to our mission of being a leader in the development of intellectual capital, products of research and educated graduates, the School and the Institute *must* be heavily invested in nanotechnology. Further, I strongly believe that the return on this proper investment will far more than justify it.

It will be interesting and exciting to participate in and watch the evolution of nanotechnology. My bet is that we'll all be proud of the role that Georgia Tech will play in that evolution. ■

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joined Georgia Tech last year, he immediately established the Advanced Material and Devices Laboratory to facilitate his research in nanotechnology. ECE Professor Rao R. Tummala is directing the NSF Microsystems Packaging Research Center, which in its ninth year of operation, continues to push packaging frontiers, as it evolves towards nano and bio-electronics packaging through its cutting-edge research in nano wafer-level packaging. The Georgia Tech Nanotechnology Research Center, which will be one of the most advanced nanotechnology research facilities in the nation, will facilitate and enable the work of these and other researchers at Georgia Tech and throughout the southeastern U.S.



Atomic force microscope images of an indium phosphide "self-assembled quantum dots" grown at Georgia Tech.

Potent with potential, the paths where this field will lead society are still unknown. The power and ambiguity are embraced by the imperative of the NNIN to not only pursue a program of research but also to simultaneously engage the wider society in these endeavors. Marie Thursby, a professor in the College of Management, will examine societal and ethical issues, and Marion Usselman of the Center for Education Integrating Science, Mathematics, and Computing (CEISM) will help educate the general public, from "K through gray" about this technology and its huge potentials.

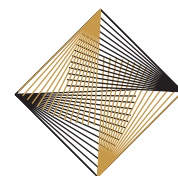
"As the world is slowly becoming aware of this tremendous new area of science and research, we at Georgia Tech and at ECE are already firmly engaged, and leading the charge in this new transformative field," said Steve W. Chaddick School Chair Roger P. Webb. ■



**Georgia Institute
of Technology**

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Juang Elected to NAE, Presents Research Vision to AAAS

February was a red-letter month for Biing-Hwang (Fred) Juang, as he was elected to membership in the National Academy of Engineering (NAE) for his contributions to speech coding and speech recognition. Dr. Juang also presented his research vision for next-generation speech systems at the annual meeting of the American Association for the Advancement of Science (AAAS).

Dr. Juang, the Motorola Foundation Chair Professor and Georgia Research Alliance Eminent Scholar in Advanced Communications, has become the sixth ECE faculty member elected to the NAE and will be inducted into the Academy on October 3, 2004 in Washington, D.C. Currently, Georgia Tech has 25 active faculty members in the NAE.

Election to the NAE is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made important contributions to engineering theory and practice and those who have pioneered new fields of engineering, made major advancements in traditional fields of engineering, or developed/implemented innovative approaches to engineering education.

While a scientist at AT&T Bell Labs, Dr. Juang helped to create the current generation of speech recognition technology that routinely handles "operator-assisted" calls and is now helping to create the next generation of speech technology—one that would facilitate natural communication between humans and machines. He presented his vision for this technology and its challenges at the AAAS annual meeting.

To have real human-machine communication, Dr. Juang said that the machine will have to go beyond the conversion of speech to text and must detect the speaker's intention by compiling all linguistic cues in the acoustic wave. That task is more difficult than what the existing technology was designed to do because human speech often mixes with noise, such as another person's speech, varying speaking pace, and grouping words in unpredictable ways, as well as peppering conversations with "ums" and "ahs."

Like humans, the machine will occasionally have to say "I don't understand" if it has doubts about what it has heard, and it will need to learn from its experiences to communicate better in the future. The next generation of speech communications technology will also require new mathematical algorithms that will go beyond the Hidden Markov Models, which are currently used, according to Dr. Juang, and researchers at university and corporate research labs worldwide have already begun working on the problem.

Dr. Juang senses increasing agreement among researchers about producing a new generation of speech communications able to do more than help route long-distance calls and accept credit card numbers. "With a new system, we will be able to automate many things," he said. "We are now talking about realizing the original dream of automatic speech recognition." ■



Photo by Billy Howard

B.H. "Fred" Juang helped create the current generation of speech recognition technology that routinely handles "operator-assisted" calls. Today he is working to create the next generation of speech technology.

NREL Recognizes Ajeet Rohatgi with Paul Rappaport Award

Ajeet Rohatgi, founding director of the University Center of Excellence for Photovoltaics Research and Education (UCEP), was presented with the 2003 Paul Rappaport Renewable Energy and Energy Efficiency Award. Given by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), Dr. Rohatgi received this award at a NREL event in December 2003.

"For more than a quarter century, Dr. Rohatgi has focused his immense technical talents on developing low cost and high efficiency solar cells," said NREL Director Richard Truly. "So many of the significant advances that have been achieved in this important field can be credited to his tireless efforts."

Currently the Georgia Power Distinguished Professor and Regents' Professor in ECE, Dr. Rohatgi has developed

one of the most respected cell characterization and fabrication labs in the world. He has published more than 275 papers in photovoltaic sciences, holds 10 U.S. patents, and has supervised 25 PhD students. He is also the recipient of the 1996 Georgia Tech Distinguished Professor Award and the 2003 IEEE William R. Cherry Award.

While expressing thanks to the NREL and the U.S. Department of Energy for financial and technical backing, Dr. Rohatgi acknowledged the support he has received at Georgia Tech. "This award is a tribute to my faculty and staff colleagues, my past and present students, the Georgia Tech administration, and my industrial and governmental collaborators," he said. "They played a major role in the research leading to this award, and I am very grateful to them." ■



Photo by Gary Meek

Ajeet Rohatgi displays a low-cost, high-efficiency screen-printed multicrystalline silicon solar cell fabricated at UCEP.

A Tale of Three of ECE's Nanotechnology Pioneers

Many of ECE's distinguished faculty members are engaged in some aspect of nanotechnology research. Here are profiles of three of the School's preeminent leaders—each blazing his own unique trail in this new frontier of science and technology. Distinct as each one is, the three men share two striking similarities: each one earned his doctorate in two short years, and each one, in spite of his undisputed stature, is described by students and colleagues alike as men of exceptional humility, compassion, and kindness. Steve W. Chaddick School Chair Roger P. Webb said, "It is remarkable how these three professors have demonstrated such a sustained and deep commitment to their roles as mentors. Their great work will be carried forward through the inspiration and leadership that they have so generously and continuously given to their students."



RUSSELL D. DUPUIS

Professor; Steve W. Chaddick Endowed Chair in Electro-Optics; Georgia Research Alliance (GRA) Eminent Scholar

Russell D. Dupuis lights up when he talks about his work, and his enthusiasm is infectious. He is engaged in the exploration of nanoscale "self-assembly," an area of nanotechnology research that he describes as "the opening act of a new chapter in science and technology." He is a scientist—precise, systematic, and meticulous. He also shows a great capacity to deal with ambiguity and with the unknown. This may be the mark of his unique genius. He speaks of the need to move to a new paradigm as one engages in nanotechnology research. "When we enter nanotechnology, we need to erase so much of what we have known and start from a clean slate. We are at the opening act of a new play and we don't know how it will unfold. Will it be a drama, a comedy, or a tragedy?" said Dr. Dupuis. "We draw from our knowledge of physics, chemistry, natural science, and partner with mother nature to see what unknown paths she will take us to."

Dr. Dupuis grew up on a small farm in Illinois and attended the local public schools. When asked how he decided to study engineering when he attended the University of Illinois, he responded that when he found that he was allergic to hay and could not be a farmer, engineering seemed his best alternative. A born scientist, Dr. Dupuis loved the study of physics and chemistry, but was attracted to the applied nature of electrical engineering. He excelled as an undergraduate, earning his bachelor's degree with "Highest Honors-Bronze Tablet" in 1970. He received his master's degree in 1971 and earned his doc-

torate just two years later in 1973. He did his graduate research under the guidance of Professor Nick Holonyak, with whom Dr. Dupuis has continued to collaborate throughout his career. Last November, these two professors jointly received the Presidential National Medal of Technology, along with George Craford, for their collaborative work in the development and commercialization of light-emitting diode (LED) technology. Dr. Holonyak describes Dr. Dupuis as, "one of the most steadfast and tenacious people I have ever known. He works harder than the measure of his brightness, and this is why he is so productive and successful." Dr. Dupuis' career has included substantial involvement with industry as well as academia. He worked at Texas Instruments from 1973-1975 and for Rockwell International from 1975-1979, and at AT&T Bell Laboratories from 1979-1989 when he finally entered the world of academia, becoming a chaired professor at the University of Texas at Austin.

Dr. Dupuis joined Georgia Tech in August 2003, where he quickly established his research laboratory and continues his research with the same energy and drive that has been his hallmark throughout his career. He enthused that "You don't need to go to another galaxy to discover new worlds. They're right in front of us, waiting to be discovered."

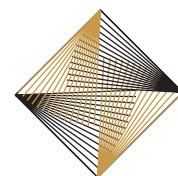


JAMES D. MEINDL

Professor; Joseph M. Pettit Chair in Microelectronics; Director, Microelectronics Research Center

James D. Meindl's elegant and understated manner belie the enormous influence that he has had in shaping the microelectronics field and his present stature of national leadership in nanotechnology research. The beginning of Dr. Meindl's career intersected with the invention of the integrated circuit in 1959. Since that historic moment in time, Dr. Meindl has played a sustained leadership role in this field, which has had such a profound and pervasive influence on so many aspects of modern life.

Dr. Meindl grew up in the steel valley of Pittsburgh, Pa. When he graduated from high school, he attended Carnegie-Mellon University, where he earned his bachelor's degree in 1954. He proceeded directly on to graduate school, earning his master's degree in 1955, and his doctorate just two years after that. He worked for Westinghouse Corp. for a year when he was drafted into the U.S. Army Signal Corp. He initially viewed this as a major interruption in his young career, but in retrospect recognizes it as serendipity for it was this experience that set the course for his entire illustrious career. While work-



ing at the Army Corp. Electronics Laboratories, Dr. Meindl was a fascinated witness to the invention of the integrated circuit. When he met its two inventors—Jack Kilby and Robert Noyce, Dr. Meindl was forever captive to this dynamic field.

Dr. Meindl found himself so immersed in this new field and found the work so rewarding that he ended up staying on an additional six years after his military duty was concluded, doing his early groundbreaking work on integrated circuits and microchips. In 1967, he joined the faculty of Stanford University, where he remained for nearly 20 years. During this time, Dr. Meindl served as a chaired professor, associate dean of engineering, founding director of the Center for Integrated Systems, and founding director of the Integrated Circuits Laboratory.

Switching his focus to academic administration, he left Stanford University to become the senior vice president for Academic Affairs and provost of Rensselaer Polytechnic Institute in 1986. While the work had its rewards, Dr. Meindl sorely missed his research and especially his work with students, which to this day he maintains is the highlight of his work. He joined the faculty of Georgia Tech in 1993, and became the director of the Microelectronics Research Center where he has led the School and the Institute's initiatives in microelectronics research.

Described by colleagues and students as a man of exceptional kindness and humility, he is said to embody "teaching leadership." He maintains that working with students is the most enjoyable aspect of his work. "The greatest opportunity for learning is working with students who are so gifted, eager to learn, and to fuel me with a continuous stream of new ideas and insights," said Dr. Meindl.

When asked about his role in the microelectronics revolution, he simply maintained that "I was pulled along with the current." Many would beg to differ and maintain that it is he who has directed and driven the current.



RAO R. TUMMALA

Professor; Joseph M. Pettit Chair in Electronics Packaging; Director, National Science Foundation Microsystems Packaging Research Center, GRA Eminent Scholar

Rao R. Tummala does nothing slowly. His manner is precise and direct as he discusses his personal story and the events that have brought him to his present stature of international leadership in the field of nanotechnology packaging research. Dr. Tummala was born and raised in India. Early in his life, his gifts as a scholar were revealed, as he efficiently mastered his early education, graduating from

high school at the age of 14. He entered Loyola College, where he earned a combined degree in physics, chemistry, and mathematics in three years, at the age of 17. He was then selected to attend the country's best technical school—the Indian Institute of Science, where he earned a second undergraduate degree in metallurgical engineering within two years. Not yet 20 years old, Dr. Tummala went to Canada where he earned his master's degree in nine months at Queens University.

Dr. Tummala then moved to the U.S., where he entered the doctoral program at the University of Illinois in 1966. Two years later, he earned his Ph.D. in materials science and engineering. In less than eight years, Dr. Tummala earned two undergraduate degrees, a master's degree, and his doctorate. He has not lost a beat since this time, as his extensive career achievements illustrate.

After completing his doctorate, Dr. Tummala began a 25-year career with IBM, where he pioneered the industry's first multichip module and advanced gas discharge display, ink jet printing, and magnetic storage technologies. He received 67 U.S. patents for his innovations, and in 1984, IBM's chairman of the board named Dr. Tummala as an IBM Fellow, making him one of the youngest scientists to ever win this coveted award.

In 1993, Dr. Tummala realized a long-term goal of working in academia, when he joined the faculty of Georgia Tech. His first order of business was to write a proposal to the National Science Foundation to establish a research center for microelectronics packaging. This winning proposal was written in two weeks, and the Microsystems Packaging Research Center was established. Today, the Center is the largest of its kind in the world and has evolved from microelectronics packaging to its present leadership in nano and bioelectronics packaging. The reach of Dr. Tummala's leadership is literally worldwide. He was awarded the Temasek Professorship in 2002 by the National University of Singapore. In this role, Dr. Tummala spearheads research in nano-wafer-level packaging in conjunction with faculty from Georgia Tech, the National University of Singapore, and the Institute of Microelectronics.

Dr. Tummala has been on the fast track throughout his career and he shows no signs of slowing down. He is described with great admiration by his colleagues and students as a critical, independent thinker whose vision is shaped by his ability to think "outside the box." He always looks forward to the next challenge. Dr. Tummala speaks with great excitement about the Center's production last year of the first IC interconnections on the nanoscale. His engagement continues. ■

Faculty News



Gisele Bennett, Associate Professor
PhDEE '95, Georgia Tech
MSEE '89, University of Central Florida
BSEE '87, University of Central Florida
Areas: Optics and photonics; digital signal processing

Dr. Bennett accepted a joint appointment as a non-tenure track associate professor in January 2004. Her primary assignment remains as a senior research engineer in the Georgia Tech Research Institute (GTRI), where she is the director of the Logistics and Maintenance Applied Research Center (LandMARC). After receiving her PhD, Dr. Bennett joined GTRI in 1996 and has built programs around RFID, optical tagging, automatic identification systems, performance support systems, electro-optic evaluations, and database architectures. She is a co-founder of LandMARC, a multidisciplinary center that focuses on system performance, prognostics, and automatic identification technologies.

While in GTRI, Dr. Bennett served as an adjunct faculty member in ECE from 1996-2003. During that time, her activities included teaching and graduate student supervision and serving as a liaison between GTRI and ECE research efforts. ■

FACULTY ACCOMPLISHMENTS

Farrokh Ayazi, Robert J. Butera, and W. Alan Doolittle have joined a talented cadre of ECE faculty who have received National Science Foundation (NSF) CAREER Awards. ECE now has 12 faculty members who hold active NSF CAREER Awards and has a total of 26 current and past recipients of this honor.

An assistant professor in ECE since 1999, Dr. Ayazi is involved in the microsystems and electronic design and applications areas. His NSF CAREER Award will fund his project, "Advanced Temperature Compensation Techniques for Integrated Bulk-Mode Micro and Nano Mechanical Resonators," which focuses on implementing temperature-compensated bulk-mode resonators in silicon at increasingly small sizes, eventually reaching the nano domain while increasing the frequency to very high values in excess of 20 GHz. Bulk-mode micro and nano mechanical resonators are also being implemented as sensor arrays in biochemical and biological applications and could also be used as filtering blocks in communications systems, such as cell phones.

Dr. Butera has been an assistant professor in ECE since 1999, and he is involved in the bioengineering and computer engineering areas. His NSF CAREER Award will fund his project, "Functional Replacement of Neural Tissue in a Model Organism-Research and Education in Neuroengineering," which is an integrated research and edu-

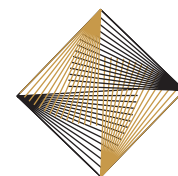
cation plan for developing a "replacement ganglion" that controls the equivalents of heartbeat and breathing for *Aplysia Californica*, a marine mollusk with a well-studied nervous system. Dr. Butera also wants to use this exercise to develop and test course modules for teaching "critical thinking" skills to undergraduate engineering students.

An assistant professor in ECE since 2001, Dr. Doolittle is involved in the microsystems area. His NSF CAREER Award will fund his project, "New Device Opportunities Enabled by Polar Dielectric and Semiconductor Heteroepitaxy," which involves growing wide bandgap semiconductors (WBGs) and single crystal ferroelectrics on each other, making possible the creation of unique electronic devices or highly integrated systems of devices. His research in this area could make it possible for power transistors for switching applications to potentially handle 50-100 times higher load of current than present state-of-the-art devices, as well as improvement of the intelligence and power of surface acoustic wave devices that are often found in televisions and older cell phones.

Miroslav Begovic, Ajeet Rohatgi, and Raghupathy Sivakumar were advisors on their students' theses that took top honors at the annual awards ceremony held by the Georgia Tech chapter of Sigma Xi. **Aleksandar Pregelj** won the Sigma Xi Best Dissertation Award, and he is advised by Drs. Begovic and Rohatgi. **Karthikeyan Sundaresan** won this year's Sigma Xi MS Thesis Award; he is advised by Dr. Sivakumar.

Gary S. May received the 2004 American Society for Engineering Education (ASEE) Minorities in Engineering Award at ASEE's annual conference June 20-23, 2004. This honor is given to engineering educators who motivate minority and women students to enter and continue in either undergraduate or graduate engineering education. Dr. May, the Motorola Foundation Professor in ECE and executive assistant to Georgia Tech President G. Wayne Clough, was recognized for his numerous contributions in this area, including his leadership role with the National Society of Black Engineers for over a decade and his creation and leadership of two successful Georgia Tech programs—Summer Undergraduate Research in Engineering/Science (SURE) and Facilitating Academic Careers in Engineering and Science (FACES). He has also served on numerous national advisory committees, including chairing the National Science Foundation Committee on Equal Opportunity in Science and Engineering in 2000-01.

Madhavan Swaminathan was named deputy director of the NSF Microsystems Packaging Research Center (PRC) in January 2004. In this new role, Dr. Swaminathan assumes several important roles with the PRC, including



Hertling Retires After 26-Year Career

leading the development of multi-functional system-on-package testbeds and forming partnerships with the Semiconductor Research Corporation, the National Electronics Manufacturing Initiative, and other industrial organizations. He will also encourage companies to sign up for PRC corporate level and alliance memberships and will act as the Center's director in Rao R. Tummala's absence. Dr. Swaminathan is a professor in the computer engineering and electromagnetic areas. ■

New Director of Research is Named for GTL

ECE Byers Professor Steven W. McLaughlin joined Georgia Tech Lorraine (GTL) as its new director of Research, on January 2004. According to GTL President Hans B. Püttgen, "Our goal is to increase the number of faculty and students involved in research at GTL, and to draw in new partnerships with European and American government, industry, and academic institutions."

Significant research collaborations with the French government are already in place. In 1998, an agreement was reached between Georgia Tech, the local Lorraine authorities, and the Centre National de la Recherche Scientifique (CNRS) to establish the GTL-CNRS Telecom Laboratory. This laboratory represents the first partnership of this kind that the CNRS has established with an American university. Last year, Georgia Tech entered into a research partnership with the Lorraine government to create the Laboratory for Acoustic Characterization of Advanced Materials. Dr. McLaughlin feels that there is a rich potential for securing research support from such entities as the National Science Foundation, the U.S. Department of Education, and the U.S. Department of Defense. "We have established solid partnerships with some of the most prestigious French and European universities. This gives us tremendous resources in terms of students, faculty, and facilities that we can leverage in new research initiatives," said Dr. McLaughlin. ■

ECE bid farewell to Professor and Associate Chair for Graduate Affairs David R. Hertling after 26 years of distinguished service. Dr. Hertling was honored by his fellow colleagues, past and current students, and staff at a reception that was held on May 14.

Dr. Hertling's career at Georgia Tech began in 1978, with several years under his belt with the U.S. Navy, and with Harris Corporation. For over 20 years, he was actively involved in both teaching and research in the areas of electronics, radio frequency electronics, modeling of active devices, computer-aided design and analysis of circuits, and computer-aided design of dipole phased antenna arrays.

Dr. Hertling has been a beloved and respected teacher, earning the ECE Outstanding Teacher Award in 1980 and 1986 and the Georgia Tech Outstanding Teacher Award in 1981. Greg Tripplet, a Ph.D. student who intends to pursue an academic career said, "Professor Hertling embodies what I myself aspire to be as an engineering faculty member. He cares about the students, the program, the College, and the profession. I am honored to have had the opportunity to work with him. He is my mentor and someone I will remember for life."

In 1999, Dr. Hertling was promoted to associate chair for Graduate Affairs in ECE. During his five-year tenure in this role, the graduate program grew from about 700 to 1,000 students, ECE transitioned from the quarter to semester system, and the graduate application process converted from a manual to on-line process. Graduate student Gavin Ho said, "There are so many wonderful things to say about Dr. Hertling. No matter how busy he is, he makes himself accessible to the students. He helped me through many difficult decisions and always told me to believe in myself, and told me that if I put my mind to something, anything is possible. I am honored to have known this great man." ■



Dave and Mary Jean Hertling at his retirement celebration on May 14.

"Dave made a tremendous contribution to the School during a crucial period of growth. He is not only an able scholar and administrator but also a man of great honor and integrity."

Roger P. Webb
Steve W. Chaddick School Chair

Congratulations to our Faculty and Staff!

Thirteen ECE faculty members have been recommended for promotion and/or tenure by Georgia Tech President Wayne Clough to the University System of Georgia Board of Regents. **Promotion:** Ali Adibi; Abhijit Chatterjee; Steven W. McLaughlin; and Henry L. Owen. **Promotion and Tenure:** Yucel Altunbasak; Robert J. Butera, Jr.; Vincent J. Mooney, III; Emmanouil M. Tentzeris; and Anthony J. Yezzi, Jr. **Tenure:** David S. Citrin; John D. Cressler; Ian T. Ferguson; and Chin-Hui Lee.

Thirteen ECE staff members received Georgia Tech Staff Training Awards. **Office Professional Certificate:** Cordai Farrar and Leslie Hudson. **Supervisory Development Certificate:** Doria Moore, Jacqueline Nemeth, and Suzzette Willingham. **Management Development Certificate:** Kayron Gilstrap and Debra Kelley. **Departmental Certification in Sponsored Programs:** LaJauna Guillory, Leslie Hudson, Judy Lorier, Janet Myrick, Mary Render, and Carla Zachery ■

2004 Award Winners

ECE ANNUAL AWARDS

On April 22, 2004, ECE celebrated the end of the academic year by holding its third annual awards program at the Student Center Ballroom. C. Dean Alford (BEE '76) and C. Meade Sutterfield (BEE '72), both members of the ECE Advisory Board, hosted the event, which honors those people who have shown exceptional dedication to their professions and studies, ECE, Georgia Tech, and the community as a whole.

This program was supported in part by Warren M. Batts (BEE '61); Jim Stratigos (BEE '74, MSEE '80), and his wife, Janie; and Cisco Systems.

ECE Student Awards

Outstanding ECE Sophomore Award.....G. Wallace Tennille
Eta Kappa Nu, the honor society for ECE, honors the sophomore electrical or computer engineering student with the highest scholastic average by presenting a copy of the Electrical Engineering Handbook and a check for \$250 from Cisco Systems.

ECE Junior Scholar Award.....Adam Eisenman
This award is presented to the student who has junior standing and has the highest GPA in ECE. The recipient will be awarded a \$250 check and a plaque.

Most Outstanding ECE Senior Co-op Award.....Robert Yhap
This award is presented to the ECE co-op student who is considered of the highest caliber by their co-op employer. The recipient will be awarded a \$250 check and a plaque. Funding for this award is provided by Mr. Warren Batts (BEE '61).

ECE Undergraduate Research Award.....Paul Mandeltort
This award recognizes an undergraduate student who has demonstrated an unusually strong aptitude for research. The recipient will be awarded a \$250 check and a plaque.

Outstanding Service to Georgia's Community Award.....Jennifer Lee
Investing time in community activities can have significant rewards for Georgia Tech in the future, and recognizing students who participate and organize such activities helps to motivate other students to do the same. The recipient will be awarded a \$250 check and a plaque.

ECE Faculty Award.....James Holland
This award is given to the electrical or computer engineering student who, in the opinion of the ECE faculty, has done the most to improve the educational environment within ECE or Georgia Tech and has contributed significantly to both student welfare and student-faculty interactions. The recipient will be awarded a \$250 check and a plaque.

Outstanding Electrical Engineering Senior Award.....Jon Perry Entwistle
Eta Kappa Nu, the honor society for ECE, honors the senior electrical engineering student who has a very high scholastic average and who plays an active role in extracurricular activities. The award consists of a certificate, engraving the name of the individual on a plaque in the Van Leer (ECE) Building, and awarding a check for \$750 from Cisco Systems.

Outstanding Computer Engineering Senior Award.....Karthik Balakrishnan
Eta Kappa Nu, the honor society for ECE, honors the senior computer engineering student who has a very high scholastic average and who plays an active role in extracurricular activities. The award consists of a certificate, engraving the name of the individual on a plaque in the Van Leer (ECE) Building, and awarding a check for \$750 from Cisco Systems.

ECE Senior Scholar Award.....Eric Clopper, Trivikram Kasivajhula, Scott Marlette, Michael McFadden, Lucas Milner, Matthew Moseley, Steven Sanders, David Sinyard
This award consists of a plaque that is given to the electrical or computer engineering senior(s) with the highest academic average.

Colonel Oscar P. Cleaver Awards.....William Potscavage, Amanda Preyer
This award is made to the outstanding graduate student(s) in ECE, as determined by scores made on the doctoral preliminary examinations. Each recipient will receive a cash award and a plaque.

ECE Teaching Assistant Excellence Award.....Samuel Li
Teaching undergraduates is one of ECE's most important missions. Teaching assistants are necessary to ensure that every student has the opportunity for personal attention during their course of study. The recipient will be awarded a \$500 check and a plaque. Funding for this award is provided by Mr. Warren Batts (BEE '61).

ECE Graduate Research Assistant Excellence Award.....Majid Fozunbal
Research is the cornerstone to ECE's success. Nurturing bright and hardworking graduate research assistants (GRAs) are among the most important factors in ensuring that ECE remains a leader in the research community. This award will be given to the GRA who has demonstrated particular excellence in performing his or her duties. The recipient will be awarded a \$500 check and a plaque.

ECE Staff Awards

Hats Off Performance Award.....Sharon Crouch, Pamela Halverson
These awards, each consisting of a \$1,000 check, recognize the classified staff members who

have demonstrated exceptional job performance and/or service to ECE above and beyond the call of duty.

Research Spotlight Award.....Ajay Upadhyaya
This award is presented to a researcher who has made a significant contribution to the research efforts in ECE. The awardee will receive a \$1,000 check.

Academic Spotlight Award.....Christina Bourgeois
This award is presented to the researcher, classified employee, or general faculty member who has made a significant contribution to the ECE teaching or academic program. The awardee will receive a \$1,000 check.

ECE Faculty Awards

Outstanding Junior Faculty Member Award.....Ali Adibi
Raghupathy Sivakumar

These awards, each consisting of a \$1,000 check, recognize the most outstanding assistant professors during 2003-04. Funding for this award is provided by Jim (BEE '74, MSEE '80) and Janie Stratigos.

Distinguished Faculty Achievement Award.....Ronald Harley
This award, consisting of a \$5,000 check, is presented to the senior faculty member who has made significant contributions throughout his/her career.

ETA KAPPA NU ANNUAL SPRING PICNIC

Nearly 400 faculty, students, and staff attended the annual Eta Kappa Nu Spring Picnic, which was held on April 16.

Outstanding ECE Graduate Teaching Assistant Awards.....Gaurav S. Asthana, Majid Badieirostami, Jared Alan Causer, David Wayne Flowers, Andrew Britton Gardner, Kenneth G. Grove, Clyde Alphonso Lettsome, Andrew W. McKensie, Alan J. Michaels, Kartik Radhakrishnan, Elbert Michael Ruiz, Richard Mark Tarbel

Richard M. Bass/Eta Kappa Nu Outstanding Teacher Awards.....Farrokh Ayazi, James O. Hamblen

These two awards, consisting of two \$2,500 checks, are presented to the most outstanding classroom instructors—one junior faculty member and one senior faculty member—as determined by the ECE senior class.

INSTITUTE AWARDS

ECE faculty and staff members were recognized for their outstanding achievements at the Georgia Tech Faculty/Staff Honors Luncheon on April 7, 2004.

Class of 1934 Outstanding Interdisciplinary Activities Award.....George Vachtsevanos

Class of 1934 Outstanding Innovative Use of Education Technology Award.....Joel Jackson

Outstanding Undergraduate Research Mentor Award.....Gary May

Outstanding Faculty Research Author Award.....Ian Akyildiz

Outstanding Staff Performance Award.....Lynda Buescher

Ten-Year Service Award.....Debra Balkom, Sherrie Cooper, Robert House, Sharon Lawrence, Madhavan Swaminathan, David Webb

Twenty-Five Year Service Award.....Kathy Cheek, Charlotte Doughty

ECE students were recognized at the Georgia Tech Student Honors Day on April 13, 2004.

Sigma Xi Best Dissertation Award.....Alex Pregelj

Sigma Xi M.S. Thesis Award.....Karthikeyan Sundaresan

Henry Ford II Scholar Award.....Adam Eisenman, Tianyu Tom Wang

Georgia Tech Faculty Women's Club Scholarship.....R. Reeve Ingle, Anil Rohatgi

**Center for the Enhancement of Teaching and Learning/
Frank Bogle Nontraditional Student Award.....Deborah Johnson**

Dorothy Cowser Yancy Incentive Award.....Don Andrew Pottinger

Tau Beta Pi Senior Engineering Cup.....Eric Joseph Clopper

A Webzine called "ecesis"

Ecesis is a noun meaning the successful establishment of an organism in a new environment. It is also the name for a unique new venture stirring at ECE—an on-line publication, referred to as a webzine that showcases the creative juices flowing through ECE. This publication includes original works of art, film, music, prose, and poetry created and authored by ECE students, faculty, and staff.

Christina Bourgeois, the director of ECE's Undergraduate Professional Communications Program (UPCP) initiated this program to offer a venue, open to anyone at ECE, to share their artistic and creative talents, and in so doing, build a community within the School that interacts "outside the box."

The idea obviously resonated deeply with the students, as nearly 40 attended the initial planning meeting for *ecesis* and quickly formed an editorial board. The board received nearly 100 entries, including poetry from two ECE professors for the first publication. "Working on this project is lots of fun and a refreshing break from the normal routine," said undergraduate student Ayan Rishore.

Ms. Bourgeois, representing UPCP, and ECE Assistant Professor Jeffery A. Davis, representing the ECE Student-Faculty Committee, serve as the official co-sponsors of *ecesis*. "I think that this is a great way to build community within ECE, by exposing our human and artistic side," Dr. Davis said. "I hope it will become a permanent part of our culture at ECE." ■

ECE Student Has the "Right Stuff"

for Academic and Athletic Excellence

The Ramblin' Wreck's amazing tournament run during "March Madness" is something that will long be remembered. Georgia Tech's basketball team not only made it to the "Final Four," but prevailed to the very end, playing the final tournament game against the University of Connecticut.

Player #14, Keith Jones, a guard on the team, is a freshman computer engineering student from Austell, Ga. He came to Georgia Tech first and foremost as a student. "I had some scholarship offers from other schools," Mr. Jones said, "but I chose Tech because I knew how strong its engineering program is, and this is what mattered most to me." He earned a spot on the team through Tech's annual walk-on tryouts in October 2003. So began a most memorable year for this young student—a year during which he has distinguished himself in the classroom as well as on the basketball court.

The exciting ride to the Final Four did not deter Mr. Jones from his academics. In the spring, he took his textbooks on the road in order to keep up with his rigorous course work. Douglas B. Williams, ECE professor and associate chair for Undergraduate Affairs said, "We are proud of Keith's accomplishments. It takes a remarkable person to be both a Dean's List student in computer engineering and to earn a spot on our Final Four team."

According to Mr. Jones, his goals for the next three years at Tech are "to stay on the Dean's List, and keep getting better at basketball." ■



Photo courtesy of Georgia Tech Sports Information Office

Third Annual FIRST LEGO League Challenge

A Great Opportunity to Make Math and Science Fun for Kids

Twenty-nine teams of students ages 9 to 14 gathered at SciTrek Museum to compete in the State of Georgia's FIRST LEGO League Challenge in November 2003. ECE faculty, staff, and students, in partnership with SciTrek, hosted this event.

Following the theme of "Mission Mars," the 2003 Challenge provided student teams the experience of what it would be like to visit and explore Mars, with visions of colonization. Using LEGO® Mindstorms™ Robotics Invention System™ technology, the teams tried solving Martian exploration challenges that NASA engineers face everyday.

FIRST (For Inspiration and Recognition of Science and Technology), an organization founded to inspire interest in science and engineering among young people, joined forces with The LEGO® Company to create FIRST LEGO League, which designs a different, real-world game challenge every year. Working with team members, mentors, and teachers, students apply engineering know how,

computer programming skills, and presentation techniques as they compete to best solve the annual challenge. The 2003 competition winners were the *Galactic Designers*, a six-member team of students from the Gallo-way School in Atlanta and Sope Creek Elementary School in Marietta, Ga.

Jeffrey A. Davis, an ECE assistant professor, served as coordinator of the State of Georgia FIRST LEGO League Competition for the third consecutive year and has seen participation in the activity more than quadruple its size. The State of Georgia FIRST LEGO League competition was supported by grants from the National Science Foundation, Kimberly Clark, and the Netherlands American Trust. ■

The Galactic Designers proudly show their award winning entry at the FIRST LEGO League Competition. Team members are (l-r): Sutton Birch, age 9; Jake Turner, age 9; Danny Kreis, age 9; Rand Elsbree, age 10; Drew Eikboff, age 10; and Andrew Young, age 9. David Turner served as the team's coach.

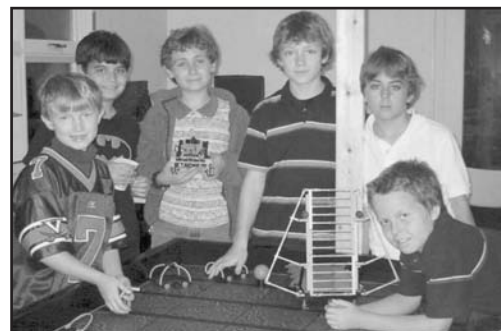


Photo by David Turner

Alumni News

ECE ADVISORY BOARD MEMBERS 2003-2004

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Cypress Semiconductor
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Allied Utility Network
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Lucent Technologies
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Capital Valley Ventures
Randall E. Poliner '77
Antares Capital Corporation
Thomas J. Quigley '84
Broadcom Corporation
C. Meade Sutterfield '72
SSPCS Corporation

Ray H. Pettit (BEE '54, MSEE '60) has published his memoirs entitled *Mill-Village Boy*. In the book, Dr. Pettit speaks of his years growing up with a goal of graduating from Georgia Tech, including his years as both an undergraduate and graduate student, as well as his 12 years as a professor in Georgia Tech's School of Electrical Engineering. For more information, visit www.millvillageboybook.com.

William Ronald Casto (BEE '76) founded Casto Information Management Systems, Inc. (CIMSinc) in 1996, with the goal of providing document management systems and associated technologies. Since then, the company has expanded into custom software services and is providing a product (CDCIS) for use by state and local health departments for the management of tuberculosis, HIV/AIDS, and STD patients. The company is located in Huntsville, Ala., with offices in Memphis, Tenn., Nashville, Tenn., and Cumming, Ga.

Blague Valet (BEE '79) is president of SIEPAT Ordinateurs, a computer training, repair, and software development company in South Africa.

David Schlicher (MSEE '80) was recently called to serve as pastor of College Community Congregational Church (United Church of Christ) in Fresno, Calif. A former electrical engineer, he is leaving the Church of the Holy Trinity UCC in Hagerstown, Md. and has previously served congregations in Colorado and Hawaii.

J. Dale Oliver (BEE '81) was promoted to regional vice president for Progress Energy Florida and is responsible for distribution operations, community relations, and customer service in south central Florida.

Sepehr Mehrabanzad (BEE '82, MSEE '84) is the director of 1xEV-DO Software for Airvana in Chelmsford, Mass.

Charles R. Rugar (BEE '84) is an investment consultant for TD Waterhouse in Richmond, Va., who recently received his Chartered Financial Consultant (CFC) and his Chartered Life Underwriter (CLU) designations.

George Christoforidis (MSEE '85, PhD '90) is a systems operator with Hellenic Transmission in Athens, Greece.

Sergio R. Garcia (BEE '85, MSEE '86) is an associate professor senior in the Mathematics, Physics, and Engineering Department in the School of Natural and Social Sciences at Miami Dade College in Miami, Fla.

Frank Rosich (MSEE '85), with ESICOM SA in Costa Rica, is a certified IBM e-business advisor.

C.R. Cris Simpson (BCmpE '87) is a senior staff architect with Intel in Beaverton, Ore. He served as editor for ANSI

Standard INCITS.365-2002, SCSI RDMA Protocol, and was recently awarded U.S. Patent 6542941, "Efficient Command Delivery and Data Transfer."

Timothy Hall (BEE '90, MSEE '03) is a design engineer II with Glenayre in Duluth, Ga.

Juanita McDowell (MSEE '90) is a mortgage consultant with Pine State Mortgage in Atlanta, Ga. After 10 years as an engineer/data network sales consultant with AT&T Global Services, she resigned in 2000 to take care of her three children. She recently received her XINNIX Certification, which places her in the top half of 1 percent of professionals in the industry. She reports that she is "striving for excellence in this new career endeavor."

Kenneth Norman (BEE '92) was promoted to major in the U.S. Air Force. Currently, he is stationed at Randolph Air Force Base, Tex. as an assignments officer for the Developmental Engineering Career Field.

Carlotta Johnson Berry (BEE '93) graduated from Vanderbilt University with a PhD in ECE in May 2003. Her research topic was an enhanced human-robot interface for a mobile robot. She is currently an assistant professor of electrical engineering at Tennessee State University.

Arnett Brown (MSEE '93), a staff circuit design engineer with IBM in Research Triangle Park, N.C., was recently awarded two patents: "Tool Suite for the Rapid Development of Advanced Standard Cell Libraries" and "Method for Providing a Fill Pattern for an Integrated Circuit Design."

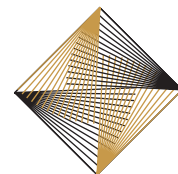
Deidre Paris (MSEE '94) is an assistant professor at Clark Atlanta University. She was selected as a participant in the NASA Faculty Fellowship program, where she will be working at Marshall Space Flight Center in Huntsville, Ala. This program is sponsored by the American Society for Engineering Education. Her research task will investigate software products, software commercial-of-the-shelf (COTS) tools, software technologies, and soft computing technologies for use with existing embedded flight software development data and processes. Dr. Paris will perform usability, applicability, and feasibility analysis for each product and technology.

Susan (Fletcher) LaBarge (BCmpE '96) is an implementation manager with WebRoomz.

Hui Wang (MSEE '97) is a manager with DVT at Calix Networks in Petaluma, Calif.

Bill Worley (BEE '97) is an engineer with Clarity, a division of Plantronics, Inc. in Chattanooga, Tenn.

Sam Gowin (BEE '99) received his J.D. from the University of Georgia School of Law in May 2004.



Ara Nefian (PhD '99) is a senior researcher with Intel Corporation in Santa Clara, Calif.

James "Hunter" Yancey (BEE '99) graduated from Franklin Pierce Law Center, where he studied intellectual property law. While at Franklin Pierce Law Center, he served as an editor for *IDEA: The Journal of Law and Technology* and also served as an intern for the Honorable Richard W. Story, United States District Judge for the Northern District of Georgia. He is a member of the bar of the State of Georgia and is also registered to practice before the United States Patent and Trademark Office. He is currently with Troutman Sanders LLP and is a member of the firm's intellectual property group. His legal practice involves all areas of intellectual property with an emphasis on all phases of patent law. He writes, "Georgia Tech prepared me well for law school, and it has also prepared me well for the daily challenges of intellectual property law."

Antonio Gentile (PhD '00) is an associate professor with the Dipartimento di Ingegneria Informatica at the University of Palermo in Italy.

Deborah Stutz (BEE '00) earned a master's degree in biomedical engineering with a focus in ultrasound from Duke University, and in October, she started work at GE Global Research at Niskayuna, N.Y., as a functional imaging scientist.

Michael Miller (BCmpE '01) is an associate with Zeta Associates, Inc. in Fairfax, Va.

David Fry (MSECE '02) is an engineer II with Honeywell in Phoenix, Ariz.

Fred Green (MSECE '03) is an associate systems engineer with Cisco Systems in Research Triangle Park, N.C.

Angelo Pereira (MSECE '03) is an electrical design engineer with Texas Instruments in Dallas, Tex. ■

ECE Alumnus Receives 2003 Mac Van Valkenburg Award

The Institute of Electrical and Electronics Engineers (IEEE) Circuits and Systems Society awarded the 2003 Mac Van Valkenburg Award to ECE alumnus Alan N. Willson, Jr. This honor, the highest in the IEEE Circuits and Systems Society, is given to professionals for their technical contributions and leadership.

Dr. Willson received his undergraduate degree in electrical engineering from Georgia Tech in 1961. After graduation, he worked for the IBM Corporation in Poughkeepsie, N.Y. During this time, he participated in a satellite program with Syracuse University, through which he earned his master's degree and served as an instructor for other IBM employees in an IBM-sponsored engineering education program. These experiences gave him a taste for teaching that has never left. He entered the Ph.D. program at Syracuse, full-time, in 1965, earning his doctorate in 1967.

The next step in his career was with Bell Laboratories, where he served as a member of the technical staff from 1967-1973. While he tremendously enjoyed the opportunity to conduct research with Bell Labs, the call to teach remained strong, and he joined the faculty at UCLA in 1973. Dr. Willson served as the assistant dean for Graduate Studies in the UCLA School of Engineering and Applied Science, from 1977-1981, and as associate dean of the School from 1987-2001. These days, Dr. Willson continues his teaching and research as a regular member of the electrical engineering faculty at UCLA and runs a small electronics research and IP-licensing company, Pentomics, Inc., which he founded in 1991.

Dr. Willson's career spans the gamut of how electrical engineering knowledge is applied—in industry, research, and academics. He credits his early education at Georgia Tech for providing him an unparalleled foundation from which his career has grown. "I was there in a different era when the School was smaller, and electrical engineering was still, unfortunately, mostly all men. I have to say, however, that the extreme academic rigor and excellence that ECE is known for today existed back in my days at Tech, and has carried me forward throughout my career." ■



We Want to Know! Share your news with your ECE classmates and friends. Just complete this form, clip, and mail or visit our web page at www.ece.gatech.edu/alumni and tell us online.

Name _____ Degree/Year _____

Information for ECE News (recent awards, job changes, papers, patents, etc.) _____

Home Address _____

Work Address (including company name) _____

Daytime Phone _____ Email _____

Mail to Suzy Briggs at the School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA 30332-0250

ECE Loses a Beloved Mentor and Friend

Thomas M. White, 1925-2004

ECE Professor Emeritus Thomas M. White, whose career with Georgia Tech spanned over half a century, died unexpectedly on June 26, 2004. Dr. White joined the School in 1948 as an instructor and dedicated his early years to laboratory and course development. His expertise was in circuit theory and electronics, and he was regarded as the circuits guru in these early years. He was promoted to assistant professor in 1954. For the next 11 years, he taught and worked towards his doctorate, which he earned from Georgia Tech in 1963. He was promoted to professor in 1968.

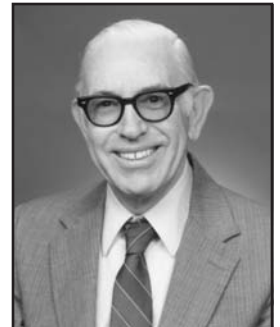
In 1969, Dr. White became undergraduate coordinator for ECE. For nearly 20 years, he continued his leadership in ECE's undergraduate program, as assistant director in 1978, and associate director in 1985. He retired from Georgia Tech in 1988. For 15 years following his retirement, he continued to work part-time in the ECE Academic Office.

His dedication and love for his students and for the School were legendary. He received the Eta Kappa Nu Outstanding Electrical Engineering Teacher Award in 1974, the Georgia Tech Outstanding Teacher Award in 1977, and the Georgia Tech Outstanding Service Award in 1987. ECE Professor W. Russell Callen, Jr. said, "Tom was a great teacher. When I first arrived at Tech, he served as my mentor. In the nearly 20 years that I knew him, he never lost his passion for teaching. He took a personal interest in each undergraduate, and has been the face of ECE to several generations of Georgia Tech students. This is his enduring legacy."

Regents Professor Emeritus Kendall L. Su, whose career paralleled Dr. White's reflected on their shared experiences at ECE. Dr. Su came to Georgia Tech as a graduate student in 1948, the same year that Dr. White began as an instructor. The faculty was small, numbering approximately 20. "He always saw the good in people," Dr. Su said, "I can't remember ever hearing him say anything bad about anyone. I thought that his soft spoken and

gentle demeanor made him ideal for his role with the undergraduate program. He was the most beloved advisor and mentor." William E. Sayle, professor emeritus and former associate chair for ECE Undergraduate Affairs said, "Tom was one of the finest individuals I have ever known. I will miss his warm personality, genuine interest in people, and his love of Georgia Tech. Thousands of current and former Georgia Tech students and faculty will all miss him too."

"Generations of Tech students were touched by his scholarship and caring," said Roger P. Webb, Steve W. Chaddick School Chair for ECE. "It is rare to encounter an ECE graduate who does not inquire of Tom and share a reminiscence of their interactions with him. A wonderful colleague has left us." ■



Klaus Building Project Progress Captured on Web Cam

Construction on the Christopher Klaus Advanced Computing Technologies Building began in April 2004. This new facility will house activities from both ECE and the College of Computing (CoC). The Klaus Building is intended to serve as a focal point for interdisciplinary research and to provide much needed additional space for both units. Jay Schlag, ECE professor and associate chair for Operations who serves as the School's representative on the building committee, said "The construction of this new facility reflects the ongoing expansion and progress of our academic and research programs." Progress on the building is captured every five minutes on a web camera which can be viewed at: www.ece.gatech.edu/internal/fac_staff_resources/klaus/index.html. ■