

2003-2004

A N N U A L R E P O R T

SCHOOL OF ELECTRICAL
AND COMPUTER ENGINEERING

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school of electrical & computer engineering

ECE Facts

Number of Faculty/Staff

| | |
|--|-----|
| Number of faculty (tenure-track)..... | 118 |
| Joint appointments..... | 3 |
| Adjunct and part-time faculty..... | 48 |
| Professors Emeriti..... | 18 |
| Research and administrative staff/academic professionals..... | 188 |

Number of Undergraduate Students

(Fall Semester 2003)

| | |
|--|-------|
| Electrical engineering..... | 945 |
| Computer engineering..... | 749 |
| Electrical engineering–Georgia Tech Savannah..... | 22 |
| Computer engineering–Georgia Tech Savannah..... | 25 |
| Total..... | 1,741 |

Number of Graduate Students

(Fall Semester 2003)*

| | |
|----------------------------------|-----|
| Doctoral..... | 621 |
| Special..... | 9 |
| Master of Science/M.S.E.C.E..... | 345 |
| Total..... | 975 |

Number of Degrees Awarded

| | |
|---------------------------------------|-----|
| B.S.Cmp.E..... | 152 |
| B.S.Cmp.E.-Georgia Tech Savannah..... | 5 |
| B.S.E.E..... | 278 |
| B.S.E.E.-Georgia Tech Savannah..... | 6 |
| M.S..... | 74 |
| M.S.E.C.E..... | 222 |
| Ph.D..... | 105 |
| Total..... | 842 |

Grants and Contracts

| | |
|---|--------------|
| Total funds received on external grants during FY 04..... | \$46,067,597 |
| Number of proposals submitted to external agencies during FY 04..... | 325 |

Faculty Credo

Unity of Purpose

Our purpose is to provide students at all degree levels with the highest quality preparation for successful professional careers, and through dedicated scholarship, to advance our profession. We will contribute to the expansion and responsible application of knowledge to the benefit of society. Our relentless pursuit of these goals will fulfill our vision of a Georgia Tech preeminent in information and telecommunications systems, energy and automation systems, and in the underlying enabling technologies.

Diversity of Function

We recognize and embrace the technical diversity of our profession. We seek to enhance this diversity by active engagement with relevant associated Georgia Tech and external professional activities. We will encourage cultural diversity within the ranks of the profession by being a leader in the education of minority and women electrical engineers and computer engineers, students attracted and taught by a faculty equally rich in role models.

Professionalism of Method

We participate in the most noble aspect of a noble profession. We will honor that profession by example, instilling in our students by our own conduct, the highest standards of professional behavior.

* Graduate program offers combined electrical and computer engineering degrees

The School of Electrical and Computer Engineering (ECE) remains among the largest producers of electrical engineering and computer engineering graduates in the United States and continues to develop programs of exploratory research in both new and existing technologies. Our commitment to supporting and recognizing our outstanding faculty, staff, and students and their accomplishments; creating innovative research programs; and providing state-of-the-art educational programs to our students is reflected in the following awards listing and research, educational, and professional summaries for 2003-04.

Faculty Honors and Awards

Global and National Awards

Russell D. Dupuis and two colleagues from the University of Illinois at Urbana-Champaign—M. George Craford and Nick Holonyak, Jr.—were awarded the 2002 National Medal of Technology by U.S. President George W. Bush at a White House ceremony. Dr. Dupuis and his two colleagues were selected “for contributions to the development and commercialization of light-emitting diode technology, with applications to digital displays, consumer electronics, automotive lighting, traffic signals, and general illumination.” The medals are the nation’s highest honor for work in science and technology and are bestowed to leading innovators in the U.S.

Fred Juang was elected to the National Academy of Engineering (NAE) for his contributions to speech coding and speech recognition. This most recent election of Dr. Juang brings ECE’s total of NAE members to six; Georgia Tech now has 25 active NAE members.

Ajeet Rohatgi received the 2003 Paul Rappaport Renewable Energy and Energy Efficiency Award from the U.S. Department of Energy’s National Renewable Energy Laboratory (NREL) for his achievements in photovoltaics research and education.

National Science Foundation CAREER and Army Young Investigator Awards

David V. Anderson received a National Science Foundation (NSF) CAREER Award “for ultra low power programmable analog signal processing systems.”

Farrokh Ayazi received a NSF CAREER Award “for advanced temperature compensation techniques for integrated bulk-mode micro and nano mechanical resonators.”

Robert J. Butera, Jr. received a NSF CAREER Award “for functional replacement of neural tissue in a model organism—research and education in neuroengineering.”

W. Alan Doolittle received a NSF CAREER Award “for new device opportunities enabled by polar dielectric and semiconductor heteroepitaxy.”

Ioannis (John) Papapolymerou received an Army Research Office Young Investigator Award for “development of micromachined traveling wave tube backward wave oscillators operating above 100 GHz.”

Professional Society Honors

Ian F. Akyildiz received the Association for Computing Machinery (ACM) SIGMOBILE 2003 Outstanding Research Contributions Award “for pioneering contributions in the area of mobility and resource management for wireless communication networks” at the ACM MobiCom 2003 Conference. SIGMOBILE, a special interest group of the ACM, focuses on mobility of systems, users, data, and computing.

Russell D. Dupuis was elected as a Fellow of the American Physical Society “for development of MOCVD deposition of semiconductors and room-temperature quantum-well lasers” and as a Fellow of the American Association for the Advancement of Science. Dr. Dupuis also received the 2004 Minerals, Metals, and Materials Society (TMS) John Bardeen Award—the highest honor that TMS awards to the researcher with an established research and publications track record in electronics materials—and the 2004 Distinguished Alumnus Award from the College of Engineering at the University of Illinois at Urbana-Champaign.

Ramesh Jain was selected as a Fellow of the ACM “for contributions to computer vision and multimedia information systems.”

Gary S. May received the 2004 American Society for Engineering Education (ASEE) Minorities in Engineering Award. This honor is given to engineering educators who motivate minority and/or women students to enter and continue in either an undergraduate or graduate engineering education path at the college or university level.

IEEE Awards

Four ECE faculty members were named as IEEE Fellows, effective January 1, 2004. ECE now has a total of 31 IEEE Fellows on its faculty.

- **Miroslav M. Begovic**, “for leadership in developing analysis tools and protection techniques for electric power transmission systems and renewable generation.”
- **Kevin F. Brennan**, “for contributions to the modeling of impact ionization in heterostructures and multiquantum well structures.”
- **Krishna V. Palem**, “for contributions to embedded computing.”
- **Paul G. Steffes**, “for contributions to the understanding of planetary atmospheres.”

Larry Coffeen received the 2003 Outstanding Engineer Award from the Atlanta chapter of the IEEE Power Engineering Society.

Joy Laskar was named Distinguished Microwave Lecturer by the IEEE Microwave Theory and Techniques Society for the term 2004-06. Dr. Laskar received this honor for his talk, “Recent Advances in High Performance Communication Modules and Circuits.”

James H. McClellan was named co-recipient of the 2004 IEEE Jack S. Kilby Signal Processing Medal, together with his Ph.D. thesis advisor, Tom Parks, “for fundamental contributions to digital filter design and interpolation, especially the Parks-McClellan algorithm.”

James H. McClellan and **Ronald W. Schafer**, with their colleague Mark A. Yoder of Rose-Hulman Institute of Technology, were co-recipients of the 2003 McGrawHill/Jacob Millman Award for authoring the textbook, *DSP First*.

A.P. Sakis Meliopoulos was named the recipient of the IEEE Richard Harold Kaufmann Award “for contributions to power system grounding design and testing procedures.”

William E. Sayle was named the recipient of the IEEE Educational Activities Board Meritorious Achievement Award in Accreditation Activities “for contributions to enhancing the quality of engineering accreditation and dedicated service to ABET/IEEE accreditation bodies.”

Rao R. Tummala received the 2003 IEEE Educational Activities Board Major Educational Innovation Award for outstanding educational innovation in a field of interest to IEEE. Dr. Tummala received his award “for reforming microsystems packaging education by unparalleled, systematic, and innovative approaches to courses, curricula, tracks, books, degrees, and conferences while mentoring and catalyzing other centers of excellence around the world.”

Georgia Tech Awards

Four ECE faculty members and one administrative staff member were recognized for their outstanding achievements at the Georgia Tech Faculty/Staff Honors Luncheon on April 7, 2004. Eight ECE faculty and staff members were also recognized for their years of service at Georgia Tech.

Ian F. Akyildiz, Outstanding Faculty Research Author Award

Lynda D. Buescher, Outstanding Staff Performance Award

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

Gary S. May, Outstanding Undergraduate Research Mentor Award

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

Ten-Year Service Award

Debra A. Balkcom

Sherrie Cooper

Robert R. House

Sharon D. Lawrence

Madhavan Swaminathan

David S. Webb

Twenty-Five Year Service Award

Kathy B. Cheek

Charlotte Doughty

Staff Honors and Awards

These staff members earned professional development certificates through the Georgia Tech Office of Organizational Development in areas such as supervisory and management skills.

Management Development Certificate

Kayron C. Gilstrap

Debra B. Kelley

Supervisory Development Certificate

Doria Moore

Suzzette E. Willingham

Jacqueline L. Nemeth

Office Professional Certificate

Cordai A. Farrar

Leslie L. Hudson

Departmental Certification in Sponsored Programs

LaJauna F. Guillory

Leslie L. Hudson

Judith Lorier

Janet M. Myrick

Mary W. Render

Carla W. Zachery

Student Awards and Honors

In addition to the ECE student award recipients, nine ECE students were also recognized at the Georgia Tech Student Honors Day on April 13, 2004 for awards given outside of ECE.

Eric Clopper received the Tau Beta Pi Senior Engineering Cup for demonstrating academic excellence, leadership, and service to the engineering field and to Georgia Tech activities.

Adam Eisenman and **Tianyu Tom Wang** received the Henry Ford II Scholar Award for having among the best academic records in the College of Engineering at the end of the third year of undergraduate study.

R. Reeve Ingle and **Anil Rohatgi** each received a Georgia Tech Faculty Women's Club Scholarship. This scholarship is given to students who are in good academic standing and whose parents are employees of Georgia Tech.

Deborah Johnson received the Center for the Enhancement of Teaching and Learning/Frank Bogle Nontraditional Student Award. This award is given to a nontraditional-aged junior or senior.

Don Andrew Pottinger received the Dorothy Cowser Yancy Award, given to an African-American freshman with the most outstanding academic record based on GPA, level of curriculum difficulty, and participation in activities related to the student's program of study.

Aleksandar Pregelj received the Sigma Xi Best Dissertation Award. His advisor was **Miroslav M. Begovic**.

Karthikeyan Sundaresan received the Sigma Xi M.S. Thesis Award. His advisor is **Raghupathy Sivakumar**.

Research, Educational, and Professional Milestones

NEW RECORD IN GRANTS AND CONTRACTS ACQUISITION For the third year in a row, the School of ECE broke records in both research grants and contracts and research proposal activity. In FY 2004, ECE faculty acquired \$46,067,597 in research grants and contracts, which represented 39.9 percent of the research funding in the College of Engineering, 24.2 percent of the research funding in units receiving resident instruction funding, 19.9 percent of Georgia Tech awards excluding the Georgia Tech Research Institute (GTRI), and 12.2 percent of all Georgia Tech sponsored awards, including those of GTRI. During FY 2004, ECE faculty members submitted 325 proposals, totaling \$194,941,178, to various governmental agencies and industrial sources.

U.S. NEWS AND WORLD REPORT RANKINGS Georgia Tech's College of Engineering was ranked fifth in the 2005 graduate engineering school rankings compiled by *U.S. News and World Report*. In rating specific, graduate engineering disciplines, Georgia Tech's electrical engineering program ranked seventh in the nation.

GEORGIA TECH LORRAINE A non-profit corporation located in Metz, France and operated under French law, Georgia Tech Lorraine (GTL) has four areas of emphasis—graduate education, sponsored research, undergraduate summer education, and continuing education. GTL offers undesignated master's degrees, master's degrees in either ECE or mechanical engineering, and Ph.D. degrees in both disciplines, in addition to a 10-week long undergraduate summer program. Cooperative agreements with local partner institutions enable students to pursue double degree programs in engineering and sciences, in addition to degrees from Georgia Tech. GTL is led by Hans B. Püttgen and François J. Malassenet, as its president and directeur, respectively. In fall 2003, GTL graduate enrollment totaled 213–132 who majored in ECE and 81 in mechanical engineering—and graduated 74 M.S.E.C.E. and 39 M.S.M.E. students.

In fall 2004, GTL plans to introduce the Senior Engineering Program, which will offer seniors majoring in mechanical engineering, electrical engineering, and computer engineering an international, multicultural dimension to their undergraduate experience. Participating students will spend the fall semester at GTL, where their course of study will include the capstone senior design project and graduate level courses in their respective disciplines. This program is a precursor to a new Undergraduate International Program, slated to begin at GTL in fall 2006. This upcoming program will offer junior-level students from electrical engineering, computer engineering, industrial and systems engineering, and mechanical engineering a year-long course of study that will include a minimum of two years of college-level French, at least two courses which are taught in French, and a course in international studies. If the program is approved, an international designation would appear on graduation diplomas, similar to the co-op or regional engineering designations that currently appear on degrees of graduates who participated in those programs.

GEORGIA TECH SAVANNAH Georgia Tech Savannah (GT Savannah) offers undergraduate degrees in civil engineering, computer engineering, electrical engineering, and mechanical engineering, as well as master's degrees in ECE, civil and environmental engineering, and mechanical engineering. In fall 2003, GT Savannah relocated its hub facility to Savannah's new Technology and Engineering Campus. Created by the Savannah Economic Development Authority, TEC is an innovative interpretation of the traditional office park that is designed to house private industry, community development offices, business incubators, and other functions of a university campus environment. Currently, GT Savannah occupies three buildings within TEC: the Engineering Laboratory and Analysis Building, the Program Administration and Resource Building, and the Economic Development and Research Building.

Enrollments in the computer engineering and electrical engineering degree programs were 25 and 22, respectively, amongst the program's three participating institutions in southeast Georgia—Georgia Southern University, Armstrong Atlantic State University, and Savannah State University. Six electrical engineering seniors—the highest total of graduates of the GT Savannah degree programs—and five computer engineering seniors graduated during 2003-04. Douglas B. Williams serves as the GT Savannah liaison for the Atlanta campus, and J. David Frost serves as GT Savannah director.

GOVERNOR PERDUE ANNOUNCES NANOTECHNOLOGY INITIATIVE In October 2003, Georgia Governor Sonny Perdue announced the planned creation of one of the nation's most advanced facilities for nanotechnology. Gov. Perdue proposed the establishment of the Nanotechnology Research Center, to be located on the Georgia Tech campus, which will be funded by a \$36 million contribution. That gift will be

matched by up to \$45 million in state support over the next several years. The Center will be the most advanced nanotechnology facility in the Southeast, the first of its kind in this region, and will be one of the most sophisticated in the country.

NATIONAL NANOTECHNOLOGY NETWORK Georgia Tech is among 13 U.S. universities participating in the new National Nanotechnology Infrastructure Network (NNIN), an integrated, nationwide system of user facilities to support research and education in nanometer-scale science, engineering, and technology. Led by Cornell University, the NNIN will enable students and researchers from any school in the U.S.—as well as scientists from U.S. corporate and government laboratories—to have open access to resources that they need for studying molecular and higher length-scale materials and processes, and for applying them in a variety of structures, devices, and systems. Georgia Tech will share its nanotechnology fabrication resources—including a new system capable of creating nanometer-scale features that will help to advance bio-electronics, nanotechnology, and advanced microelectronics—and lead the network's education and outreach efforts. James D. Meindl, director of Georgia Tech's Microelectronics Research Center, will head this initiative on campus. The network, an investment of at least \$70 million under NSF's nanoscale science and engineering priority area, also includes Harvard University, Howard University, North Carolina State University, Pennsylvania State University, Stanford University, the University of California at Santa Barbara, the University of Michigan, the University of Minnesota, the University of New Mexico, the University of Texas at Austin and the University of Washington.

ARBUTUS CENTER FOR DISTRIBUTED ENGINEERING EDUCATION The learning and education arena is undergoing an exciting transformation. Until recently, a traditional learning environment consisted of board-based lectures or group discussions in the classroom, complemented by a textbook and oral or written homework. While televised, Internet, and videotaped lectures expand the reach of the classroom teacher, they are relatively primitive and ineffective extensions of the traditional approach. This ineffective use of technology represents the consequence of technology merely elaborating a particular teaching paradigm. It is the premise of the Arbutus Center that effective learning environments can only be created by fusing information technology and learning science in such ways that each adds to and enhances the other.

The support of various foundations, Georgia Tech alumni, and other funding organizations has made it possible for Arbutus Center personnel to build and instrument learning laboratories that allow the development and testing of innovative learning technologies that leverage wireless infrastructures, mobility, and context-aware architectures. These resources have also provided opportunities for undergraduate internships, making it possible to provide extraordinary research opportunities for gifted undergraduate students. The Center's work has resulted in international publications, new learning technologies, and has helped to seed growing, interdisciplinary initiatives to explore the frontiers of enhanced learning environments. Arbutus Center personnel continue the development of content authoring technologies like *inFusion* and are beta testing the newest version of eClass. The early development of eClass began in 1997 (as Classroom 2000) and has captured over 3,000 lectures in over 100 courses. The Arbutus Center began supporting the development of eClass 2.0 in 2002 and began beta-tests in the summer of 2004. A new learning tool, CNT (Concept Navigation Tool), allows students to construct concept maps and uses those maps as an access interface to relevant digital content available in the repository.

CENTER FOR BOARD ASSEMBLY RESEARCH Founded eight years ago, the Center for Board Assembly Research (CBAR) is engaged in research that will enable the manufacture of next generation electronic products. CBAR's mission is to develop new technology for system-level board assembly to support ongoing product development trends such as reduced size and cost and enhanced performance. Primary areas of research include assembly materials development, process technology development, production and manufacturing systems, automated optical inspection, roadmapping and standards, and factory information systems. CBAR maintains close ties with professional organizations such as the National Electronics Manufacturing Initiative (NEMI), Integrated Printed Circuits (IPC), the Surface Mount Technology Association (SMTA), and the National Institute of Standards and Technology (NIST). Students participating in CBAR activities have the opportunity to learn about the latest in manufacturing equipment and software and to obtain technological skills that directly benefit industry. Industry partners have the opportunity to recruit students and to enroll in instructional courses on topics such as flip chip processing and evaluation and equipment interfacing. David G. Taylor is the director of CBAR, and he also serves as associate director of the Manufacturing Research Center.

CENTER FOR EXPERIMENTAL RESEARCH IN COMPUTER SYSTEMS The Georgia Tech Center for Experimental Research in Computer Systems (CERCS) brings together researchers from ECE and Georgia Tech's College of Computing (CoC) who share a common focus on the design and evaluation of computer and software systems through experimental methods. CERCS research focuses on complex systems, including their hardware, communications and system-level software, and applications. By emphasizing the experimental method, the Center promotes the creation of knowledge through the design, implementation, and measurement of potentially large-scale prototype systems.

One of the largest experimental systems centers in the U.S., CERCS is led by Karsten Schwan of CoC and co-directors Douglas M. Blough and Sudhakar Yalamanchili of ECE and Calton Pu from CoC. As a NSF Industry/University Cooperative Research Center, the Center's industrial partners during FY 2004 were Boeing, Dell, Delta Technologies (a subsidiary of Delta Air Lines), Hewlett-Packard, IBM, Intel, Raytheon, and Microsoft. Other companies with whom CERCS faculty interact include DoCoMo, TIBCO, Siemens, Sony, Sun Microsystems, and Xilinx, just to name a few. Basic membership permits industrial partners to support a CERCS student, interact with CERCS faculty and staff, and benefit from the general CERCS outreach program. Membership, defined via contractual relationships, provides specific rights to research output.

CENTER FOR MEMS AND MICROSYSTEMS TECHNOLOGIES The Center for MEMS and Microsystems Technologies (CMMT) at Georgia Tech creates and disseminates intellectual properties and produces highly qualified graduates trained in microsystems and microelectromechanical systems (also known as MEMS) for employment in academia, industry, and governmental agencies. Under the leadership of its four co-directors—Mark G. Allen, Farokh Ayazi, Oliver Brand, and A. Bruno Frazier, CMMT offers educational opportunities to undergraduates, graduate students, and post-graduates through a series of semester courses, short courses, and practical research-related training activities. CMMT research is quite broad, encompassing the areas of biomedical MEMS, RF MEMS, sensory MEMS, micromagnetics, fabrication technology development and characterization, integrated MEMS,

and actuators. In the past year, the CMMT faculty members have produced 5 Ph.D. and 4 M.S. graduates, one edited book, 61 refereed journal and conference publications, and six patents/records of invention. Thirty-four Ph.D. students, six master's students, three postdoctoral fellows, two research scientists/engineers, 12 undergraduate students, and three administrative staff members supported these faculty members' activities during FY 2004. Currently, the Center is seeking industrial members and is offering opportunities for collaboration via prototyping, design, consulting services, research programs, short courses, and general MEMS processing services.

CENTER FOR ORGANIC PHOTONICS AND ELECTRONICS The Georgia Tech Center for Organic Photonics and Electronics (COPE) is a research and educational center focused on the development of organic-based devices and circuits that have the potential to be manufactured at reduced cost on light weight, flexible substrates using non-traditional and environmentally friendly printing processes. These advances will serve the information-technology, energy, and defense sectors.

COPE was established in 2003 with Seth Marder (School of Chemistry and Biochemistry) serving as director and Bernard Kippelen (ECE) and Joe Perry (School of Chemistry and Biochemistry) serving as associate directors. The Center received initial funding from Georgia Tech and is funded via research contracts from industry and federally funded research grants and has raised over \$12 million. COPE's mission is to foster interdisciplinary research and education in the emerging areas of organic photonics and electronics. The Center supports over 10 faculty and more than 50 students and postdoctoral fellows from various schools and colleges across the Georgia Tech campus. The Center has four research and three administrative staff and provides specially equipped laboratories for the processing and testing of organic nanostructured materials and devices, the majority of which are housed in the School of ECE. COPE is working closely with the Advanced Technology Development Center (ATDC) to spin off new startup companies and is assisting small, local companies with technology needs.

CENTER FOR RESEARCH ON EMBEDDED SYSTEMS AND TECHNOLOGY During the last year, the Center for Research on Embedded Systems and Technology (CREST) has grown to include ECE faculty David V. Anderson, Magnus Egerstedt, Sungkyu Lim, Vincent Mooney (associate director, Internal Relations), Krishna Palem (director), and Sudhakar Yalamanchili (associate director, External Relations). Centered around the collaborative efforts of these faculty and their students, CREST aims to deliver impact that is internationally visible along the education and research dimensions, with commercial impact to Georgia as a concomitant theme. The unique depth and breadth of the faculty participants has allowed CREST to embark upon the twin themes of use-inspired research, with a five-year plan to maturity, and an independent science inspired research agenda, spanning a 10-year plan. In the use-inspired context, CREST faculty members are pursuing design space exploration and optimization for embedded platforms, with the goal of reducing time-to-market and non-recurring engineering costs by a factor of 50. Target application domains include digital signal processing (DSP) and robotics. As recognition, CREST is pleased to acknowledge an invitation to be a U.S. partner (one of four) by ARTIST, the European Network of Excellence in Embedded Systems. The science inspired research theme focuses on the thermodynamics of computing and probabilistic hardware, with the Georgia Tech Microelectronics Research Center being a strategic partner in the context of the National Nanotechnology Infrastructure Network. Educational

accomplishments include a novel joint venture with Georgia Tech's Global Learning Center for sharing CREST's Hewlett-Packard-sponsored courseware with universities worldwide in a commercial context, and a first course has been delivered to the Nanyang Technological University of Singapore. During the last year, Intel has joined CREST's industrial partner pool.

CENTER FOR SIGNAL AND IMAGE PROCESSING The Center of Signal and Image Processing (CSIP) is at the forefront of research and education in this important field. The laboratory boasts an outstanding, internationally known faculty, a large doctoral education program, excellent laboratory and computer facilities for research and education, and a wide-ranging selection of courses at both the graduate and undergraduate level. The research in CSIP covers all areas of signal processing, including speech recognition, speech compression, image and video processing, non-linear systems, statistical signal processing, radar and sonar imaging, acoustic localization, distributed microsensor networks, secure communication, DSP algorithms, hardware architectures, and DSP software.

CSIP researchers not only present over 100 papers each year at conferences, but they are also very active in organizing international meetings. During 2003, CSIP professors hosted an NSF Symposium on Next Generation Automatic Speech Recognition.

CSIP is one of only three university programs designated as a Leadership University by Texas Instruments; in addition, the Center maintains a strong joint research program with Hewlett-Packard Labs. CSIP researchers receive support from many funding sources, including the NSF, the Defense Advanced Research Projects Agency, the U.S. Army Research Office, the Ballistic Missile Defense Organization, the Air Force Office of Scientific Research, the Georgia Research Alliance (GRA), NASA, the John and Mary Franklin Foundation, Intel, Microsoft Corp., IBM Corp., and AT&T Laboratories.

COMMUNICATIONS SYSTEMS CENTER The Communications Systems Center (CSC) has an active research program in the area of Internet-Protocol networks, digital two-way CATV networks, and wireless network systems. CSC personnel are also working on developing new technologies for providing security on these networks. The laboratory has a 4.5-meter C-band and K-band satellite antenna and digital receiver connected to a digital CATV testbed system, donated by Scientific-Atlanta, Inc. The pad construction was made possible by funds from the GRA and help from Turner Broadcasting. Much of the Center's research involves network simulators, including standards like OpNet and NS2 or locally designed special purpose simulators. During the past year, CSC personnel worked on a Scientific-Atlanta-sponsored project for studying applications and communications issues at several layers on a digital two-way broadband CATV system, including research on traffic analysis and improved transmission protocols. The Center also participated in a U.S. Navy project to improve the effectiveness of network security exercises. Ph.D. thesis research was conducted on peer-to-peer ad-hoc wireless networks and on future wide-area mixed-mode networks. Research was also done on Internet traffic analysis and visualization and on the detection of rogue nodes on wireless networks.

GEORGIA CENTERS FOR ADVANCED TELECOMMUNICATIONS TECHNOLOGY The Georgia Centers for Advanced Telecommunications Technology (GCATT) house a number of Georgia Tech- and ECE-based research centers, multi-university collaborative projects, and an advanced communications business incubator. As a GRA initiative,

GCATT also supports advanced telecommunications research centers from the University of Georgia, the Medical College of Georgia, and Georgia State University. Nikil Jayant serves as executive director of GCATT.

During FY 04, GCATT reinforced its "TCP" theme—technology, commercialization, and policy—and continued to receive positive feedback from both industry and government supporters in these areas. The core technology research themes of GCATT continue to be on networking, content processing, and system solutions.

GCATT was host of one of five national public hearings by the President's Commission on Moon, Mars, and Beyond. Georgia Tech professors in aerospace engineering gave presentations on what Tech is doing to promote space careers, as well as what the space industry needs to do to compel Americans to support sustained space exploration. Buzz Aldrin, Apollo 11 Astronaut, discussed lessons learned from the space race of the 1960s and how they will affect implementation of U.S. President George W. Bush's new challenge to reach Mars and beyond.

The Office of Technology Policy and Programs (OTP) at GCATT presented the first ever State of Technology Conference on Mobile Wireless Technologies for Persons with Disabilities this year, in conjunction with the Wireless RERC. More than 200 attendees and 60 speakers from the public, private, and government sectors attended the conference. Sixteen states and eleven countries were represented, with one-quarter of the attendees self-identified as having a disability. The conference served to chart the field of mobile wireless technologies for people with disabilities and will produce a report on its findings in fall 2004.

Also part of OTP, the Municipal Advanced Telecommunications Infrastructure Project released its white paper "MuniTIP." The paper examined the role of municipal involvement in advanced information infrastructure development. The results of the report resulted in a schematic process for considering the factors that influence infrastructure development. The process model allowed municipalities, their stakeholders, and policy makers to consider the factors that most influence their decisions in infrastructure development.

GEORGIA ELECTRONIC DESIGN CENTER Professor Joy Laskar serves as the director of the Georgia Electronic Design Center (GEDC). The GEDC is a multi-disciplinary center at Georgia Tech dedicated to ground breaking mixed signal research with an annual research budget of \$10 million per year supported by industry and federal and state agencies. Located in Technology Square Research Building adjacent to Technology Square, GEDC is comprised of approximately 20 faculty and 150 graduate students who work closely with partner companies and agencies to solve pressing next-generation communications challenges. The Center currently has 40 industrial research partners, making it one of the largest industry-supported research programs at Georgia Tech. In addition, GEDC has worked closely with ATDC to help foster several start-up companies in the areas of mixed-signal technology development.

In 2003-04, industry funding totaled almost \$3 million, including programs with IBM, Motorola, National Semiconductor, Raytheon, Rockwell, Samsung, Siemens, and Sun Microsystems. In addition, a prototype/test bed program was developed to establish major consortia of excellence for the center in areas including: system-on-chip for millimeter wave silicon technology; system-on-package millimeter

wave liquid crystal polymer technology; integrated silicon technology for 10Gbs and higher for wired interconnect; RFID and wireless interoperability for fourth generation wireless systems; and optoelectronic platform for 10 Gbs and higher ethernet.

GEDC is having significant technical impact, as shown at the most recent IEEE International Microwave Symposia, the largest IEEE RF/microwave conference. Roughly 10 percent of all the presentations were from GEDC. In addition, three GEDC papers were entered into the student finalist competition (top 25 out of ~295 submissions): Rajarshi Mukhopadhyay, a Ph.D. candidate in Dr. Laskar's group, took third place in this student paper competition.

GEORGIA TECH ANALOG CONSORTIUM The Georgia Tech Analog Consortium (GTAC) is a proven, effective way for companies to receive direct and tangible benefits through faculty access, student research, and semi-annual research reviews that are held in the spring and fall. At the same time, the program gives sponsored students real world experience through ongoing research relationships with faculty and fellow students and via cooperative/internship assignments. ECE has a very active educational program in analog circuits and systems at both the undergraduate and graduate level.

GTAC's strength and vitality rests in the dynamic relationships that it fosters between students, faculty, and the corporate world, providing stronger relationships with the analog microelectronics industry. It was founded in 1989 and is now under the leadership of Paul E. Hasler. GTAC consists of 14 full-time faculty members, 1 full-time staff member, approximately 50 Ph.D. students, and 30 master's students. The Consortium's member companies include Analog Devices, Intersil, ON Semiconductor, Raytheon, RF Micro Devices, Schlumberger, and Texas Instruments.

GEORGIA TECH BROADBAND INSTITUTE In 2003, the Georgia Tech Broadband Institute (GTBI), led by Nikil Jayant, renewed its sponsorships from BellSouth, Broadcom, Hewlett-Packard, Intel, NTT DoCoMo Labs USA, Arris, Alcatel, and 3e Technologies International.

GTBI funded 25 projects in FY2004, which were selected based on sponsor inputs. These projects addressed the physical layer (both wireless and optical), networking and security, and multimedia and user interface. The funding for these projects supported over 25 students. In addition, GTBI held semi-annual Industrial Advisory Board meetings in October 2003 and April 2004, where the results of the industry-guided research were presented. These sessions offered the sponsors opportunities to interact with the faculty and students during poster sessions and lab tours/demo sessions. The April meeting resulted in over 33 proposals for new or continued funding in FY05 within the same areas of focus. GTBI expects to fund about half of these, taking industry feedback into account.

INTERACTIVE MEDIA TECHNOLOGY CENTER The Interactive Media Technology Center (IMTC) is focused on advancing science, technology, education, and culture through the use of interactive technologies. IMTC consists of nine research faculty, four research/administrative staff, and numerous undergraduate and graduate students. IMTC also contains a biomedical component referred to as the Biomedical Interactive Technology Center (BITC). The Center is directed by Mark A. Clements, who is also a professor in ECE. The Center, founded in 1989 to support Atlanta's bid for the 1996 Summer Olympics, is

funded via research contracts from industry and federally-funded research grants. One main focus is the creation of startup companies and assisting small, local companies with technology needs.

During FY 04, IMTC collaborated with Charmed Technology to re-design and improve the CharmBadge System, an electronic conference badge that uses infrared, line-of-sight technology to communicate with other CharmBadges in its viewing area. At any time, the CharmBadge interaction information can be downloaded at a CharmBadge download station and stored in the CharmBadge database for later viewing via the CharmBadge Information Access Center website. Through this site, attendees can change their contact information and the information they allow others to view. IMTC debuted the CharmBadge System at the North American IPv6 Summit in June 2004 in Santa Monica, Calif. The Summit was a great test of the system, and the feedback from the attendees will help determine further improvements. IMTC also continued its partnership with one of its spin-off companies, Nexidia (formerly known as Fast-Talk Communications), collaborating with the company on developing new products.

MICROELECTRONICS RESEARCH CENTER The Microelectronics Research Center (MiRC) provides the largest and most comprehensively equipped cleanroom facility on the Georgia Tech campus for collaboration among faculty, students, research staff, and industry in the highly technical and innovative fields of microelectronics, microfabrication, and nanotechnology. The MiRC's goal is to continue to meet the ever increasing interdisciplinary demands for process and fabrication tools and expertise, as well as cleanroom, lab, work, and meeting space made available to traditional and non-traditional users. Supporting operation of the 8,500-foot cleanroom facility, and keeping pace with the three-fold increase in cleanroom use since 1996, has been the total commitment of the 43-member staff. This commitment provides the highest quality set of services to a multidisciplinary research community with 20 specially equipped labs, 35 faculty offices, 177 cubicle seats for students, and six conference rooms. Since 1989, the MiRC has developed relationships with various centers and consortia on the Georgia Tech campus that cross over traditional engineering and research disciplines, as well as established and built relationships with the GRA and the NSF-sponsored National Nanotechnology Infrastructure Network to promote growth in cross-university use of resources and personnel. Many fledgling programs are underway that promise leading edge discoveries, most of which will be aided by the latest addition to the Center, the E-beam nanolithography tool, which was installed in 2004. This system, funded by the GRA, will allow the etching of patterns at the nano-scale and will facilitate advances in bioelectronics, nanotechnology, and advanced microelectronics. The MiRC is honored to be one of only two university research centers in the U.S. to provide this nanoscale technical capability to users.

NATIONAL ELECTRIC ENERGY TESTING, RESEARCH, AND APPLICATIONS CENTER Widely recognized as one of the world's foremost electric energy research, testing, and evaluation facilities, the National Electric Energy Testing, Research, and Applications Center (NEETRAC) is a member-supported electric energy research, development, and testing center that is engaged in a wide spectrum of innovative activities, including cable and cable accessory assessment, connector evaluation, failure analysis, grounding and surge protection service, high voltage testing services, and overhead conductor assess-

ment and hardware conductor analysis. Led by Hans B. Püttgen, NEETRAC consists of 11 faculty members—five from ECE, two from industrial and systems engineering, two from materials science and engineering, one from mechanical engineering, and one from civil and environmental engineering.

Through membership in this innovative enterprise, NEETRAC's industrial partners enjoy streamlined access to the faculty, students, and facilities of Georgia Tech's world-class engineering schools and GTRI. The Center's industrial members include American Electric Power, NRECA, The Southern Company, Exelon/Commonwealth Edison & PECO, Alcoa, Baltimore Gas and Electric, Borealis Compounds LLC, Cooper Power Systems, Dominion/Virginia Power, Dow/Union Carbide, Duke Power Company, Entergy Transmission, Florida Power and Light, GRESCO, Oncor, PEPCO, Pirelli Cable North America, Public Service Electric and Gas, South Carolina Electric and Gas, Southern California Edison, Southwire, Tyco-Raychem Electronics Energy Division, Cox Industries, and Southern States.

PACKAGING RESEARCH CENTER The Packaging Research Center (PRC) at Georgia Tech—funded by the NSF as one of its Engineering Research Centers from 1994 to 2005—was established to improve U.S. competitiveness in electronics via a new technical vision embodied by the Center's pioneering development of "System-on-a-Package (SOP)" and by reforming electronics packaging education.

The SOP concept of microsystems integration and packaging uses the best of both the integrated circuit (IC) and the package: the IC for transistor density and the package for component density of optical, digital, and wireless integration. Such a concept leads to miniaturization, lower cost, higher performance, and higher reliability of systems. It is also consistent with the emerging convergent computing, communication, and consumer systems trend.

The PRC continues to improve on its own reforms to electronics packaging education, leading to the graduation of globally competitive systems engineers. The education program also includes tight coupling of research to the curriculum, global business and management courses, internships in the U.S. and abroad, outreach to underrepresented groups and to students in the metro area public school systems, and national and international outreach with world-class universities and professional societies.

The Center's SOP research is leading to unanticipated new directions, including "nano-product systems." Multiplexed, ultrasensitive, and real-time detection and sensing of chemical and biological species represent a significant challenge to the current frontiers of research in biology, chemistry, and engineering. This challenge could be met by exploiting the unique electronic properties and integration potential of nanoscale electronic devices. If nanosensors can be applied to detect chemical and biological species at single molecule/cell sensitivity, this approach could lead to major technological breakthroughs in the field of implantable nano-size sensors with low power consumption and high sensitivity, with the potential to make unforeseen contributions to in-situ, early detection of cancers, environmental monitoring, and homeland security.

UNIVERSITY CENTER FOR EXCELLENCE IN PHOTOVOLTAICS RESEARCH AND EDUCATION During its 12-year existence at Georgia Tech, the University Center of Excellence in Photovoltaics Research and Education (UCEP) has made considerable strides in making solar-

electric power technology less expensive and more efficient. Established by the U.S. Department of Energy in 1992, UCEP is one of the largest solar power research centers in the U.S.

Led by Ajeet Rohatgi, Regents' Professor and Georgia Power Distinguished Professor, UCEP is unique because it has both state-of-the-art research laboratories and an on-campus solar powered facility that also acts as a research laboratory. UCEP labs house facilities for materials characterization, solar cell modeling, process development and cell fabrication, and solar cell testing. Dr. Rohatgi and researchers in the Center have established several world records for high efficiency cells. In 2003, UCEP achieved five new record efficiencies, including 18.2 percent and 17.9 percent efficient cells on EFG and String Ribbon Si with photolithography contacts and 17 percent, 16.1 percent, and 15.6 percent efficient cells on EFG, SR, and HEM multicrystalline materials with manufacturable screen printed contacts. A technological centerpiece during the 1996 Summer Olympics, the 342 kW rooftop, grid connected photovoltaic (PV) system at the Georgia Tech Aquatic Center now serves as a test bed for large-scale PV arrays. The solar-powered system provides about 30 percent of the electrical energy needed for the Aquatic Center and saves Georgia Tech almost \$30,000 a year in energy bills. It has produced more than 2 billion watt hours of electrical energy during the last six years, an amount sufficient to provide power to about 70 homes, and prevents the release of almost 400 tons of carbon dioxide into the atmosphere every year.

ECE-FOUNDED STARTUPS REACH MILESTONES During FY 04, significant investments were made in Advanced Technology Development Center (ATDC) graduate companies founded by ECE faculty members: Quellan (\$5.5 million, founded by Joy Laskar); Lancop (\$12.5 million, founded by John A. Copeland); Nexidia (formerly known as Fast-Talk Communications, \$7.5 million, co-founded by Mark A. Clements); and CardioMEMS (\$14 million, co-founded by Mark G. Allen). In its May 6, 2004 issue, the *Atlanta Business Chronicle* listed the top 25 venture investments in Atlanta of 2003. Four companies were established by ECE faculty members—CardioMEMS (seventh), Nexidia (17th), EGT, Inc. (18th, founded by Nikil S. Jayant), and Lancop (24th). ATDC, based on the Georgia Tech campus in Technology Square, is a nationally recognized technology incubator that helps Georgia entrepreneurs launch and build successful companies.

In July 2004, Jacket Micro Devices (JMD) closed its first round of financing for an undisclosed sum from Noro-Moseley Partners, Sevin Rosen Funds, Imlay Investments, the ATDC Seed Capital Fund, and Atlanta Technology Angels. Company founders are Madhavan Swaminathan and Rao Tummala, professors in ECE and deputy director and director of the Packaging Research Center (PRC), respectively; Venkatesh Sundaram, a PRC research engineer; and George White and Sidharth Dalmia, formerly PRC researchers who now work full-time with JMD. In March 2004, Jim Stratigos (BEE '74, MSEE '80) joined JMD as its CEO.

In July 2004, GTronix, a new startup company created through ATDC's VentureLab initiative, closed a round of seed financing with Silicon Valley-based Menlo Ventures that will support commercialization of a new technology aimed at integrating its novel, fully programmable analog chips into future generations of portable wireless products to improve performance, lower costs, and reduce power consumption. The new company has exclusively licensed two patents for cooperative analog-digital signal processing that were developed

in the laboratory of Paul Hasler, an associate professor in ECE. Hal Calhoun (BEE '87, PhD '93) is the managing director at Menlo Ventures and will serve on the GTronix's board of directors, and Dr. Hasler serves as the company's chief science officer.

ATDC hosted its 14th annual Open House in May 2004. The event featured the graduation of two ATDC companies, a "company showcase" featuring products and services from member companies, and recognition of ATDC supporters and volunteers. Among the graduate companies, congratulated for their accomplishments measured by sustainable operations, investment, and revenues, was EGT, Inc. EGT produces MPEG-2 digital video encoders used by cable, satellite, and telecommunications networks to provide the best quality video with the lowest possible bandwidth. Based on innovations in signal processing and compression technologies, EGT's encoder allows network operators to deliver more channels of content within a given amount of bandwidth; reduce requirements for rack space, power, and cooling; and build in flexibility for future video processing applications. EGT has sold and deployed encoders to leading cable and satellite providers throughout North America and the world, enabling operators to optimize bandwidth utilization and deliver new services to subscribers over their existing networks.

FUTURETRUCK Georgia Tech was among the 15 teams from U.S. and Canadian universities that competed in the fifth year of FutureTruck, held in June 2004 at Ford's Michigan Proving Grounds in Romeo, Mich. The Georgia Tech team placed third in the overall competition and won first place in the technical event for Acceleration. Comprised of undergraduate students in mechanical and electrical engineering, the team was advised by Jerome Meisel, an ECE visiting professor.

FutureTruck is a joint government-industry project created by the U.S. Department of Energy to explore alternative propulsion systems and fuels through student competition. The program's goal is to help raise the environmental performance of the popular sports utility vehicle segment while keeping the amenities and features that have made the vehicle so popular with consumers.

FIRST LEGO LEAGUE COMPETITION 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, and Jeffrey A. Davis, an assistant professor in the computer engineering and microsystems areas, served as the overall competition coordinator for the third consecutive year. Under his leadership, this activity has more than quadrupled in size. 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 toward colonization.

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. The 2003 competition winners were the Galactic Designers, a six-member team from the Galloway School in Atlanta and Sope Creek Elementary School in Marietta, Ga. The State of Georgia FIRST LEGO League Challenge was supported by grants from NSF, Kimberly Clark, and the Netherlands American Trust.

DUPUIS APPOINTMENT Russell D. Dupuis joined ECE in August 2003 as the Steve W. Chaddick Endowed Chair in Electro-Optics and GRA Eminent Scholar and is involved in the microsystems and optics and photonics areas. Before coming to Georgia Tech, he held the Judson S. Swearingen Regents Chair in Engineering in the Department of Electrical and Computer Engineering at the University of Texas at Austin. Dr. Dupuis is a member of the NAE and Fellow of the IEEE and Optical Society of America. In November 2003, he was awarded a National Medal of Technology by U.S. President George W. Bush at a White House ceremony.

McCLELLAN NAMED AS McCARTY CHAIR PROFESSOR James H. McClellan was named as the new John and Marilu McCarty Chair Professor in the School of ECE, effective July 1, 2004. Dr. McClellan assumes this new title after the retirement of Ronald W. Schafer, who held the McCarty Chair since his arrival at Georgia Tech in 1974. A member of the ECE faculty since 1987, Dr. McClellan has most recently held the title of Byers Professor. An IEEE Fellow, Dr. McClellan is the 2004 co-recipient of the IEEE Jack S. Kilby Signal Processing Medal, with his Ph.D. thesis advisor, Tom Parks of Cornell University, "for fundamental contributions to digital filter design and interpolation, especially the Parks-McClellan algorithm."

CRESSLER, McLAUGHLIN NAMED TO BYERS PROFESSORSHIPS John D. Cressler and Steven W. McLaughlin were named as Byers Professors, effective July 1, 2004. Endowed by Kenneth G. Byers, Jr. (BEE '66, MSEE '68), these professorships provide a major incentive to retain faculty members who are leading teachers and scholars, yet who are attractive to industry and other institutions.

Dr. Cressler's main interests are in silicon-based microelectronic devices and technologies, radiation effects in electronics, cryogenic electronics, and transistor-level numerical simulation and compact circuit modeling. A Fellow of the IEEE and a recipient of the IEEE Third Millennium Medal, Dr. Cressler is associated with the Georgia Electronic Design Center and the Georgia Tech Analog Consortium. He is a member of the microsystems and electronic design and applications technical interest groups.

Dr. McLaughlin is the director of Research at Georgia Tech Lorraine, and his research interests are in the areas of communications and information theory, error control coding, coding and signal processing for magnetic/optical storage and fiber optic transmission systems, and source coding and data compression. Dr. McLaughlin is a past recipient of the NSF Presidential Early Career Award for Scientists and Engineers, and he is second vice president of the IEEE Information Theory Society. He is a member of the telecommunications technical interest group.

LANTERMAN NAMED TO PARIS PROFESSORSHIP Aaron D. Lanterman was named as the Demetrius T. Paris Professor in ECE, effective July 1, 2004. The ECE Advisory Board established this professorship in 1998 in honor of Dr. Paris— who served as the School's chair from 1969–89—to support the professional advancement of junior faculty. An assistant professor in DSP, Dr. Lanterman's research interests are in the areas of target recognition, image reconstruction, and radar systems.

MERSEREAU, YALAMANCHILI NAMED TO PETTIT PROFESSORSHIPS Russell M. Mersereau and Sudhakar Yalamanchili were named as Joseph M. Pettit Professors, effective July 1, 2004. Funds from these professorships will support program development in Drs. Mersereau's and Yalamanchili's areas of interest.

Dr. Mersereau is a Regents' Professor who is a member of the DSP technical interest group. His research lies primarily in the areas of enhancement, modeling, and coding of computerized images and video; DSP for communications; acoustic arrays for echo removal and object tracking; and pattern recognition. An IEEE Fellow, he has been on the ECE faculty since 1975 and is an international leader in two-dimensional signal processing.

Dr. Yalamanchili is a professor in the computer engineering area. His research is in the areas of customizable hardware/software for embedded platforms, design and analysis of interconnection networks, and cluster computing architectures. A member of the ECE faculty since 1989, he is the associate director for the Center for Research on Embedded Systems and Technology and leads the Center's architecture design thrust group.

SAYLE RETIREMENT After 33 years of distinguished service, William E. Sayle retired as professor and associate chair for ECE Undergraduate Affairs in August 2003. Dr. Sayle began his career at Georgia Tech in 1970 and devoted it to teaching in the power electronics, microsystems, and electronic design and applications areas and in the overall development and promotion of engineering education. During Dr. Sayle's 15-year tenure as associate chair for ECE Undergraduate Affairs, the School's reach grew from its Atlanta campus to Georgia Tech Lorraine and to Georgia Tech Savannah in southeast Georgia. He was also heavily involved in Georgia Tech faculty governance, and he championed diversity and recruitment of underrepresented minorities and women to engineering and science, long before it became a national issue.

HERTLING AND SCHAFFER RETIREMENTS In Spring 2004, both David R. Hertling and Ronald W. Schafer retired after many years of tireless efforts on behalf of ECE, Georgia Tech, and their technical fields as a whole.

Dr. Hertling came to Georgia Tech in 1978, and throughout his career, he taught and performed research in electronics, radio frequency electronics, modeling of active devices, computer-aided design and analysis of circuits, and computer-aided design of dipole phased antenna arrays. In 1999, Dr. Hertling became associate chair for ECE Graduate Affairs, where he increased the office's staff to serve the School's graduate students more effectively and efficiently, in using the Internet to distribute information and for the application process, and in more aggressively recruiting the top graduate student applicants. He will continue with the School on a part-time basis, assisting in the ECE Graduate Office and maintaining his longstanding involvement in continuing education courses for RF engineering and wireless communications.

Dr. Schafer came to ECE in 1974 as the John and Marilu McCarty Chair Professor of Electrical Engineering, where he was the second faculty member to join the DSP group. In his 30-year career, he has played a major role in establishing the Center for Signal and Image Processing as one of the world's finest, counting 20 affiliated faculty and more than 100 graduate students. He was involved in teaching

and research in speech and image processing, nonlinear signal processing algorithms, applications of DSP in multimedia systems, and DSP applications in medicine and biology. A member of the National Academy of Engineering and a Fellow of the IEEE, Dr. Schafer is the recipient of numerous teaching and educational honors from both Georgia Tech and IEEE.

WEBB RETIREMENT In May 2004, Roger P. Webb, the Steve W. Chadwick School Chair of ECE, announced his plans to retire, effective January 1, 2005, after having served on the ECE faculty since 1964. Dr. Webb served as ECE's associate director from 1978 to 1989, and since 1990, he has served as its director/chair. In his 15-year tenure as ECE's top administrator, the School has experienced an incredible amount of growth in the breadth and depth of research, instructional, and economic development programs. Twenty-three new named professor positions, including seven that have GRA Eminent Scholar status, were created during his watch. Under his leadership, the amount of research funding per fiscal year has grown by almost eight-fold, and the size of the faculty has increased from 79 in 1990 to a total of 114 who will be employed in ECE as of fall 2004. Upon his retirement, Dr. Webb will join the Office of the Provost and Vice President for Academic Affairs for specific programmatic initiatives.

NEW ACADEMIC AFFAIRS ADMINISTRATORS Douglas B. Williams became the associate chair for ECE Undergraduate Affairs, effective fall semester 2003. Dr. Williams replaced William E. Sayle, who retired in August 2003. He is responsible for ECE undergraduate curriculum issues, student recruitment, and student advising, and he has continued as ECE coordinator for Georgia Tech Savannah. Dr. Williams teams with Joseph L.A. Hughes, associate chair for ECE Academic Operations; Dr. Hughes handles faculty workload, course scheduling, and oversight of assessment and accreditation activities and has served as an associate chair in ECE Academic Affairs since 1997.

Paul G. Steffes became associate chair for ECE Graduate Affairs, effective at the end of spring semester 2004 with the retirement of David R. Hertling. Dr. Steffes is responsible for curricula, student recruitment, and advising for a graduate program that has numbered approximately 1,000 students during the last couple of years.

McLAUGHLIN APPOINTED TO GTL POST Steven W. McLaughlin joined the GTL team as its new director of Research, effective January 2004. 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. In 2003, Georgia Tech entered into a research partnership with the Lorraine government to create the Laboratory for Acoustic Characterization of Advanced Materials. Dr. McLaughlin and other GTL personnel also intend to pursue research support from such entities as NSF, the U.S. Department of Education, and the U.S. Department of Defense.

LASKAR NAMED GEDC DIRECTOR Joy Laskar was named the director of GEDC in March 2004. The initiative combines the efforts of private enterprise, academia, and state government to leverage Georgia's existing high-technology base and its global leadership in

broadband technology research. GEDC is specifically focused on innovations at the boundary between telecommunications, microelectronics, analog/RF, and mixed signal systems.

As director, Dr. Laskar is responsible for establishing strategic direction for GEDC's research activities, recruiting the research team, providing management of research activities, and ensuring appropriate fund allocation. In addition, he is responsible for recruiting industry affiliates to the design center and for maintaining close liaison between the research activities and industry.

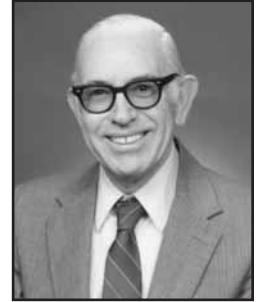
FACULTY PROMOTIONS Six faculty members were promoted and/or tenured, effective July 1, 2003. John A. Buck, Stephen P. DeWether, Joseph L.A. Hughes, and D. Scott Wills were promoted to professor. Paul E. Hasler and Linda M. Wills were promoted to associate professor and tenured.

As of July 1, 2004, 13 faculty members were promoted and/or tenured. Ali Adibi was promoted to associate professor, and Abhijit Chatterjee, Steven W. McLaughlin, and Henry L. Owen were promoted to professor. Yucel Altunbasak; Robert J. Butera, Jr.; Vincent J. Mooney, III; Emmanouil M. Tentzeris; and Anthony J. Yezzi, Jr. were awarded tenure

and promoted to associate professor. David S. Citrin, John D. Cressler, Ian T. Ferguson, and Chin-Hui Lee were all granted tenure.

In Loving Remembrance

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. 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. After his retirement from Georgia Tech in 1988, he continued to work part-time in the ECE Academic Office until August 2003. His dedication and love for his students and the School were legendary, and he will be missed.



Third Annual Awards Program Honors ECE's Best

ECE held its third annual awards program on April 22, 2004 at the Georgia Tech Student Center Ballroom. Twelve student awards, three staff awards, and three faculty awards were presented, recognizing some of the most outstanding members of the ECE community. C. Dean Alford and C. Meade Sutterfield, both ECE alumni and ECE Advisory Board members, hosted the program.

ECE faculty and staff who received awards at the Georgia Tech Faculty/Staff Honors Luncheon, students who received recognitions at the Georgia Tech Student Honors Day and Sigma Xi Awards Program, and recipients of ECE Outstanding Graduate Teaching Assistant Awards were also recognized during this event.

STUDENT AWARDS

| | |
|---|--|
| Outstanding ECE Sophomore Award..... | G. Wallace Tennille |
| ECE Junior Scholar Award..... | Adam Eisenman |
| Most Outstanding ECE Senior Co-op Award..... | Robert Yhap |
| ECE Undergraduate Research Award..... | Paul Mandeltort |
| Outstanding Service to Georgia's Community Award..... | Jennifer Lee |
| ECE Faculty Award..... | James Holland |
| Outstanding Electrical Engineering Senior Award..... | Jon Perry Entwistle |
| Outstanding Computer Engineering Senior Award..... | Karthik Balakrishnan |
| ECE Senior Scholar Award..... | Eric Clopper, Trivikram Kasivajhula, Scott Marlette, Michael McFadden, Lucas Milner, Matthew Moseley, Steven Sanders, David Sinyard |
| Colonel Oscar P. Cleaver Awards..... | William Potscavage, Amanda Preyer |

| | |
|---|-----------------------|
| ECE Teaching Assistant Excellence Award..... | Samuel Li |
| ECE Graduate Research Assistant Excellence Award..... | Majid Fozunbal |

STAFF AWARDS

| | |
|---------------------------------|--|
| Hats Off Performance Award..... | Sharon Crouch, Pamela Halverson |
| Research Spotlight Award..... | Ajay Upadhyaya |
| Academic Spotlight Award..... | Christina Bourgeois |

FACULTY AWARDS

| | |
|--|--|
| Outstanding Junior Faculty Member Award..... | Ali Adibi, Raghupathy Sivakumar |
| Richard M. Bass/Eta Kappa Nu Outstanding Teacher Awards..... | Farrokh Ayazi, James O. Hamblen |
| Distinguished Faculty Achievement Award..... | Ronald Harley |

This past fiscal year was one of transition—a trend that will continue into 2004-05, as Roger P. Webb, Steve W. Chaddick School Chair, announced his retirement to be effective no later than January 1, 2005. He has been associated with ECE for the last 41 years, with the past 15 years spent as the School's chair. In the past year, the ECE Academic Office has had two changes in leadership—Douglas B. Williams was named associate chair for ECE Undergraduate Affairs and Paul G. Steffes was named associate chair for ECE Graduate Affairs.

One hundred eighteen faculty members were employed in ECE during 2003-04. Six faculty members were hired—three in ECE and three ECE-affiliated faculty members at Georgia Tech Savannah. Two faculty members resigned, two faculty members retired, and one faculty member died. As of fall 2004, 114 faculty members will be employed in ECE.

Three new faculty members joined ECE for the start of fall semester 2003. Russell D. Dupuis is the Steve W. Chaddick Endowed Chair in Electro-Optics and is a Georgia Research Alliance (GRA) Eminent Scholar, and he is involved in the microsystems and optics and photonics areas. Bernard Kippelen, who came from the University of Arizona, is a professor in the microsystems and optics and photonics areas, and Gregory D. Durgin joined the electromagnetics areas as an assistant professor. Ghassan Al-Regib, Benjamin D.B. Klein, and P. Douglas Yoder were the newest ECE additions to Georgia Tech Savannah. Dr. Al-Regib is an assistant professor in telecommunications and digital signal processing (DSP); Dr. Klein is an assistant professor in microsystems and optics and photonics; and P. Douglas Yoder is an associate professor in microsystems and optics and photonics.

David R. Hertling and Ronald W. Schafer, two faculty members who have made invaluable contributions to the growth and reach of the School of ECE and their respective fields, retired in spring 2004. Dr. Hertling began his career at Georgia Tech in 1978, and in 1999, he became associate chair for ECE Graduate Affairs. Dr. Hertling will continue working with the School on a part-time basis. In 1974, Dr. Schafer came to ECE as the John and Marilu McCarty Chair Professor of Electrical Engineering, where he was the second faculty member to join a new area known as DSP. Since then, he played a major role in establishing ECE's DSP group, known as the Center for Signal and Image Processing, as one of the finest in the world that counts 20 affiliated faculty and more than 100 graduate students.

At the end of summer semester 2003, Kevin F. Brennan, Byers Professor in Microelectronics, died after a long battle with cancer. Dr. Brennan set the bar high for what a faculty member can achieve, while retaining the respect, support, and camaraderie of his academic colleagues and his students. Martin A. Brooke and Nan Marie Jokerst resigned in August 2003, after 15-year and 14-year tenures with ECE, respectively, to join the Department of Electrical Engineering at Duke University.

Sixty-four percent of the ECE faculty is tenured, with all members holding doctorates, and the average age of the faculty was 48. The table summarizes the academic ranks and the ethnic and gender composition of the faculty. A list of the faculty members and their research interests is also included in this section.

FACULTY PROFILE

RANK

| | |
|----------------------------|------------|
| Regents' Professors | 5 |
| Professors | 60 |
| Associate Professors | 29 |
| Assistant Professors | 24 |
| Total* | 118 |

TENURED

| | |
|----------------------------|----|
| Regents' Professors | 5 |
| Professors | 54 |
| Associate Professors | 17 |

FEMALE AND MINORITY REPRESENTATION

| | |
|------------------------|----|
| Female | 9 |
| African-American | 1 |
| Asian | 20 |
| Hispanic | 1 |
| Multi-racial | 1 |

* Includes GT Savannah faculty and all faculty members employed during FY 2004

Regents' Professors

Thomas K. Gaylord, Ph.D., Rice University

Julius Brown Chair Professor

Diffractive optics; optical interconnects; fiber optic devices; optics instrumentation; semiconductor quantum devices; nanostructure optoelectronics

Russell M. Mersereau, Sc.D., Massachusetts Institute of Technology
Enhancement, modeling, and coding of computerized images and video; DSP for communications; acoustic arrays for echo removal and object tracking; pattern recognition

Ajeet Rohatgi, Ph.D., Lehigh University

Georgia Power Distinguished Professor, Director of the University Center of Excellence for Photovoltaics Research and Education

Modeling and fabrication of low-cost high-efficiency silicon solar cells; growth and characterization of low-temperature and high-performance dielectrics; defects and carrier lifetime in semiconductors; rapid thermal processing of silicon devices; growth and optoelectronic properties of compound semiconductors

Ronald W. Schafer, Ph.D., Massachusetts Institute of Technology
(Retired April 2004), *John and Marilu McCarty Chair of Electrical Engineering*

Nonlinear signal processing systems; speech processing and multimedia systems; DSP in medicine and biology research; DSP for communications

Glenn S. Smith, Ph.D., Harvard University
John Pippin Chair in Electromagnetics
Basic electromagnetic theory and measurements; antennas and wave propagation in materials; radiation and reception of pulses by antennas

Professors

Ian F. Akyildiz, Ph.D., University of Erlangen
Byers Professor in Telecommunications
Wireless networks; satellite networks; next generation Internet

Mark G. Allen, Ph.D., Massachusetts Institute of Technology
Joseph M. Pettit Professor in Microelectronics and Co-Director, Center for MEMS and Microsystems Technologies
Micromachining; microsensors and microactuator fabrication compatible with integrated circuit (IC) fabrication; microelectromechanical systems (MEMS)

Phillip E. Allen, Ph.D., University of Kansas
Schlumberger Chair Professor in Microelectronics
Analog IC design; analog filters; analog modeling and computer-aided design (CAD); analog circuits and systems for telecommunications applications

Thomas P. Barnwell, III, Ph.D., Massachusetts Institute of Technology
Director, Arbutus Center for Distributed Engineering Education; Arbutus Chair in Distributed Engineering Education; and GRA Eminent Scholar
Computer-enhanced education; speech analysis, synthesis, and coding; multiprocessor architectures for DSP; DSP algorithms; objective speech quality measures

Douglas M. Blough, Ph.D., The Johns Hopkins University
Co-Director, Center for Experimental Research in Computer Systems
Multicomputer architecture; dependable computer systems; operating systems and middleware; computer systems security

Kevin F. Brennan, Ph.D., University of Illinois at Urbana-Champaign (Deceased August 2003), *Byers Professor in Microelectronics*
High field carrier transport in semiconductors; optoelectronic device physics; transport properties and device potential of wide band gap semiconductors; electronic device modeling and theory

John A. Buck, Ph.D., University of California at Berkeley
Nonlinear pulse propagation in optical fibers and fiber amplifiers

W. Russell Callen, Jr., Ph.D., Stanford University
Engineering educational methods; integration of engineering and the humanities; professional engineering education

Gee-Kung Chang, Ph.D., University of California at Riverside
Byers Endowed Professor in Optical Networking
Optoelectronic and photonic subsystems; optical networks and systems; optical networking technologies; next generation optical Internet

Mark A. Clements, Sc.D., Massachusetts Institute of Technology
Director, Interactive Media Technology Center
DSP and analysis; speech recognition; analysis and compensation of stress in speech; sensory aids for the hearing impaired; pattern recognition

John A. Copeland, Ph.D., Georgia Institute of Technology
John H. Weitnauer, Jr. Technology Transfer Chair; GRA Eminent Scholar; and Director, Communications Systems Center
Computer communication networks; digital cable television networks; computer architecture and operating systems

John D. Cressler, Ph.D., Columbia University
Silicon-germanium (SiGe) microelectronic devices and technology; Si-based RF/microwave/millimeter-wave heterostructure devices and circuits; radiation effects in electronics; cryogenic electronics; silicon-carbide (SiC) microelectronic devices and technology; transistor-level numerical simulation and compact circuit modeling

Stephen P. DeWeerth, Ph.D., California Institute of Technology
Neuromorphic engineering; hybrid neuronal-MEMS systems; biologically-inspired sensorimotor systems and motor learning; analog VLSI circuits and systems; "smart" sensors; remote interfacing to embedded systems

John F. Dorsey, Ph.D., Michigan State University
Modeling and control of large-scale systems; real time identification of parameters of power system models; online power system security assessment; elimination of sustained oscillations in power systems; effect on stability of nonutility generation

Russell D. Dupuis, Ph.D., University of Illinois at Urbana-Champaign
Steve W. Chaddick Endowed Chair in Electro-Optics and GRA Eminent Scholar
Semiconductor materials and devices; epitaxial growth by metalorganic chemical vapor deposition; heterojunction structures in III-V compound semiconductors

Robert K. Feeney, Ph.D., Georgia Institute of Technology
CAD and fabrication of printed-circuit-phased-array antennas; integration of advanced monolithic microwave ICs with microwave antennas; CAD for radio frequency (RF) and microwave circuit analysis and design

Ian T. Ferguson, Ph.D., University of St. Andrews in Scotland
Solid state lighting; light emitting diodes (LEDs)/lasers for UV and biomedical applications; MOCVD growth and fabrication of GaN-based materials; intelligent epitaxy; spintronics; entrepreneurship

Elias N. Glytsis, Ph.D., Georgia Institute of Technology
Diffractive optics; optical interconnections; integrated and fiber optic devices; numerical techniques in electromagnetic problems

Thomas G. Habetler, Ph.D., University of Wisconsin at Madison
Current-based condition monitoring of electric machines; control of electric machine drives; power electronics; design and protection of electric machines

James O. Hamblen, Ph.D., Georgia Institute of Technology
Rapid prototyping; embedded systems; computer architecture; CAD

Ronald G. Harley, Ph.D., London University
Duke Power Company Distinguished Professor
Power system stability and control, including flexible AC systems devices; power electronics, motor drives, and electric vehicles; neural networks applied to power electronics and electrical machines

Monson H. Hayes, III, Sc.D., Massachusetts Institute of Technology
Stereo image processing; face and gesture recognition; multimedia signal processing; adaptive signal processing; Internet education

academic faculty

Bonnie S. Heck, Ph.D., Georgia Institute of Technology
Control theory; power electronics; software architecture for control systems

David R. Hertling, Ph.D., University of Illinois at Urbana-Champaign (Retired May 2004) *Associate Chair for ECE Graduate Affairs*
Modeling of linear and non-linear active devices; CAD and analysis of electronic circuits; CAD of planar dipole phased antenna arrays

Joseph L.A. Hughes, Ph.D., Stanford University
Associate Chair for ECE Academic Operations
IC testing; VLSI system design; optical communication networks; educational program assessment

William D. Hunt, Ph.D., University of Illinois at Urbana-Champaign
Thin film piezoelectric materials; surface acoustic wave and bulk acoustic wave devices for wireless applications; microelectronic acoustics in chemical sensing and biological research; device physics and fabrication of microelectronic acoustic devices

Ramesh C. Jain, Ph.D., Indian Institute of Technology at Kharagpur
Rhesa "Ray" S. Farmer, Jr. Distinguished Chair in Embedded Experiential Systems and GRA Eminent Scholar
Multimedia information systems; image databases; machine vision; intelligent systems

Nikil S. Jayant, Ph.D., Indian Institute of Science, Bangalore
Executive Director, Georgia Centers for Advanced Telecommunications Technology; Director, Georgia Tech Broadband Institute; John Pippin Chair in Wireless Systems; and GRA Eminent Scholar
Signal compression; multimedia communications; wireless systems; broadband access

Nan Marie Jokerst, Ph.D., University of Southern California (Resigned August 2003), *Joseph M. Pettit Professor in Electro-optics*
Integrated optoelectronic links; integrated microsystems and nanosystems; optical network interfaces and imaging systems; alignment tolerant high performance optoelectronic interfaces

Biing-Hwang (Fred) Juang, Ph.D., University of California at Santa Barbara
Motorola Foundation Chair Professor and GRA Eminent Scholar
Speech processing; multi-channel and array signal processing; stochastic modeling of signal and data sequence; signal processing for communications; multimedia and multimodal communications

Bernard Kippelen, Ph.D., Université Louis Pasteur
Associate Director, Center for Organic Photonics and Electronics
Organic light-emitting devices for displays and lighting; flexible organic photovoltaic cells for power generation; low-cost organic electronics for RFID; real-time holography and signal processing; ultra-fast photonics; structure-property relationships in photonic and electronic materials

Joy Laskar, Ph.D., University of Illinois at Urbana-Champaign
Director, Georgia Electronic Design Center and Joseph M. Pettit Professor in Electronics
RF and microwave ICs in CMOS, SiGe, GaAs, and InP; integration and packaging techniques for RF/microwave applications; next generation IC applications in 4G wireless and hybrid RF/optoelectronic ICs

W. Marshall Leach, Jr., Ph.D., Georgia Institute of Technology
Electroacoustic modeling of transducers; audio signal processing; analog circuit design; low-noise electronics; electromagnetics

Chin-Hui Lee, Ph.D., University of Washington
Speech and speaker recognition; multimedia signal and information processing; speech and language understanding; spoken dialogue processing; pattern recognition; machine learning; biometric authentication; multimodal access; information retrieval and text categorization

James H. McClellan, Ph.D., Rice University
Byers Professor in Digital Signal Processing
Computer technology applied to education; sensor array signal processing; radar signal processing; software for DSP

Vijay K. Madiseti, Ph.D., University of California at Berkeley
Embedded software systems; digital system design; VLSI systems; system-on-package and system-on-chip technologies; DSP hardware and software

Gary S. May, Ph.D., University of California at Berkeley
Executive Assistant to President G. Wayne Clough and Motorola Foundation Professor
Computer-aided manufacturing of ICs and devices; monitoring, modeling, simulation, control, and diagnosis of semiconductor fabrication processes; IC design for manufacturability; IC yield modeling; computer-enhanced education

James D. Meindl, Ph.D., Carnegie-Mellon University
Joseph M. Pettit Chair in Microelectronics and Director, Microelectronics Research Center
Microsystems; gigascale integration (GSI)

A.P. Sakis Meliopoulos, Ph.D., Georgia Institute of Technology
Power system reliability and risk assessment; power systems operations planning; electromagnetic influence of power systems; power quality; protective relaying and disturbance analysis; simulation, animation, and visualization of power systems

Krishna V. Palem, Ph.D., University of Texas at Austin
Director, Center for Research in Embedded Systems and Technology
Adaptive hardware, compiler optimizations for instruction level parallel processors; embedded and fault-tolerant systems; parallel computing, programmable memory hierarchies, and smart caches; real-time systems, string, and pattern matching

John B. Peatman, Ph.D., Case Western Reserve University
Development of low-cost tools for the design of microcontroller applications; embedded microcontroller applications

Andrew F. Peterson, Ph.D., University of Illinois at Urbana-Champaign
Associate Chair for ECE Faculty Development
Computational electromagnetics; radar signature prediction; signal integrity in electronic packaging applications; antennas and microwave devices

Hans B. Püttgen, Ph.D., University of Florida
Associate Chair for ECE External Affairs; President, Georgia Tech Lorraine; Director, National Electric Energy Testing, Research, and Applications Center; and Georgia Power Distinguished Chair Professor
Power systems analysis and planning; utility deregulation; electric transportation vehicles and systems

William T. Rhodes, Ph.D., Stanford University
Image formation; partially coherent optical systems; Fourier optics; information processing and telecommunications; secure communication technology

Jay H. Schlag, Ph.D., Georgia Institute of Technology
Associate Chair for ECE Operations
Computer applications; CAD; neural networks

Waymond R. Scott, Jr., Ph.D., Georgia Institute of Technology
Methods for detecting buried objects using both electromagnetic and acoustic waves; measurement of electromagnetic properties of materials; transient electromagnetic fields; numerical methods including the finite element and the finite-difference time-domain techniques; antennas

Paul G. Steffes, Ph.D., Stanford University
Associate Chair for ECE Graduate Affairs (Effective May 2004)
Microwave systems for remote sensing of planetary atmospheres and surfaces; microwave and millimeter-wave properties of terrestrial and planetary atmospheres; satellite communications and navigation systems; spectrum allocation and usage; non-invasive monitoring of glucose in the human body; radio astronomy

Gordon L. Stüber, Ph.D., University of Waterloo
Joseph M. Pettit Professor in Communications
Wireless physical communications; cellular mobile radio systems; broadband wireless access systems

Madhavan Swaminathan, Ph.D., Syracuse University
Deputy Director, Packaging Research Center
Numerical methods in electromagnetics; interconnect design and analysis; power distribution for GHz systems; time domain characterization methods; IC package co-design

Allen Tannenbaum, Ph.D., Harvard University
Julian Hightower Professor
Computer vision; image processing; computer graphics; control theory; cryptography; biomedical imaging

David G. Taylor, Ph.D., University of Illinois at Urbana-Champaign
Director, Center for Board Assembly Research, and Associate Director, Manufacturing Research Center
Nonlinear control systems; electromechanical systems and devices; optimization of manufacturing machines

Rao R. Tummala, Ph.D., University of Illinois at Urbana-Champaign
Director, Packaging Research Center; Joseph M. Pettit Chair in Electronics Packaging; and GRA Eminent Scholar
Microelectronics systems packaging; electronic materials; display technologies; magnetic storage

George J. Vachtsevanos, Ph.D., The City University of New York
Hierarchical/intelligent control of large-scale industrial processes; fault-tolerant and mode transitioning control of unmanned aerial vehicles; vision- and IR-based inspection technologies for textile, glass, and other industrial products; analysis of EEG signals for detection and prediction of epileptic seizures; sensor fusion techniques for classification and control

Erik I. Verriest, Ph.D., Stanford University
Mathematical system theory; algorithms for optical signal processing; effects of finite precision on control; model reduction; stochastic realization theory; data compression

Yorai Y. Wardi, Ph.D., University of California at Berkeley
Analysis and optimization of discrete event dynamical systems; gradient estimation via simulation; modeling for rapid simulation of high-speed networks; optimal control of manufacturing systems

Roger P. Webb, Ph.D., Georgia Institute of Technology
Steve W. Chaddick School Chair
Electric power systems; instrumentation; control systems

D. Scott Wills, Sc.D., Massachusetts Institute of Technology
Portable multimedia supercomputers; short wire VLSI architectures; GSI system modeling; parallel computing; embedded SIMD architectures; high efficiency computation; multicomputer interconnection networks

Sudhakar Yalamanchili, Ph.D., University of Texas at Austin
Co-Director, Center for Experimental Research in Computer Systems, and Associate Director, Center for Research in Embedded Systems and Technology
Customizable hardware/software for embedded platforms; design and analysis of interconnection networks; cluster computing architectures

Associate Professors

John R. Barry, Ph.D., University of California at Berkeley
Communication theory; coding, equalization, and synchronization; wireless communications; signal processing for multiuser systems

Miroslav M. Begovic, Ph.D., Virginia Polytechnic Institute and State University
Wide area disturbances in transmission networks; distributed energy resources in power systems; sustainable energy systems; distribution network analysis; applications of DSP to power system protection

Oliver Brand, Ph.D., ETH-Zurich
Co-Director, Center for MEMS and Microsystems Technologies
Micromachining, MEMS, micro, and nano systems technology; micro-sensors for physical, chemical, and biological applications; microsensor fabrication based on IC technologies; microsystem packaging

Martin A. Brooke, Ph.D., University of Southern California
(Resigned August 2003)
High-speed, high performance signal processing

Abhijit Chatterjee, Ph.D., University of Illinois at Urbana-Champaign
VLSI and mixed-signal testing; fault tolerant computing; low power circuit design; computer algorithms; digital automation

David S. Citrin, Ph.D., University of Illinois at Urbana-Champaign
Nonlinear optical properties of semiconductor materials and devices; high-speed electronic, photonic, and optoelectronic devices; quantum computing; ultrahigh speed, all-optical switching; terahertz technology

K.-H. Michael Fan, Ph.D., University of Maryland
Video compression; nonlinear optimization; system theory; computer-aided engineering system design; robust control

A. Bruno Frazier, Ph.D., Georgia Institute of Technology
Co-Director, Center for MEMS and Microsystems Technologies
Micromachining, MEMS, and microsystems technology; biomedical microsystems; integrated biodetection systems; microsystems fabrication technologies

Paul E. Hasler, Ph.D., California Institute of Technology
Director, Georgia Tech Analog Consortium
Mixed-signal ICs; floating-gate devices, circuits, and systems; use of floating-gate MOS transistors to build "smart" interfaces for MEMS sensors; low power electronics; analog VLSI models of on-chip learning and sensory processing in neurobiology

Christiana B. Honsberg, Ph.D., University of Delaware
Design, development, and characterization of novel, commercially-oriented solar cell structures using buried contact technology; identification, modeling, and analysis of novel techniques to overcome traditional homojunction or two-stack tandem efficiency limits; GaAs solar cells

Mary Ann Ingram, Ph.D., Georgia Institute of Technology
Wireless communications systems; RF propagation measurements and modeling; array signal processing; antenna pattern synthesis

Chuanyi Ji, Ph.D., California Institute of Technology
Management and control of heterogeneous and large networks; adaptive algorithms, statistics, and information theory

David C. Keezer, Ph.D., Carnegie-Mellon University
Test methods for high performance electronic systems; design of high-speed logic systems; advanced electronics packaging methods; computer applications for music

J. Stevenson Kenney, Ph.D., Georgia Institute of Technology
ON Semiconductor Junior Professor
RF and microwave power amplifier design; behavioral simulation and PA linearization; advanced RFIC design; phase shifters and beam forming networks for smart antennas

Arthur Koblasz, Ph.D., California Institute of Technology
Rehabilitation engineering; medical diagnostic protocols

Ye (Geoffrey) Li, Ph.D., Auburn University
Wireless communications; adaptive signal processing

Steven W. McLaughlin, Ph.D., University of Michigan at Ann Arbor
Research Director, Georgia Tech Lorraine
Communications and information theory; error control coding; coding and signal processing for magnetic and optical storage and fiber optic transmission systems; source coding and data compression

Jennifer E. Michaels, Ph.D., Cornell University
Ultrasonic testing of components and structures; nondestructive materials characterization; DSP applied to measurement processes; sensors and measurement systems; robotics and motion controls for automated measurements

Thomas E. Michaels, Ph.D., Washington State University
Nondestructive evaluation of components and structures; materials characterization using ultrasonic methods; development of instrumentation and controls for automated testing; DSP of ultrasonic signals; measurement technology and sensor development

Linda S. Milor, Ph.D., University of California at Berkeley
Circuit performance (speed) modeling and prediction; analog and mixed-signal testing; yield modeling and prediction; modeling of process modules; statistical process modeling and characterization; digital testing

Henry L. Owen, Ph.D., Georgia Institute of Technology
Internetworking; computer networks; quality of service in the Internet; network protocol implementations in operating systems

Stephen E. Ralph, Ph.D., Cornell University
Ultrafast optical devices for high-speed optical communications; ultrafast processes in photonic devices; all-optical switching; optical telecommunications networks; optical materials and phenomena for optical signal processing

David E. Schimmel, Ph.D., Cornell University
Parallel computer architecture and reconfigurable computing; VLSI system design; system area computer network design; asynchronous and self-timed system design

Douglas B. Williams, Ph.D., Rice University
Associate Chair for ECE Undergraduate Affairs (Effective August 2003)
Statistical signal processing; signal processing techniques for communications; adaptive radar signal processing; applications of chaos and nonlinear dynamics to communications

Linda M. Wills, Ph.D., Massachusetts Institute of Technology
Demetrius T. Paris Professor
Reverse engineering existing systems for redesign and reuse; retargeting multimedia software to data parallel architectures; dynamically reconfigurable, self-adaptive software; rapid prototyping of real-time embedded systems; interactive architectural simulators for educational use

G. Tong Zhou, Ph.D., University of Virginia
Statistical signal processing; signal processing for communications applications; DSP-based power amplifier linearization; network traffic analysis; seismic deconvolution; bioinformatics

Assistant Professors

Ali Adibi, Ph.D., California Institute of Technology
Holographic data storage; holographic optical elements for optical communications; design, characterization, and applications of photonic crystals; optical communication and networking

Yucel Altunbasak, Ph.D., University of Rochester
Multimedia processing and communications; scalable video coding, high definition television, Internet video, and wireless video; audio-visual information management; 3-D graphics streaming; inverse problems in signal processing

David V. Anderson, Ph.D., Georgia Institute of Technology
DSP for speech and audio enhancement; signal processing for the hearing impaired; ultra-low power signal processing systems; Internet-based engineering education

Farrokh Ayazi, Ph.D., University of Michigan at Ann Arbor
Co-Director, Center for MEMS and Microsystems Technologies
Integrated MEMS; RF MEMS; VLSI analog/mixed-mode circuits for sensor readout and control; integration of high aspect-ratio silicon technologies with CMOS circuits; high-precision inertial sensing microsystems

Robert J. Butera, Jr., Ph.D., Rice University
Neural control of breathing; pattern-generating neural circuits; real-time computing applied to electrophysiology; nonlinear dynamics in electronic circuits; nonlinear dynamics in biological circuits

Jeffrey A. Davis, Ph.D., Georgia Institute of Technology
System-level interconnect prediction; interconnect limits for GSI; compact distributed RLC interconnect device modeling; interconnect-centric design methodologies; on-chip high speed networks and optimal multilevel network design

W. Alan Doolittle, Ph.D., Georgia Institute of Technology
Wide bandgap semiconductor materials and devices; dielectric materials growth and characterization; electrical, optical, and structural characterization and optimization of electronic materials and devices; microelectronic device/circuit fabrication; RF power electronic devices

Gregory D. Durgin, Ph.D., Virginia Polytechnic Institute and State University
Space-time wireless channel modeling; radiolocation; RF engineering and measurement; applied electromagnetics; wireless communications

Magnus Egerstedt, Ph.D., Royal Institute of Technology, Stockholm, Sweden
Hybrid automata theory; robotics, optimal control; complexity issues in control

Faramarz Fekri, Ph.D., Georgia Institute of Technology
Error control coding; wavelets; cryptography; digital communications; DSP for communications

Aaron D. Lanterman, Ph.D., Washington University in St. Louis
Target recognition; image reconstruction; radar systems

Hsien-Hsin Sean Lee, Ph.D., University of Michigan at Ann Arbor
Computer architecture, compiler optimization, low-energy computing system design, performance modeling analysis techniques, parallel processing, computer graphics

Sung Kyu Lim, Ph.D., University of California at Los Angeles
Physical design automation for VLSI circuits; three-dimensional circuit/packaging layout automation; quantum circuit layout automation; micro-architecture design space exploration; layout automation for reconfigurable circuits; graph theory and combinatorial optimization

Vincent J. Mooney, III, Ph.D., Stanford University
System level design; hardware-software co-design; synthesis of reconfigurable architectures; logic synthesis; application-specific system design; low-power architectures, modeling, and compilers

Ioannis (John) Papapolymerou, Ph.D., University of Michigan
Monolithic microwave/millimeter wave integrated circuits; silicon micromachining for high-frequency applications; RF MEMS; EBG structures; packaging and wireless interconnects; W-band transmit/receive modules

George F. Riley, Ph.D., Georgia Institute of Technology
Distributed discrete event simulation techniques; large-scale computer networks; distributed computing; operating systems; communications front-end processors

Gabriel Rincón-Mora, Ph.D., Georgia Institute of Technology
Precision low-voltage/low-power analog circuit design; low-noise analog circuit design; high performance power management integrated circuits; mixed-signal IC/layout design techniques

Raghupathy Sivakumar, Ph.D., University of Illinois at Urbana-Champaign
Computer networks; wireless networks; mobile computing; network quality of service

Emmanouil M. Tentzeris, Ph.D., University of Michigan at Ann Arbor
Real-time multiresolution algorithms for analysis and design of wireless communication front-ends; RF packaging; RF MEMS; antenna integration and miniaturization techniques; adaptive transient analysis of active circuits

Anthony J. Yezzi, Jr., Ph.D., University of Minnesota
Image processing; computer vision; estimation and control; computation and algorithms; applied differential geometry

Georgia Tech Savannah Faculty

Randal T. Ablner, Ph.D., Georgia Institute of Technology
Assistant Professor
Multi-protocol label switching/dense wavelength division multiplexing (MPLS/DWDM) integration; embedded systems design using Internet Engineering Task Force (IETF) session initiation protocol for use in distributed switching; telepresence for distance learning; and distributed content systems for improving network connectivity

Ghassan Al-Regib, Ph.D., Georgia Institute of Technology
Assistant Professor
Multimedia communications; image/video processing; error control coding; selective encryption; three-dimensional graphics streaming; animation compression; multimedia transport protocols; continuous media distribution services

Christopher F. Barnes, Ph.D., Brigham Young University
Associate Professor
Information and communication theory; DSP in radar and sonar; synthetic aperture imaging; pattern recognition and machine learning; high performance computing for radar and sonar

Joel R. Jackson, Ph.D., Georgia Institute of Technology
Assistant Professor
DSP with applications in medical imaging and remote sensing; DSP education; sonoelasticity imaging; embedded medical imaging devices; context-aware wireless devices for enhanced learning systems

Benjamin D.B. Klein, Ph.D., University of Illinois at Urbana-Champaign
Assistant Professor
Electromagnetic simulation of two- and three-dimensional photonic crystals; coherent interactions between light and charge carriers in nanoscale semiconductor devices

Ashraf Saad, Ph.D., Vanderbilt University
Associate Professor
Intelligent evolutionary systems; robotics; agent- and multiagent-based systems; mobile agents; artificial intelligence in education

Fedor Vainstein, Ph.D., Boston University
Professor
Fault-tolerant computing; computer hardware and software testing; computer hardware design; digital communication; error-correcting codes; applied mathematics and control

P. Douglas Yoder, Ph.D., University of Illinois at Urbana-Champaign
Associate Professor
Physics of deep submicron MOS transistors and semiconductor photonic devices; Monte Carlo device simulation

Rahman Zaghoul, Ph.D., University of Nebraska at Lincoln
Professor
Semiconductor materials characterization; novel cognitive-enabling educational environments; applications to machine learning, problem solving, robotics, and decision making under stressed conditions

Professors Emeriti and Length of Service

| | |
|---------------------------|--|
| Cecil O. Alford | 1968-98 |
| Henry C. Bourne | 1982-92 |
| Aubrey Bush | 1965-92 (Employed with the Georgia Centers for Advanced Telecommunications Technology) |
| J. Alvin Connelly | 1968-2001 (Employed with ECE on a part-time basis) |
| Joseph L. Hammond | 1955-84 (Employed with Clemson University) |
| Richard J. Higgins | 1987-99 |
| John W. Hooper | 1957-88 |
| Edward B. Joy | 1970-98 |
| Edward W. Kamen | 1971-80, 1991-2002 |
| Richard P. Kenan | 1986-99 |
| Mohamed F. Moad | 1963-2001 (Employed with ECE on a part-time basis) |
| Dale C. Ray | 1966-99 |
| George P. Rodrigue | 1968-96 |
| William E. Sayle | 1970-2003 (Employed with ECE on a part-time basis) |
| Kendall L. Su | 1954-94 (Employed with ECE on a part-time basis) |
| Thomas M. White | 1948-88 (Deceased June 2004) |

Joint Faculty Appointments

Gisele Bennett, Senior Research Engineer, Georgia Tech Research Institute

James Foley, Associate Dean, Professor, and Stephen Fleming Chair in Telecommunications; College of Computing

Yogendra Joshi, Professor, Woodruff School of Mechanical Engineering

Adjunct and Part-time Appointments

Emmanuel Anemogiannis, Nortel Networks

Paul J. Benkeser, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory University

Daniel J. Blumenthal, University of California at Santa Barbara

David E. Bockelman, Free Electron Technology

Bertrand Bousset, Georgia Tech Lorraine

Catherine Brechignac, Centre National De La Recherche Scientifique

Martin A. Brooke, Duke University

Marijn Brummer, Emory University

Brian Butka, Integrated Device Technology

Donald D. Davis, Antec Corporation

Jim D. Echard, Georgia Tech Research Institute

Robert Eisner, Crawford Long Hospital of Emory University

Irfan Essa, College of Computing

Gary G. Gimmestad, Georgia Tech Research Institute

Jean-Pierre Goedgebuer, Centre National De La Recherche Scientifique

Mathieu Hans, Hewlett-Packard Company

Nile F. Hartman, Georgia Tech Research Institute (Retired)

E. Jefferson Holder, Georgia Tech Research Institute

Michele L. Jamrozik, Georgia Tech Lorraine

Nan Marie Jokerst, Duke University

Lance Kaplan, Clark Atlanta University

Fred Kitson, Hewlett-Packard

Laurent Larger, Georgia Tech Lorraine

Bob Lee, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory University

Y.-L. Li, Intel Corporation

John O. Limb, Broadcom

Kenneth M. Mackenzie, College of Computing

John H. Matthews, John H. Matthews and Associates, Inc.

Bill McKinnon, Georgia Tech Research Institute

Robert McNally, NuTek BioMedical

Jerome Meisel, Georgia Tech

William L. Melvin, Georgia Tech Research Institute

Stephen C. Mettler, Lucent Technologies

Joseph W. Monaco, Line Imaging Systems

Romain Murenzi, Clark Atlanta University

William R. Owens, Georgia Tech Research Institute

Umakishore Ramachandran, College of Computing

Craig Richardson, ASPI Digital

Tariq Samad, Honeywell

Karsten Schwan, College of Computing

Robert E. Schwerzel, Georgia Tech Research Institute

Oskar Skrinjar, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory University

Christopher Summers, School of Materials Science and Engineering

John D. Terry, Nokia

Kwan K. Truong, Polycom, Inc.

May Wang, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory University

Stephen B. Wicker, Cornell University

Zhiping (James) Zhou, Georgia Tech Microelectronics Research Center

Faculty Service on Institute Governing Bodies and Committees

Georgia Tech has several governing bodies and standing committees that shape and administer Institute policies. These groups include the Institute Executive Board, the Academic Senate, and the General Faculty; six general faculty standing committees and nine academic faculty standing committees study issues and make policy recommendations.

During 2003-04, 23 ECE academic and general faculty members were involved in academic government, two who served as committee chairs—Frank D. Lambert for the Institute Welfare and Security Committee and D. Scott Wills for the Institute Undergraduate Curriculum Committee.

Executive Board

Andrew F. Peterson

Academic Senate

Miroslav M. Begovic
Jeffrey A. Davis
Joseph L.A. Hughes

Robert J. Butera, Jr.
Thomas G. Habetler

General Faculty Assembly

Miroslav M. Begovic
Robert J. Butera, Jr.
Jeffrey A. Davis
Joseph L.A. Hughes

Douglas M. Blough
Abhijit Chatterjee
Thomas G. Habetler
Mark A. Richards

General Faculty Standing Committees

Faculty Honors

Paul G. Steffes

Faculty Status & Grievance

Erik I. Verriest

Welfare & Security

Mary Ann Ingram
Frank C. Lambert*
Gail O. Palmer

Academic Faculty Standing Committees

Academic Integrity

W. Russell Callen, Jr.
Magnus Egerstedt

Graduate Curriculum

Stephen P. DeWeerth
Monson H. Hayes, III
David R. Hertling
Andrew F. Peterson**

Student Computer Ownership

James H. McClellan

Student Honor Committee

Jennifer E. Michaels
William T. Rhodes

Student Regulations

Thomas G. Habetler

Undergraduate Curriculum

Jeffrey A. Davis
Joseph L.A. Hughes
D. Scott Wills*

* Committee chair

** Ex-officio

Faculty Service on ECE Standing Committees

Education & Research Technology Transfer

Phillip E. Allen
Thomas P. Barnwell, III*
Robert K. Feeney
Monson H. Hayes, III
Bonnie S. Heck
William D. Hunt
Vijay K. Madiseti
Hans B. Püttgen
William T. Rhodes
Jay H. Schlag**
Emmanouil M. Tentzeris

Faculty Honors

John R. Barry
Russell D. Dupuis
David C. Keezer
Gary S. May
John B. Peatman
Andrew F. Peterson**
Ajeet Rohatgi
Rao R. Tummala
George J. Vachtsevanos*

Faculty Recruitment

John A. Copeland
Nikil S. Jayant
George F. Riley
Allen Tannenbaum
Roger P. Webb*

Graduate

David V. Anderson
Oliver Brand
Magnus Egerstedt
David R. Hertling**
Ramesh Jain
J. Stevenson Kenney
Hsien-Hsin Sean Lee
A.P. Sakis Meliopoulos
Russell M. Mersereau*
Krishna V. Palem
Raghupathy Sivakumar
Erik I. Verriest

Graduate Student Recruitment

Farrokh Ayazi
Mark A. Clements
Thomas K. Gaylord
Ronald G. Harley
David R. Hertling*
Ye Geoffrey Li
Vincent J. Mooney, III
John Papapolymerou
Paul G. Steffes
Anthony J. Yezzi

Laboratory

John A. Buck
Ian T. Ferguson*
James O. Hamblen*
Christiana B. Honsberg
W. Marshall Leach, Jr.
Thomas E. Michaels
Waymond R. Scott, Jr.

Reappointment, Promotion, & Tenure

Ian F. Akyildiz
Mark G. Allen
Gee-Kung Chang
Stephen P. DeWeerth
Joseph L.A. Hughes
Joy Laskar
Russell M. Mersereau
Andrew F. Peterson*
Hans B. Püttgen
Glenn S. Smith
Yorai Y. Wardi
Sudhakar Yalamanchili

Seminar

Yucel Altunbasak
David S. Citrin
K.H. Michael Fan
James D. Meindl
Linda S. Milor
Ronald W. Schafer
Gordon L. Stüber*
G. Tong Zhou

Statutory Advisory

Miroslav M. Begovic
David E. Schimmel*
Madhavan Swaminathan
David G. Taylor
Douglas B. Williams
D. Scott Wills

Student/Faculty

Ali Adibi
John D. Cressler
Jeffrey A. Davis*
Gregory D. Durgin
Faramarz Fekri
Biing-Hwang (Fred) Juang
Bernard Kippelen
Arthur Koblasz
Sung-Kyu Lim
Gabriel Rincón-Mora

Undergraduate

Robert J. Butera, Jr.
W. Russell Callen, Jr.
W. Alan Doolittle
John F. Dorsey
Joseph L.A. Hughes**
Aaron D. Lanterman
Chin-Hui Lee
James H. McClellan
Jennifer E. Michaels
Henry L. Owen*
Douglas B. Williams**
Linda M. Wills

Technical Interest Groups

Bioengineering

A. Bruno Frazier*
George J. Vachtsevanos

Mark G. Allen
Paul E. Hasler
Erik I. Verriest

Robert J. Butera, Jr.
William D. Hunt
Anthony J. Yezzi, Jr.

Mark A. Clements
Arthur Koblasz
G. Tong Zhou

Stephen P. DeWeerth
Allen Tannenbaum

Computer Engineering

Douglas M. Blough
Magnus Egerstedt
Ramesh C. Jain
Sung-Kyu Lim
Krishna V. Palem
Jay H. Schlag
Yorai Y. Wardi
A. Rahman Zaghoul

Randal T. Abler
Robert J. Butera, Jr.
James O. Hamblen
Nikil S. Jayant
Vijay K. Madiseti
John B. Peatman
Gordon L. Stüber
D. Scott Wills

Ian F. Akyildiz
Abhijit Chatterjee
Paul E. Hasler
David C. Keezer
James H. McClellan
George F. Riley
Madhavan Swaminathan
Linda M. Wills

David V. Anderson
Jeffrey A. Davis
Bonnie S. Heck
Chin-Hui Lee
Vincent J. Mooney, III
Ashraf Saad
Rao R. Tummala
Sudhakar Yalamanchili

Thomas P. Barnwell, III
Stephen P. DeWeerth
Joseph L.A. Hughes
Hsien-Hsin (Sean) Lee
Henry L. Owen*
David E. Schimmel
Feodor Vainstein
Anthony J. Yezzi, Jr.

Digital Signal Processing

Thomas P. Barnwell, III
Ramesh C. Jain
James H. McClellan*

Ghassan Al-Regib
Mark A. Clements
Bing-Hwang (Fred) Juang
Russell M. Mersereau

Yucel Altunbasak
Faramarz Fekri
Aaron D. Lanterman
Ronald W. Schafer

David V. Anderson
Monson H. Hayes, III
Chin-Hui Lee
Douglas B. Williams

Christopher F. Barnes
Joel R. Jackson
Vijay K. Madiseti
G. Tong Zhou

Electric Power

A.P. Sakis Meliopoulos
Roger P. Webb

Miroslav M. Begovic
Hans B. Püttgen

Thomas G. Habetler*
Ajeet Rohatgi

Ronald G. Harley
David G. Taylor

Christiana B. Honsberg
George J. Vachtsevanos

Electromagnetics

Robert K. Feeney
Joy Laskar
Waymond R. Scott, Jr.

Ali Adibi
Thomas K. Gaylord
W. Marshall Leach, Jr.
Glenn S. Smith*

John A. Buck
Elias N. Glytsis
I. (John) Papapolymerou
Paul G. Steffes

David S. Citrin
William D. Hunt
Andrew F. Peterson
Madhavan Swaminathan

Gregory D. Durgin
J. Stevenson Kenney
Stephen E. Ralph
Emmanouil M. Tentzeris

Electronic Design & Applications

Stephen P. DeWeerth
Joy Laskar

Robert K. Feeney
W. Marshall Leach, Jr.

Phillip E. Allen
Paul E. Hasler*
Linda S. Milor

Farrokh Ayazi
David R. Hertling
I. (John) Papapolymerou

John D. Cressler
J. Stevenson Kenney
Gabriel A. Rincón-Mora

Microsystems

David S. Citrin
Robert K. Feeney
Christiana B. Honsberg
Benjamin D.B. Klein
Linda S. Milor
P. Douglas Yoder

Ali Adibi
John D. Cressler
Ian T. Ferguson
Joseph L.A. Hughes
Joy Laskar
Stephen E. Ralph

Mark G. Allen*
Jeffrey A. Davis
A. Bruno Frazier
William D. Hunt
W. Marshall Leach, Jr.
Ajeet Rohatgi

Farrokh Ayazi
W. Alan Doolittle
Thomas K. Gaylord
David C. Keezer
Gary S. May
Jay H. Schlag

Oliver Brand
Russell D. Dupuis
Elias N. Glytsis
Bernard Kippelen
James D. Meindl
Rao R. Tummala

Optics & Photonics

David S. Citrin
William D. Hunt
William T. Rhodes
A. Rahman Zaghoul

Ali Adibi
Ian T. Ferguson
Mary Ann Ingram
Ajeet Rohatgi

John A. Buck
Thomas K. Gaylord
Bernard Kippelen
Glenn S. Smith

W. Russell Callen, Jr.
Elias N. Glytsis
Benjamin D.B. Klein
Erik I. Verriest

Gee-Kung Chang
Christiana B. Honsberg
Stephen E. Ralph*
P. Douglas Yoder

Systems & Controls

Gary S. May
David G. Taylor

John F. Dorsey
A.P. Sakis Meliopoulos
George J. Vachtsevanos

Magnus Egerstedt
Jennifer E. Michaels
Erik I. Verriest

K.-H. Michael Fan
Thomas E. Michaels
Yorai Y. Wardi*

Bonnie S. Heck
Allen Tannenbaum
Anthony J. Yezzi, Jr.

Telecommunications

John A. Copeland
Chuangyi Ji
Henry L. Owen
Erik I. Verriest

Ian F. Akyildiz
Faramarz Fekri
Bing-Hwang (Fred) Juang
Ronald W. Schafer
Yorai Y. Wardi

Ghassan Al-Regib
Joseph L.A. Hughes
J. Stevenson Kenney
Raghuopathy Sivakumar
Douglas B. Williams

John R. Barry
Mary Ann Ingram*
Ye (Geoffrey) Li
Paul G. Steffes

Gee-Kung Chang
Nikil S. Jayant
Steven W. McLaughlin*
Gordon L. Stüber

* Chair

Distance Learning and Professional Education Conferences and Courses

During 2003-04, both active and retired ECE faculty members offered and taught 21 sections of courses through the Georgia Tech Distance Learning and Professional Education (DLPE) Office. Below is a listing of course dates, titles, and ECE-based instructors and administrators; all classes were taught at Georgia Tech's Atlanta campus, unless indicated otherwise. Three ECE-sponsored conferences and workshops are also included in this list.

| DATE | TITLE | INSTRUCTOR/ADMINISTRATOR |
|-----------------------|---|--|
| July 2003 | | |
| 14-18 | <i>RF & Wireless Principles and Practice</i> | Robert K. Feeney and David R. Hertling |
| August 2003 | | |
| 4-8 | <i>CMOS Analog Integrated Circuits</i> | Phillip E. Allen |
| 18-22 | <i>Near-Field Antenna Measurements and Microwave Holography</i> | Edward B. Joy (Boulder, CO) |
| September 2003 | | |
| 3-October 22 | <i>Fundamentals of Engineering</i> | W. Russell Callen, Jr. |
| 16-18 | <i>Power Distribution System Grounding and Transients</i> | A.P. Sakis Meliopoulos |
| 29-April 30, 2004 | <i>DSP for Practicing Engineers</i> | Doug Williams (Online course) |
| October 2003 | | |
| 6-9 | <i>Fundamentals of Synthetic Aperture Radar Signal Processing</i> | Mark Richards |
| 14-17 | <i>Power System Relaying: Theory and Application</i> | Miroslav M. Begovic and A.P. Sakis Meliopoulos |
| November 2003 | | |
| 10-11 | <i>Wireless Local Area Networks</i> | Benny Bing |
| 11-13 | <i>Modern Energy Management Systems</i> | A.P. Sakis Meliopoulos |
| 18-21 | <i>Fault Diagnostics/Prognostics for Equipment Reliability and Health Maintenance</i> | George Vachtsevanos |
| December 2003 | | |
| 1-5 | <i>Far-Field, Anechoic Chamber, Compact, and Near-Field Antenna Measurements</i> | Edward B. Joy |
| January 2004 | | |
| 24-March 13 | <i>Electrical Engineering Refresher</i> | W. Russell Callen, Jr. and William E. Sayle |
| 27-30 | <i>Radar Signal Processing</i> | Mark Richards |
| February 2004 | | |
| 9-13 | <i>RF and Wireless Engineering</i> | Robert K. Feeney and David R. Hertling |
| 9-March 31 | <i>Fundamentals of Engineering</i> | W. Russell Callen, Jr. |
| March 2004 | | |
| 22-23 | <i>First International Workshop on Nano & Bio-Electronics Packaging</i> | Leyla S. Conrad |
| 23-26 | <i>Integrated Grounding System Design and Testing</i> | A.P. Sakis Meliopoulos |
| 24-26 | <i>Ninth International Symposium on Advanced Packaging Materials</i> | Leyla S. Conrad |
| April 2004 | | |
| 26-27 | <i>Fault and Disturbance Analysis Conference</i> | A.P. Sakis Meliopoulos |
| 26-28 | <i>Antenna Engineering</i> | Edward B. Joy, Waymond R. Scott, Jr., and Glenn S. Smith |
| 28-30 | <i>58th Annual Protective Relaying Conference</i> | A.P. Sakis Meliopoulos |
| May 2004 | | |
| 17-19 | <i>Grounding, Harmonics, and Electromagnetic Influence Design Practices</i> | A.P. Sakis Meliopoulos and George Cokkinides |
| 18-21 | <i>Fault Diagnostics/Prognostics for Equipment Reliability and Health Maintenance</i> | George Vachtsevanos |

academic, research, and administrative

Two hundred thirteen employees holding academic professional titles, research faculty/personnel titles, and administrative staff titles were employed in ECE during 2003-2004. As of June 30, 2004, ECE employed 188 administrative, research, and academic professionals.

Academic Professionals

| | |
|------------------------|--|
| Jill Auerbach | Academic Professional |
| Catherine Bass | Instructor |
| Christina Bourgeois | Lecturer |
| Leyla Sutcu Conrad | Senior Academic Professional |
| Michael D. Furman | Academic Professional |
| Warren M. Lanier | Academic Professional |
| François J. Malassenet | Directeur of Georgia Tech Lorraine/Academic Professional |
| Christopher McGahey | Academic Professional |
| Gail O. Palmer | Lecturer |
| Ashanti Pyrtle | Academic Professional |
| Kathleen Robichaud | Senior Academic Professional |
| David S. Webb | Senior Academic Professional and Assistant to the Chair for Computer Support |

Research Faculty/Personnel

| | |
|------------------------|---------------------------|
| Robin Abothu | Research Scientist II |
| Caryn Arrowood | Research Engineer I |
| Ali Asghar | Research Engineer I |
| Junfeng Bai | Postdoctoral Fellow |
| Adriano Batista | Postdoctoral Fellow |
| Abdul Beyah | Research Engineer I |
| Amir Betser | Senior Research Engineer |
| Swapan K. Bhattacharya | Senior Research Scientist |
| Benny Bing | Research Engineer II |
| John Bordelon | Senior Research Engineer |
| Edgar Brown | Research Engineer I |
| Giorgio Casinovi | Senior Research Engineer |
| Sudipto Chakraborty | Research Engineer II |
| Thomas C. Champion | Research Engineer I |
| Yi-Jan Chen | Research Engineer II |
| Uttiya Chowdhury | Postdoctoral Fellow |
| Theodore Chung | Postdoctoral Fellow |
| Larry T. Coffeen | Research Engineer II |
| George Cokkinides | Visiting Professor |
| Didier Contis | Research Engineer I |
| Christophe Courcimault | Research Engineer I |
| Florent Cros | Research Engineer I |
| Lorand Csiszar | Research Technologist |
| Sidharth Dalmia | Research Engineer II |
| Benoit Domerc | Research Scientist II |
| Ravi Doraswami | Research Engineer II |
| Adriane Swalm Durey | Postdoctoral Fellow |
| Abashifreke Ebong | Senior Research Engineer |
| Babak Firoozbakhsh | Research Engineer I |
| Mahmoud Fuad Almassri | Postdoctoral Fellow |
| Sergei Goupalov | Postdoctoral Fellow |
| Mason Graff | Research Scientist I |
| Daniel Guidotti | Senior Research Scientist |
| Jeongseok Ha | Postdoctoral Fellow |
| Joshua Haddock | Research Scientist I |

| | |
|---------------------------|-----------------------------|
| Zhili Hao | Postdoctoral Fellow |
| Richard A. Hartlein | Senior Research Engineer |
| Lonnie D. Harvel | Senior Research Scientist |
| Walter Henderson | Research Scientist I |
| Eliezer Hershkovits | Postdoctoral Fellow |
| Raymond C. Hill | Research Technologist |
| Raquel Hill | Postdoctoral Fellow |
| Zhaoran Huang | Postdoctoral Fellow |
| Jiandong Huang | Postdoctoral Fellow |
| Ajay Jayaraj | Research Engineer I |
| Jimmie Jones | Research Technician III |
| Admela Jukan | Research Engineer II |
| Sina Khorasani | Postdoctoral Fellow |
| Kang-Wook Kim | Postdoctoral Fellow |
| Sungwon Kim | Postdoctoral Fellow |
| Tong-Ho Kim | Postdoctoral Fellow |
| Frank C. Lambert | Senior Research Engineer |
| Chang Ho Lee | Research Engineer II |
| Jongsoo Lee | Postdoctoral Fellow |
| Peng Li | Postdoctoral Fellow |
| Ronglin Li | Postdoctoral Fellow |
| Kyutae Lim | Research Engineer II |
| Fuhan Liu | Research Engineer I |
| Pulugurtha Markondeya-Raj | Postdoctoral Fellow |
| Janeen McReynolds | Research Engineer I |
| Bao Mi | Postdoctoral Fellow |
| Oleg Michailovich | Postdoctoral Fellow |
| Elliot Moore | Postdoctoral Fellow |
| Gon Namkoong | Postdoctoral Fellow |
| Sebastien Nuttinck | Research Engineer I |
| Ming Pan | Postdoctoral Fellow |
| Hyun Min Park | Postdoctoral Fellow |
| Jin-Woo Park | Postdoctoral Fellow |
| Jung Hwan Park | Postdoctoral Fellow |
| Thomas J. Parker | Research Technologist II |
| Shashikant G. Patel | Research Engineer II |
| Adam Payne | Research Engineer II |
| Stephane Pinel | Research Engineer II |
| Mark A. Richards | Principal Research Engineer |
| Jae-Hyun Ryou | Research Engineer II |
| Caterina Scoglio | Research Engineer II |
| Susanta Sengupta | Research Engineer I |
| Rahul Singh | Research Scientist II |
| Samuel F. Smith | Research Scientist I |
| W. Whitfield Smith | Senior Research Engineer |
| Paul L. Springer | Senior Research Engineer |
| Harry T. Sullivan | Research Scientist I |
| Venkatesh Sundaram | Research Engineer II |
| Dean A. Sutter | Electrical Engineer III |
| Liang Tang | Postdoctoral Fellow |
| Greg Triplett | Postdoctoral Fellow |
| Ajay Uphadhyaya | Research Engineer I |
| Patricio Vela | Postdoctoral Fellow |
| Lixi Wan | Research Engineer II |
| George White | Senior Research Engineer |
| Shun-Der Wu | Postdoctoral Fellow |

academic, research, and administrative

| | |
|----------------|----------------------|
| Wei Dong Xiang | Research Engineer II |
| Vijay Yelundur | Research Engineer II |
| Changhyun Yi | Research Engineer II |
| Seunghyup Yoo | Research Scientist I |
| Chong K. Yoon | Research Engineer II |
| Jianjun Yu | Research Engineer II |
| Junsheng Yu | Postdoctoral Fellow |
| Guang Yuan | Postdoctoral Fellow |
| Iulica Zana | Postdoctoral Fellow |
| Tiejun Zhang | Postdoctoral Fellow |
| Lichu Zhao | Postdoctoral Fellow |

| | |
|----------------------|--|
| Marcus Johnson | Program Manager |
| Edgar L. Jones | Facility and Laboratory Coordinator |
| Rajib Joshi-Acharya | Computer Services Specialist III |
| Debra B. Kelley | Program Manager |
| Deborah K. King | Administrative Assistant II |
| Sharon D. Lawrence | Academic Assistant II |
| Angelo Lawton | Research Coordinator I |
| Herbert Lensch | Computer Services Specialist II |
| Judith C. Lorier | Accounting Manager I |
| Ephraim Macharia | Administrative Assistant I |
| Keith May | Computer Services Specialist III |
| Elizabeth McDonald | Systems Support Specialist I |
| W. Bruce McFarland | Laboratory Coordinator |
| Thomas McKoon | Research Coordinator II |
| Rachel Melton | Web Developer |
| Doria Moore | Accountant III |
| Mary Ellen Mount | Administrative Coordinator |
| Marilouise Mycko | Program Manager |
| Janet M. Myrick | Administrative Assistant II |
| Jacqueline L. Nemeth | Senior Information Specialist |
| Linda Newton | Administrative Assistant II |
| Jalisa Norton | Program Coordinator II |
| Julie Peterson | Academic Advisor I |
| Boyd M. Pettitt | Research Coordinator II |
| Sharon Pugh | Administrative Assistant II |
| Gail A. Reeves | Project Coordinator II |
| Mary Render | Accountant III |
| Brian Rounsaville | Electronics Technician I |
| Gwendolyn J. Satchel | Administrative Assistant II |
| Leslie Schlag | Administrative Assistant I |
| Jason Seletos | Program Coordinator II |
| Purnima Sharma | Administrative Assistant II |
| Fred T. Stanley | Research Coordinator I |
| Florence I. Stoa | Program Coordinator II |
| Brian Strickland | Programmer I |
| Christine Sun | Programmer III |
| Dean C. Sutter | Electronics Technician I |
| Denise D. Taylor | Program Coordinator II |
| Marvin Tingler | Head of Supply and Materials |
| Selina Tinsley | Administrative Secretary |
| Janet Tippens | Information Analyst II |
| Michael Toole | Electronics Technician I |
| Jacqueline Trappier | Administrative Supervisor II |
| Alvis Turner | Assistant to the Director for NEETRAC Operations |
| Richard Turner | Electronics Technician II |
| Judith Vanderboom | Administrative Manager I |
| Harry L. Vann | Director of ECE Development-Corporate Relations |
| Darryl Warsham | Accountant III |
| Todd E. Whitehurst | Computer Services Specialist IV |
| Dean Williams | Research Coordinator II |
| Rochelle Y. Williams | Accountant III |
| Suzzette Willingham | Program Coordinator I |
| Carla Zachery | Accountant III |

Administrative Staff

| | |
|------------------------|--|
| Nancy L. Baines | Administrative Assistant II |
| Debra Balkcom | Accountant II |
| Harry Beck | Director of Operations |
| Brian Bennett | Mechanical Technician I |
| DeeDee Bennett | Administrative Assistant I |
| Margaret Boehme | Administrative Assistant II |
| Margarita Bolet | Administrative Coordinator |
| Robert C. Boozer | Business Operations Manager |
| Louis Boulanger | Mechanical Technician III |
| Thomas E. Brewer | Assistant to the Chair and Laboratory Manager II |
| Yvonne Bridges | Administrative Assistant II |
| Rebecca "Suzy" Briggs | Director of ECE Development-Alumni |
| Lynda D. Buescher | Assistant Director for ECE Personnel Services |
| Mary Christine Bullard | Accountant III |
| Dale E. Callaway | Research Coordinator II |
| Kathy B. Cheek | Program Coordinator II |
| Sherrie Cooper | Academic Assistant I |
| Reed Crouch | Program Coordinator II |
| Sharon Crouch | Assistant Director for ECE Accounting |
| Marion Crowder | Senior Information Specialist |
| Bethany Davis | Program Coordinator II |
| Charlotte A. Doughty | Administrative Assistant II |
| Erica Edwards | Accountant II |
| Angela Elleby | Academic Advisor I |
| Christy K. Ellis | Administrative Assistant II |
| Christopher Evans | Project Director II |
| Kimberly Faggett | Program Coordinator I |
| Barry N. Fairley | Research Coordinator I |
| Cordai Farrar | Administrative Assistant II |
| Claudia Ford | Academic Advisor II |
| Diana L. Fouts | Graphics Specialist |
| Fabienne Gayet-Bergé | Program Coordinator II |
| Kayron C. Gilstrap | Administrative Manager I |
| LaJauna F. Guillory | Program Manager |
| Samuel Gunderman | Computer Services Specialist III |
| Pamela F. Halverson | Administrative Assistant II |
| Lauren Hall | Program Manager |
| David W. Harwell | Research Coordinator I |
| Sandra S. Hayes | Program Manager |
| Elaine Hicks | Administrative Assistant I |
| Fanchette Hillery | Computer Services Specialist III |
| Robert R. House | Electronics Specialist |
| Leslie Hudson | Accountant II |
| Angela Hughes | Administrative Manager I |

The official ECE student enrollment totaled 2,716, according to Georgia Tech's Office of Institutional Research and Planning. This total represents all full-time and part-time undergraduate and graduate students, including those students enrolled in electrical engineering and computer engineering at the Georgia Tech Savannah campus, as of October 2003.

According to ECE Academic Office records, the average entering freshman had a high school grade point average (GPA) of 3.75, an SAT verbal score of 640, and an SAT math score of 700. The average entering undergraduate transfer student had a high school GPA of 3.58, a previous college GPA of 3.48, an SAT verbal score of 551, and an SAT math score of 643. The average entering graduate student had an undergraduate GPA of 3.62, a GRE analytical score of 716, a GRE quantitative score of 764, and a GRE verbal score of 527.

The tables in this section detail enrollments and graduation totals for each of the School's academic programs, including percentages of female and ethnic group representation. Female enrollment and graduation totals are derived from the total number of women in each ethnic group.

Student Honors and Awards

Pranjal Adurkar received a Georgia Tech Presidential Undergraduate Research Award for his project entitled "Pin Assignment for 3D Packaging." His advisor on the project was **Sung Kyu Lim**.

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, and Richard Mark Tarbell each received an Outstanding ECE Graduate Teaching Assistant Award.

Karthik Balakrishnan received the Outstanding Computer Engineering Senior Award for attaining a very high scholastic average and for his active role in Georgia Tech and ECE extracurricular activities. Mr. Balakrishnan also received a Georgia Tech Presidential Undergraduate Research Award for his project, "Congestion-Driven Global Placement for Three Dimensional VLSI Circuits." His advisor on this project was **Sung Kyu Lim**.

Suna Choi, Woopoung Kim, and Jifeng Mao were awarded the Shri Mukhopadhyay Memorial Best Paper Award at the International Conference on ElectroMagnetic Interference and Compatibility held in Chennai, India in December 2003. Their advisor, **Madhavan Swaminathan**, also served as a co-author on the paper entitled "Electromagnetic Modeling of Switching Noise in On-Chip Power Distribution Networks."

Eric Clopper received the Tau Beta Pi Senior Engineering Cup for demonstrating academic excellence, leadership, and service to the engineering field and to Georgia Tech activities.

Eric Clopper, Trivikram Kasivajhula, Scott Marlette, Michael McFadden, Lucas Milner, Matthew Moseley, Steven Sanders, and David Sinyard each received the ECE Senior Scholar Award for having the highest GPAs in their class.

Siddharth Easwar received a Georgia Tech Presidential Undergraduate Research Award for his project entitled "Thermal Analysis for 3D Packaging." His advisor on the project was **Sung Kyu Lim**.

Adam Eisenman received the ECE Junior Scholar Award for having the highest GPA in his class.

Adam Eisenman and Tianyu Tom Wang received the Henry Ford II Scholar Award for having among the best academic records in the College of Engineering at the end of the third year of undergraduate study.

John Perry Entwistle received the Outstanding Electrical Engineering Senior Award for attaining a very high scholastic average and for his active role in Georgia Tech and ECE extracurricular activities.

Siddharth Easwar received a Packaging Research Center/National Science Foundation Undergraduate Research Scholarship for his work, "Thermal-aware 3D Floorplanning." His advisor on this project was **Sung Kyu Lim**.

Majid Fozunbal received the ECE Graduate Research Assistant Excellence Award for his outstanding research productivity, helping to ensure that ECE remains a leader in the research community.

James Holland received the ECE Faculty Award for being the student, in the opinion of the ECE faculty, who 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.

Hung-Yun Hsieh, Kyu-Han Kim, and Yujie Zhu, received the Best Student Paper Award at the ACM International Conference on Mobile Computing and Networking (MobiCom) for their work entitled, "A Receiver-Centric Transport Protocol for Mobile Hosts with Heterogeneous Wireless Interfaces." MobiCom was held in September 2003 in San Diego, Calif. Their advisor is **Raghupathy Sivakumar**, who was also a co-author on the paper.

R. Reeve Ingle and Anil Rohatgi each received a Georgia Tech Faculty Women's Club Scholarship. This scholarship is given to students who are in good academic standing and whose parents are employees of Georgia Tech.

Deborah Johnson received the Center for the Enhancement of Teaching and Learning/Frank Bogle Nontraditional Student Award. This award is given to a nontraditional-aged junior or senior.

Kangwook Kim received the first place award in the Best Student Paper competition for "Design and Realization of a Discretely Loaded Resistive Vee Dipole on a Printed Circuit Board," published in the *Proceedings of the SPIE: 2002 Annual International Symposium on Aerospace/Defense Sensing, Simulation, and Controls*. His Ph.D. advisor was **Waymond R. Scott, Jr.**

Jennifer Lee received the ECE Outstanding Service to Georgia's Community Award for her volunteer work with the FIRST LEGO League Robotic Competition and with the ECE Student-Faculty Committee.

Samuel Li received the ECE Teaching Assistant Excellence Award for his outstanding work in support of the ECE instructional program.

Paul Mandeltort received the ECE Undergraduate Research Award for demonstrating an unusually strong aptitude for research.

Rohan Mandrekar was the recipient of the IBM Best Paper Award for his paper entitled, "Extraction of Current Signatures for Simulation of Simultaneous Switching Noise in High Speed Digital Systems." The paper was presented at the IEEE Electrical Performance of Electronic Packaging Conference (EPEP), held in Princeton, N.J. in October 2003. The co-authors of the paper were his advisor, **Madhavan Swaminathan** and Sungjun Chun of IBM.

Jacob Minz received a graduate scholarship at the 40th ACM Design Automation Conference for his project entitled "Chip/Package Co-design of Physical Layout for Fast and Reliable System-On-Packages." His advisor was **Sung Kyu Lim**.

Rajarshi Mukhopadhyay placed third in the student paper competition at the IEEE MTT International Microwave Symposium in June 2004. His paper was entitled "Reconfigurable RFICs for Frequency-Agile VCOs in

STUDENT PROFILE (Based on Fall 2003 Enrollment)

| | Total | Asian | Black | Hispanic | White | Multi-Racial | American Indian/Alaskan Native | Female* |
|--------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------------------------|--------------|
| BSEE | 945 | 310 | 114 | 26 | 490 | 4 | 1 | 125 |
| BSCmpE | 749 | 225 | 80 | 32 | 395 | 16 | 1 | 58 |
| BSEE/ GT Savannah | 22 | 3 | 2 | 0 | 17 | 0 | 0 | 1 |
| BSCmpE/GT Savannah | 25 | 5 | 5 | 0 | 15 | 0 | 0 | 4 |
| Total | 1,741 | 31.2% | 11.6% | 3.3% | 52.7% | 1.1% | .1% | 10.8% |
| MS/MSECE | 345 | 88 | 22 | 10 | 223 | 2 | 0 | 43 |
| Special | 9 | 1 | 0 | 0 | 8 | 0 | 0 | 1 |
| PhD | 621 | 359 | 37 | 23 | 200 | 1 | 1 | 70 |
| Total | 975 | 46.0% | 6.0% | 3.4% | 44.2% | .3% | .1% | 11.7% |
| Grand Total | 2,716 | | | | | | | |

DEGREES AWARDED (Summer 2003-Spring 2004)

| | Total | Asian | Black | Hispanic | White | Multi-Racial | American Indian/Alaskan Native | Female* |
|--------------------|------------|--------------|--------------|-------------|--------------|--------------|--------------------------------|--------------|
| BSEE | 278 | 80 | 37 | 9 | 147 | 5 | 0 | 42 |
| BSCmpE | 152 | 49 | 17 | 3 | 77 | 6 | 0 | 14 |
| BSEE/GT Savannah | 6 | 1 | 1 | 0 | 4 | 0 | 0 | 0 |
| BSCmpE/GT Savannah | 5 | 2 | 1 | 0 | 2 | 0 | 0 | 0 |
| Total | 441 | 30.0% | 12.7% | 2.7% | 52.1% | 2.5% | 0% | 12.7% |
| MS | 74 | 54 | 1 | 2 | 17 | 0 | 0 | 17 |
| MSECE | 222 | 46 | 15 | 7 | 154 | 0 | 0 | 28 |
| PhD | 105 | 55 | 9 | 2 | 38 | 1 | 0 | 16 |
| Total | 401 | 38.7% | 6.2% | 2.7% | 52.1% | .3% | 0% | 15% |
| Grand Total | 842 | | | | | | | |

Si-Based Technology for Multi-Standard Applications," and his advisor is **Joy Laskar**.

Youngcheol Park received an honorable mention at the Student Paper Contest of the 2003 International Microwave Symposium for the paper, "Digital Predistortion Linearization of Frequency Multiplier." His coauthors were K.M. Low and his Ph.D. advisor, **J. Stevenson Kenney**.

Eric Pichon received the Best Student Paper Award at MICCAI (International Society and Conference Series on Medical Image Computing and Computer-Assisted Intervention) for his paper, "Statistically Based Surface Evolution Method for Medical Image Segmentation: Presentation and Validation." His co-authors were R. Kikinis and **Allen Tannenbaum**, his Ph.D. advisor.

William Potscavage and **Amanda Preyer** each received the Colonel Oscar P. Cleaver Award for earning the highest scores on the doctoral preliminary examination.

Don Andrew Pottinger received the Dorothy Cowser Yancy Award, given to an African-American freshman with the most outstanding academic record based on GPA, level of curriculum difficulty, and participation in activities related to the student's program of study.

Aleksandar Pregelj received the Sigma Xi Best Dissertation Award; his advisor was **Miroslav M. Begovic**.

Sajid Saleem received a Georgia Tech Presidential Undergraduate Research Award for his project entitled "Thermal Analysis for 3D Packaging." His advisor on this project was **Sung Kyu Lim**.

Michael Sorensen received the Student Paper Award at the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, held in September 2003 in Cancun, Mexico. The paper entitled, "Control of Bursting Activity with an Intrinsic Current in a Hybrid Half-Center Oscillator," was co-authored by Gennady S. Cymbalyuk, Ronald L. Calabrese, and **Stephen P. DeWeerth**, Mr. Sorensen's advisor in the bioengineering program.

Karthikeyan Sundaresan received the Sigma Xi Best M.S. Thesis Award; his advisor was **Raghupathy Sivakumar**.

G. Wallace Tennille received the Outstanding Sophomore Award for having the highest scholastic average in his class.

Jaikrishna Venkatesanan received the second place award in the Best Student Paper competition for "Investigation of the Double-Y Balun for Feeding Pulsed Antennas," published in the *Proceedings of the SPIE: 2002 Annual International Symposium on Aerospace/Defense Sensing, Simulation, and Controls*. His Ph.D. advisor is **Waymond R. Scott, Jr.**

Robert Yhap received the Most Outstanding ECE Senior Co-op Award; he was chosen from a set of nominees considered by their co-op employers to be the most outstanding co-op employees in their companies.

Yong-Kyu Yoon received second place in the Student Paper Contest of the 2003 International Microwave Symposium for his paper, "A Reduced Intermodulation Distortion Tunable Ferroelectric Capacitor: Architecture and Demonstration." His coauthors were D.S. Kim, M.G. Allen, and his Ph.D. advisor, **J. Stevenson Kenney**.

Student Organizations

The lifeblood of ECE is its students. The IEEE student branch, Eta Kappa Nu (HKN), the ECE Student Advisory Council, and the ECE Student-Faculty Committee play very important roles by providing students with opportunities for personal and professional development. These groups also provide valuable input to the School's faculty and administrators regarding student issues and concerns.

Maintaining its stature as the world's largest student branch, the Georgia Tech IEEE hosts seminar speakers from various companies and organizations on a weekly basis. They also sponsor a Student-Professional Awareness Conference each spring, and they participate in numerous competitions and conferences on the national and international levels.

HKN is the international honor society for electrical engineers; outstanding juniors, seniors, and graduate students are eligible for election to this program. This organization sponsors the annual ECE Spring Picnic and several awards throughout the year, including the Richard M. Bass Eta Kappa Nu Outstanding Teacher Awards, which were presented to Farrokh Ayazi and James O. Hamblen. The ECE Student Advisory Council meets with ECE administrators and the School's Advisory Board on a regular basis, and the Student-Faculty Committee works on various projects throughout the year to promote more interactions and better relations among students and faculty.

| 2003-04 IEEE Student Branch Officers & Chairs | | 2003-04 Eta Kappa Nu Officers | | 2003-04 ECE Student Advisory Council | |
|---|--------------------------------|-------------------------------|-------------------------|--------------------------------------|-----------------------|
| Irene Chow | Chair | Moatasm Ramli | President | Christopher Alvino | Jennifer Lee |
| Sriram Narasimhan | Vice Chair, Internal Relations | Ryan Westafer | Vice President | Woosuk Choi | Miguel Lopez |
| Saunvit Pandya | Vice Chair, External Relations | Mario Vittes | Treasurer | Irene Dershin Chow | Elliot Moore |
| Glenda Schumann | Treasurer | Allison Lyon | Recording Secretary | Eric Clopper | Saunvit Pandya |
| Mashruba Tasneem | Secretary | Abhinav Saxena | Corresponding Secretary | Douglas DesCamps | Nirav Patel |
| Ryan Westafer | Hardware Chair | Justin Vogt | Bridge Correspondent | Siddharth Easwar | Darius Person |
| June Zhang | Historian | Mustayeen Nayeem | Graduate Liaison | Adam Eisenman | Steven J. Romej |
| James Moes | Mailing Lists Manager | Thomas K. Gaylord | Faculty Advisor | David Ewing | Anthony E. Seto |
| Chris Wieczorek | Membership Coordinator | | | Tiffany Glover | Arjun Nitin Warty |
| Cody Planteen | Publicity Chair | | | Kenneth Grove | Elizabeth A. Whitaker |
| Parul Gupta | Social Chair | | | Gavin Ho | Christopher Wieczorek |
| Nasir Barday | Software Chair | | | James Holland | Matt Wiggins |
| Peter Sahlstrom | Webmaster | | | | |
| W. Marshall Leach | Faculty Advisor | | | | |
| Chase Battaglio | Alumni Mentor | | | | |

Ph.D. Students Graduated

One hundred five students graduated with their doctoral degrees in 2003-04. The students are listed in this section, along with their advisors, graduation dates, thesis titles, and current places of employment.

Summer 2003

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| Ghassan Al-Regib | Altunbasak | <i>Delay-Constrained 3-D Graphics Streaming over Lossy Networks</i> | Assistant professor in electrical and computer engineering at GT Savannah in Savannah, Ga. |
| Aziz Batur | Hayes | <i>Illumination-Robust Face Recognition</i> | Technical staff member at Texas Instruments in Dallas, Tex. |
| Raheem Bayeh | Copeland | <i>Deployable Framework for Providing Better Than Best-Effort Quality of Service for Traffic Flows</i> | Research engineer in the Communications Systems Center at the Georgia Institute of Technology in Atlanta, Ga. |
| Shankar Chandrasekaran | Frazier | <i>Surface Micromachined Hollow Metallic Microneedles</i> | Postdoctoral fellow in the School of Chemical and Biomolecular Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Sang-Yeon Cho | Jokerst | <i>High Speed Optical Interconnection on Electrical Boards Using Embedded OE Devices in Polymer Optical Waveguides</i> | Research and development engineer at Duke University in Durham, N.C. |
| Justin Davis | Keezer | <i>An FPGA-Based Digital Logic Core for ATE Support and Embedded Test Applications</i> | Assistant professor in the Department of Electrical and Computer Engineering at Mississippi State University, located in Mississippi State, Miss. |

students

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|------------------------------|--------------------------|---|---|
| Mekita Davis | Laskar | <i>RF/Microwave Integrative Passives for System on Package Module Development</i> | Assistant professor in the Department of Electrical and Computer Engineering at the University of Tennessee in Knoxville, Tenn. |
| Mehmet Demirkol | Ingram | <i>Resource Allocation for Interfering MIMO Links</i> | Assistant professor in the College of Engineering/Hawaii Center for Advanced Communications at the University of Hawaii at Manoa in Honolulu, Hawaii. |
| Edward Gebara | Laskar | <i>Temperature Dependent RF and Optical Device Characterization and Its Application to Circuit Design</i> | Systems application engineer at Quellan, Inc. in Atlanta, Ga. |
| Jonathan James | Rhodes | <i>Imaging Systems Based on the Encoding of Optical Coherence Functions</i> | Research engineer at the Electro-Optics, Environment, and Materials Laboratory of the Georgia Tech Research Institute (GTRI) in Atlanta, Ga. |
| Jung-Hyuck Jo | Jayant | <i>Site-Specific Prediction of Propagation Interference and Network Performance in Wireless Communications</i> | Network consultant with Samsung Networks, Inc. in Seoul, South Korea. |
| James Joyner | Meindl | <i>Opportunities and Limitations of Three-Dimensional Integration for Interconnect Design</i> | Enrolled as a graduate student in the School of Theology at Emory University in Atlanta, Ga. |
| Jungwon Kang | Mersereau | <i>Effective Temporal Video Segmentation and Content-Based Audio-Visual Video Clustering</i> | Senior engineer in the Broadcasting Media Technology Department and Radio and Broadcasting Laboratory at the Electronics and Telecommunications Research Institute in Daejeon, South Korea. |
| Joohee Kim | Altunbasak/ Mersereau | <i>Error-Resilient Video Streaming over Lossy Channels</i> | Senior engineer in the Multimedia Lab at Samsung Advanced Institute of Technology in Suwon, South Korea. |
| Fang Lin | P. Allen | <i>High-Q High-Frequency CMOS Bandpass Filters for Wireless Applications</i> | Analog integrated circuit (IC) design engineer at AVS Technology, Inc. in Fremont, Calif. |
| Renato da Rocha Lopes | Barry | <i>Iterative Estimation, Equalization, and Decoding</i> | Postdoctoral fellow in the Department of Electrical and Computer Engineering at Universidade Estadual de Campinas in Campinas, Brazil. |
| Gon Namkoong | Brown | <i>Molecular Beam Epitaxy Grown III-Nitride Materials for High-Power and High-Temperature Applications Impact of Nucleation Kinetics on Material and Device Structure Quality</i> | Research engineer in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Ramzy Obaid | Habetler | <i>Detection of Rotating Mechanical Asymmetries in Small Induction Motors</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Jung Wook Park | Harley | <i>Adaptive/Optimal NeuroControl Based on Adaptive Critic Designs for Synchronous Generator and GACTS Device in a Power System Using Artificial Neural Networks</i> | Postdoctoral fellow in the Department of Electrical and Computer Engineering at the University of Wisconsin in Madison, Wis. |
| Shawn Pinkett | Hunt | <i>Techniques to Facilitate the Fabrication of ZnO-Based Thin Film Bulk Acoustic Wave Devices</i> | SiGe model developer at IBM Corporation in Hopewell Junction, N.Y. |
| Arvind Raghavan | Laskar | <i>Bipolar Large-Signal Modeling and Power Amplifier Design</i> | Senior IC design engineer at Quellan, Inc. in Atlanta, Ga. |
| Jun Tan | Stüber | <i>Iterative Decoding and Multicarrier Modulation for Wireless Communications</i> | Self-employed as a consultant in Chicago, Ill. |
| Andrew Thangaraj | McLaughlin | <i>Iterative Coding Methods for the Binary Symmetric Channel and the Magnetic Recording Channel</i> | Postdoctoral fellow at Georgia Tech Lorraine in Metz, France. |
| Xudong Wang | Akyildiz | <i>Medium Access Control Protocols for the Next Generation Wireless Networks</i> | Senior staff research engineer at Kiyon, Inc. in La Jolla, Calif. |

Fall 2003

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|-------------------------|------------------------|---|---|
| Jon Arrowood | Clements | <i>Using Observation Uncertainty for Robust Speech Recognition</i> | Speech scientist at Nexidia, Inc. in Atlanta, Ga. |
| Ashraf Awad | Sivakumar/ McKinnon | <i>Scalable Application-Aware Router Mechanisms</i> | Staff design scientist at Broadcom Corporation in Atlanta, Ga. |
| Muhannad Bakir | Meindl | <i>Sea of Leads Electrical-Optical Pillar Chip I/O Interconnections for Gigascale Integration</i> | Research engineer in the Microelectronics Research Center at the Georgia Institute of Technology in Atlanta, Ga. |
| Irtaza Barlas | Vachtsevanos | <i>A Multiagent Framework for a Diagnostic and Prognostic System</i> | Employed at Intelligent Automation Systems, Inc. in Atlanta, Ga. |
| Jed Brody | Rohatgi | <i>Doping Dependence of Surface and Bulk Passivation of Multicrystalline Silicon Solar Cells</i> | Lecturer and director of Advanced Laboratories in the Department of Physics at Emory University in Atlanta, Ga. |
| Terence Brown | May | <i>Anion Exchange at the Interfaces of Mixed Anion III-V Heterostructures Grown by Molecular Beam Epitaxy</i> | Vice president for Research and Development at Teck Vond Enterprise, Inc. in Powder Springs, Ga. |
| Jinsoo Cho | Benkeser | <i>Velocity-Based Cardiac Segmentation and Motion-Tracking</i> | Senior engineer at Samsung Electronics Company, Ltd. in Seoul, South Korea. |
| Kyu-Won Choi | Chatterjee | <i>Hierarchical Power Optimization for Ultra-Low Power Digital Systems</i> | Staff member at Samsung Electronics in Seoul, South Korea. |
| Yuhua Ding | Vachtsevanos | <i>An Integrated Approach to Real-Time Multisensory Inspection with an Application to Food Processing</i> | Unknown. |
| Jeffrey Dugger | Hasler | <i>Adaptive Analog VLSI Signal Processing and Neural Networks</i> | Employed with GTronix in Atlanta, Ga. |
| Adriane Durey | Clements | <i>Melody Spotting Using Hidden Markov Models</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Demetrius Geddis | Jokerst | <i>Single Fiber Bi-Directional OE Links Using 3D Stacked Thin Film Emitters and Detectors</i> | Assistant professor in the Department of Engineering at Norfolk State University in Norfolk, Va. |
| Alfred Gomes | Chatterjee | <i>Alternate Test Generation for Detection of Parametric Faults</i> | Senior test engineer at National Semiconductor Corporation in Santa Clara, Calif. |
| Michael Gross | Ralph | <i>High-Rate, Short-Pulse Sources: Jitter and Pedestal Level in Optical Time-Division Multiplexing</i> | Unknown. |
| Bahadir Gunturk | Altunbasak | <i>Multi-Frame Information Fusion for Image and Video Enhancement</i> | Assistant professor in the Department of Electrical and Computer Engineering at Louisiana State University in Baton Rouge, La. |
| Jeongseok Ha | McLaughlin | <i>Low-Density Parity-Check Codes with Erasures and Puncturing</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Sang Jeen Hong | May | <i>Real-Time Malfunction Diagnosis and Prognosis of Reactive Ion Etching Using Neural Networks</i> | JSPS Fellow and research associate at the Institute of Fluid Science/Tohoku University in Sendai, Japan. |
| Sa Huang | Brown | <i>GaN-Based and High-Speed Metal-Semiconductor-Metal Photodetector: Growth and Device Structures for Integration</i> | Unknown. |
| Zhaoran Huang | Jokerst | <i>Multi Gigahertz InGaAs/InP Inverted MSM Photodetectors for Photoreceiver and Waveguide Applications</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |

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|--------------------------|------------|---|---|
| Yeun-Ho Joung | M. Allen | <i>Electroplating Bonding Technology for Chip Interconnect Wafer Level Packaging and Interconnect Layer Structures</i> | Postdoctoral associate at Clark Atlanta University in Atlanta, Ga. |
| Kyung Hun Jung | Mersereau | <i>Error Resilient Video Coding for Wireless Application</i> | Unknown. |
| Minjung Kim | Copeland | <i>Quality of Service Support for Progressive Video Transmission over the Internet</i> | Senior engineer in the Mobile Communication Division at Samsung Electronics, Suwon, South Korea. |
| Hyunchul Ku | Kenney | <i>Behavioral Modeling of Nonlinear RF Power Amplifiers for Digital Wireless Communications Systems with Implications for Predistortion Linearization Systems</i> | Employed at Samsung Electronics in Seoul, South Korea. |
| Sangkeun Lee | Hayes | <i>Video Analysis and Abstraction in the Compressed Domain</i> | Senior software engineer at SISA in Irvine, Calif. |
| Yen-Chi Lee | Altunbasak | <i>Error Resilient Video Streaming over Lossy Networks</i> | Employed at Nokia Research Center in Dallas, Tex. |
| Roy Melton | L. Wills | <i>Parallelizing the Spectral Method in Climate and Weather Modeling</i> | Unknown. |
| Jeongseung Moon | Wardi | <i>Timing Control in Manufacturing and Supply Chains</i> | Research engineer at Samsung Electronics in Seoul, South Korea. |
| Elliot Moore | Clements | <i>Evaluating Objective Feature Statistics of Speech as Indicators of Vocal Affect and Depression</i> | Assistant professor in electrical and computer engineering at GT Savannah in Savannah, Ga. |
| Robert Morris | Clements | <i>Enhancement and Recognition of Whispered Speech</i> | Speech scientist at Nexidia in Atlanta, Ga. |
| Azad Naeemi | Meindl | <i>Analysis and Optimization for Global Interconnects for Gigascale Integration</i> | Research engineer in the Microelectronics Research Center at the Georgia Institute of Technology in Atlanta, Ga. |
| Vinod Rajasekaran | Heck | <i>Power Delivery in Systems with Lossy Cables or Interconnects</i> | Electrical engineer III at Schlumberger in Sugar Land, Tex. |
| William Robinson | D.S. Wills | <i>Modeling and Implementation of an Integrated Pixel Processing Tile for Focal Plane Systems</i> | Assistant professor in the Department of Electrical Engineering and Computer Science at Vanderbilt University in Nashville, Tenn. |
| Sang-Woo Seo | Jokerst | <i>Development of Thin Film Photodetectors and Their Applications: Multispectral Detection and High Speed Optical Interconnections</i> | Research engineer in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Mohamed Shalan | Mooney | <i>Dynamic Memory Management for Embedded Real-Time Multiprocessor System on a Chip</i> | Unknown. |
| Eung Shin | Mooney | <i>Automated Generation of Round-Robin Arbitration and Crossbar Switch Logic</i> | Unknown. |
| Frances Williams | May | <i>Monitoring and Control of Semiconductor Manufacturing Using Acoustic Techniques</i> | Assistant professor at the Department of Engineering at Norfolk State University in Norfolk, Va. |
| Janghyun Yoon | Jayant | <i>A Network-Aware Semantics-Sensitive Image Retrieval System</i> | Senior engineer in the Mobile Communications Division of Samsung Electronics in Suwon, South Korea. |
| Xin Zhong | Clements | <i>Speech Coding and Transmission for Improved Automatic Recognition in Communication Networks</i> | Senior member of technical staff at Northrop Grumman Space Technology in Torrance, Calif. |

Spring 2004

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| Wajih Abu-Al-Saud | Stüber | <i>Efficient Wideband Digital Front-End Transceivers for Software Radio Systems</i> | Assistant professor at King Fahd University of Petroleum and Minerals in Dhahran, Saudi Arabia. |
| Ozgun Baris | Akyildiz | <i>Advanced Transport Protocols for Next Generation Heterogeneous Wireless Network Architectures</i> | Assistant professor in the Department of Electrical and Electronics Engineering at the Middle East Technical University in Ankara, Turkey. |
| Bilge Akgul | Mooney | <i>The System on a Chip Lock Cache</i> | Unknown. |
| Tankut Akgul | Mooney | <i>Assembly Instruction Level Reverse Execution for Debugging</i> | Unknown. |
| Tricha Anjali | Akyildiz | <i>Diffserv/MPLS Network Design and Management</i> | Assistant professor in the Department of Electrical and Computer Engineering at the Illinois Institute of Technology in Chicago, Ill. |
| Chonlameth Arpikanondt | Madiseti | <i>A Platform-Centric UML-/XML-Enhanced HW/SW Codesign Method for the Development of System on a Chip Systems</i> | Unknown. |
| Mohamed Babaali | Egerstedt | <i>Switched Linear Systems Observability and Observers</i> | Postdoctoral fellow at the General Robotics, Automation, Sensing, and Perception (GRASP) Laboratory/ Department of Electrical and Systems Engineering at the University of Pennsylvania in Philadelphia, Pa. |
| Tariq Bakir | Mersereau | <i>Blind Adaptive Dereverberation of Speech Signals Using a Microphone Array</i> | Unknown. |
| Cagatay Candan | Jayant | <i>Minimum Distortion Data Hiding for Compressed Images</i> | Assistant professor in the Electrical and Electronics Engineering Department at the Middle East Technical University in Ankara, Turkey. |
| Cheolung Cha | Brooke | <i>Broadband and Scalable Circuit-Level Model of MSM PD for Co-Design with Preamplifier in Front-End Receiver</i> | Unknown. |
| Charles Chung | M. Allen | <i>Thermomigrated Junction Isolation of Bulk-Micromachined Single Crystal Silicon MEMS Devices and Its Application to Inertial Navigation Systems</i> | Research engineer at Intel Corporation in Hillsboro, Ore. |
| Ben Damiani | Rohatgi | <i>Investigation of Light Induced Degradation in Promising Photovoltaic Grade Silicon and Development of Porous Silicon Anti-Reflection Coatings for Silicon Solar Cells</i> | Senior process engineer at Intel Corporation in Hillsboro, Ore. |
| Lei Ding | Zhou | <i>Digital Predistortion of Power Amplifiers for Wireless Applications</i> | Digital design engineer at Cirrus Logic in Austin, Tex. |
| Yalcin Eker | Uyemura/ P.Allen | <i>High Frequency Voltage Controlled Ring Oscillators in Standard CMOS</i> | Design engineer at the Atlanta Design Center of Integrated Device Technology, Inc., in Atlanta, Ga. |
| Ali Ertan | Barnwell | <i>Pitch Synchronous Processing of Speech Signal for Improving the Quality of Low Bit Rate Speech Coders</i> | Senior software engineer in the Research and Development Group at Texas Instruments, Inc. in Dallas, Tex. |
| Andrew Gardner | Vachtsevanos | <i>A Novelty Detection Approach to Seizure Detection and Prediction from Intracranial EEG</i> | Postdoctoral fellow in the Department of Neurology at the University of Pennsylvania, located in Philadelphia, Pa. |
| Loran Jatunov | Madiseti | <i>Unified Performance Analysis for Third-Generation CDMA Systems</i> | Unknown. |

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| Dongsu Kim | Kenney | <i>Monolithic Analog Phase Shifters Based on Barium Strontium Titanate Coated Sapphire Substrates for WLAN Applications</i> | Senior engineer at the Korea Electronics Technology Institute, R&D Division, in Seoul, South Korea. |
| Pramote Kuacharoe | Mooney | <i>Embedded Software Streaming via Block Streaming</i> | Unknown. |
| Dong-Myung Lee | Habetler | <i>A Voltage Sag Supporter Utilizing a PWM-Switched Autotransformer</i> | Research engineer with Samsung Electronics in Seoul, South Korea. |
| Kwan-Seop Lee | Buck | <i>Studies on the Decan and Recovery of Higher-Order Solutions Initiated by Localized Channel Perturbations</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| John Levine | Owen | <i>A Methodology for Detecting and Classifying Root Kits</i> | Associate professor in the Department of Electrical Engineering and Computer Science at the United States Military Academy in West Point, N.Y. |
| Jorge Estuardo Licona-Nunez | McLaughlin | <i>M-ary Runlength Limited Coding and Signal Processing for Optical Data Storage</i> | Seeking employment. |
| Erdem Matoglu | Swaminathan | <i>Statistical Design Analysis and Diagnosis of Digital Systems and Embedded RF Circuits</i> | Advisor engineer/scientist at IBM in Austin, Tex. |
| Sung-Hwan Min | Swaminathan | <i>Automated Construction of Macromodels from Frequency Data for Simulation of Distributed Interconnect Networks</i> | Employed at Samsung Electronics in Seoul, South Korea. |
| Anthony Mule | Meindl | <i>Optical Interconnect Technologies for Polyolithic Gigascale Integration</i> | Senior processing engineer at Intel in Hillsboro, Ore. |
| Raghunath Murali | Meindl | <i>Scaling Opportunities for Bulk Accumulation and Inversion MOSFETs for Gigascale Integration</i> | Research engineer in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Jin-Woo Park | M. Allen | <i>Core Lamination Technology for Micromachined Power Inductive Components</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |
| Aleksandar Pregelj | Begovic | <i>Impact of Distributed Generation on Power Network Operation</i> | Transmission planning engineer at Georgia Transmission Corporation in Tucker, Ga. |
| Nicholas Propes | Vachtsevanos | <i>Hybrid System Diagnosis and Control Reconfiguration for Manufacturing Systems</i> | Principal research engineer at Global Technology Connection, Inc. in Atlanta, Ga. |
| Raviv Raich | Zhou | <i>Nonlinear System Identification and Analysis with Applications to Power Amplifier Modeling and Power Amplifier Predistortion</i> | Postdoctoral researcher at the Department of Electrical Engineering and Computer Science at the University of Michigan in Ann Arbor, Mich. |
| Soojung Ryu | D.S. Wills | <i>Storage Management for Embedded SID Processors</i> | Senior engineer with Samsung Advanced Institute of Technology in Suwon, South Korea. |
| Han-Woong Son | P. Allen | <i>A Fully Integrated Fractional-N Frequency Synthesizer for Wireless Communications</i> | Seeking employment. |
| Weilian Su | Akyildiz | <i>Enabling Quality of Service Applications in Sensor Networks</i> | Assistant professor in the Naval Postgraduate School in Monterey, Calif. |
| Jialin Tian | Hayes | <i>Reconstruction of Irregularly Sampled Interferograms in Imaging Fourier Transform Spectrometry</i> | Research scientist at SAIC in Hampton, Va. |
| Gregory Triplett | May | <i>Process Modeling of InAs/AISB Materials for High Electron Mobility Transistors Grown by Molecular Beam Epitaxy</i> | Assistant professor in the Department of Electrical and Computer Engineering at the University of Missouri in Columbia, Mo. |

students

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|----------------------------|-------------|--|--|
| Louis Tirino | Brennan | <i>Transport Properties of Wide Band Gap Semiconductors</i> | Employed at MIT Lincoln Laboratory in Lexington, Mass. |
| Brian Wilson | Heck | <i>Control Designs for Low Loss Active Magnetic Bearings Theory and Implementation</i> | Employed at the U.S. Air Force Research Laboratory/VSSV at Kirtland Air Force Base, N.M. |
| Shun Der Wu | Glytsis | <i>Polymer Based Volume Holographic Grating Couplers for Optical Interconnects</i> | Unknown. |
| Jiang Xie | Akyildiz | <i>Mobility Management in Next Generation All IP-Based Wireless Systems</i> | Assistant professor in the Department of Electrical and Computer Engineering at the University of North Carolina at Charlotte in Charlotte, N.C. |
| Weilai Yang | Blough/Owen | <i>Pricing Network Resources for Differentiated Services Networks</i> | Seeking employment. |
| Andreas Yankopoulos | Copeland | <i>Adaptive Error Control for Wireless Multimedia</i> | Senior engineer at Scientific Research Corporation in Marietta, Ga. |
| Yong Kyu Yoon | M. Allen | <i>Micromachined Components for RF Systems</i> | Postdoctoral fellow in the School of Electrical and Computer Engineering at the Georgia Institute of Technology in Atlanta, Ga. |

Undergraduate Instructional Operations

The ECE Undergraduate Affairs Office schedules and coordinates electrical and computer engineering courses for the main Georgia Tech campus; ECE programs for Georgia Tech Savannah (GT Savannah) and its partner schools, Georgia Southern University, Armstrong Atlantic State University, and Savannah State University; and Georgia Tech Lorraine. During 2003-04, ECE undergraduate enrollment totaled almost 1,800 students on the Atlanta campus. GT Savannah had an enrollment of 47 and produced six electrical engineering graduates—more than any other degree offered at the Savannah campus—and five computer engineering graduates.

Douglas B. Williams and **Joseph L.A. Hughes** served as associate chair for ECE Undergraduate Affairs and associate chair for ECE Academic Operations, respectively. Dr. Williams is responsible for undergraduate curriculum matters, student recruiting and advising, and served as the GT Savannah coordinator. Dr. Hughes handles faculty workload, course scheduling, and oversight of assessment and accreditation activities.

Jill Auerbach is the School's academic program assessment coordinator. **Claudia Ford** and **Angela Elleby** continued to advise students on a daily basis, and during summer 2003, **Julie Peterson** transferred from the Registrar's Office to ECE Undergraduate Affairs, where she became the staff's third academic advisor. **Janet Tippens** maintains class schedules in the Banner registration program, produces various reports, manages textbook information, and provides analysis of student and faculty data.

ECE Professor Emeritus **Thomas M. White**, whose career with Georgia Tech spanned more than 50 years, died unexpectedly on June 26, 2004. Dr. White joined the School in 1948, and from the late 1960s until his retirement in 1988, he advised ECE students in the School's Academic Office for nearly 20 years, eventually rising to the position of associate director of Undergraduate Affairs. After his retirement in 1988, he continued to advise students on a part-time basis until August 2003, when he "retired" again. His dedication and love for his students and the School were legendary, and he will be missed.

Graduate Instructional Operations

During FY 2004, the ECE Graduate Affairs Office continued its quest to deliver its services more efficiently and effectively, as it processed thousands of pre-applications and actual applications to the ECE program. **David R. Hertling**, associate chair for ECE Graduate Affairs, and **Marilouise Mycko**, academic advisor, advised all students, made graduate teaching assistant assignments, and oversaw proper documentation of student progress through master's and doctoral programs. **Jacqueline Trappier** and **Suzette Willingham** served as administrative supervisor and program coordinator, respectively, and **Sherrie Cooper**, also an academic assistant, works with both the graduate and undergraduate offices. All of these personnel are responsible for recruitment, admission, financial support, advisement, and record keeping. They also work in tandem with the ECE Graduate Committee and the ECE Graduate Student Recruitment Committee to enact sound academic policies and to attract high quality master's and doctoral students to the program. In May 2004, Dr. Hertling retired after five years of service as associate chair for ECE Graduate Affairs, and **Paul G. Steffes** took on this position after a semester-long transition period.

Georgia Tech Lorraine

A non-profit corporation located in Metz, France and operated under French law, Georgia Tech Lorraine (GTL) has four areas of emphasis—graduate education, sponsored research, undergraduate summer education, and continuing education. GTL offers undesignated master's degrees, master's degrees in either electrical and computer engineering or mechanical engineering, and Ph.D. degrees in both disciplines. In fall 2003, GTL graduate enrollment totaled 213–132 who majored in ECE and 81 in mechanical engineering—and graduated 74 M.S.E.C.E. and 39 M.S.M.E. students during the 2003-04 academic year.

Cooperative agreements with local partner institutions enable students to pursue double degree programs in engineering and sciences, in addition to degrees from Georgia Tech. Upon successful completion of these highly innovative and integrated programs, students are awarded master's degrees from Georgia Tech and graduate diplomas from a partner institution. The Binôme Program, a double-degree graduate program and an industry-university partnership between the U.S. and France, allows two-member, Franco-American student teams to immerse themselves in the other country's culture through an industrial internship and academic study. The sponsoring company places the American student on work assignment in France, and then the same company places a French student to work at one of its locations in the U.S. For the American student, the program begins with two consecutive semesters of study at GTL and then the student spends three months working for a French company. The program then concludes with a final semester of study at one of the partner institutions.

GTL also offers a 10-week-long, summer undergraduate program that includes courses in architecture; electrical engineering; computer engineering; economics; French; industrial and systems engineering; history, technology, and society; mechanical engineering; and management. The GTL summer students also had ample time to savor the country's rich culture and history by traveling on their own during the weekends, as well as on organized excursions to the French cities of Nancy and Verdun and to specific sites in Metz.

Hans B. Püttgen and **François J. Malassenet** serve as GTL's president and directeur, respectively. **Florence I. Stoia** and **Fabienne Bergé** are the GTL program coordinators at the Atlanta campus, while **Josyane Roschitz-Pierre** and **Marie-Pierre Delaleux** serve as program coordinator and assistant to the directeur, respectively, at the GTL campus in France. **Catherine Bass** is the resident director of the summer undergraduate program, and **William E. Sayle**, retired associate chair for ECE Undergraduate Affairs, also works with Georgia Tech Lorraine academic program development. **Steven W. McLaughlin** joined the GTL team as its new director of Research in January 2004.

ECE Advisory Board

An outside perspective is essential to maintaining the relevancy of the School's programs to its alumni and corporate constituencies. The ECE Advisory Board, composed of mostly alumni industry representatives, provides this external assessment during its formal, biannual meetings and throughout the year.

The School of ECE added three new advisory board members—Fred Kitson (MSEE '75), Kelvin C. Hawkins, Sr. (MSEE '92), and Ronald S. Slaymaker (BEE '82)—during the past fiscal year, all who represent strong corporate partnerships with the School and Georgia Tech. Dr. Kitson is the director of the Mobile and Media Systems Lab with Hewlett-Packard Laboratories in Palo Alto, Calif. He received his undergraduate degree from the University of Delaware and his Ph.D. from the University of Colorado, where he serves on the Engineering Advisory Council. A 2001 inductee into the College of Engineering Academy of Distinguished Engineering Alumni, Dr. Kitson serves as an adjunct faculty member at Georgia Tech. Mr. Hawkins is the program director for XSeries and Intellistation Hardware Development for IBM in Research Triangle Park, N.C. He is involved in recruiting efforts on campus and is the technical leader to Tech for IBM. Mr. Hawkins is a 2002 inductee into the CoE Council of Young Engineering Alumni. Mr. Slaymaker is vice president of Investor Relations for Texas Instruments and is responsible for communications with Wall Street analysts and investors regarding the company's strategies and performance. In this role, he has been recognized as one of the top investor relations officers in the U.S. by *Barron's* and *Investor Relations Magazine*. Mr. Slaymaker also holds an MBA degree from the University of Chicago.

Three advisory board members—Rodney Adkins (BEE '81, MSEE '83) of IBM and Hal Calhoun (BEE '87, PhD '93) of Menlo Ventures—both stepped down from the Board during 2003-04. Mr. Adkins served on the Board since 2000, and Mr. Calhoun was on the Board since 2001. After seven years of service, Mr. Bartlett (BEE '76) left the ECE Advisory Board to prepare for retirement from Texas Instruments.

Effective fall 2004, C. Meade Sutterfield (BEE '72) will become the chair of the ECE Advisory Board, succeeding C. Dean Alford (BEE '76) who served as the Board's chair for over a decade. Mr. Alford will assume the chair of the CoE Advisory Board in fall 2004 and will retain his membership on ECE's Advisory Board.

2003-04 Advisory Board Members and Their Company Affiliations

| | |
|-------------------------------|--|
| C. Dean Alford* | Allied Utility Network, Conyers, Ga. |
| Antonio R. Alvarez | Cypress Semiconductor, San Jose, Calif. |
| Michael B. Bartlett | Texas Instruments, Inc., Dallas, Tex. |
| Michael Buckler | Lucent Technologies, Cary, N.C. |
| Hal Calhoun | Menlo Ventures, Menlo Park, Calif. |
| Steve W. Chaddick | CIENA Corporation, Alpharetta, Ga. |
| Michael A. Coleman | Winter Garden, Fla. |
| H. Allen Ecker | Scientific-Atlanta, Inc., Lawrenceville, Ga. |
| Kelvin C. Hawkins, Sr. | IBM, Research Triangle Park, N.C. |
| Leonard J. Haynes | The Southern Company, Atlanta, Ga. |
| Fred Kitson | Hewlett-Packard Laboratories, Palo Alto, Calif. |
| Scott Madigan | Tphone.us, Cumming, Ga. |
| Jim Maran | Gwinnett County Chamber of Commerce, Duluth, Ga. |
| Michael R. McQuade | DuPont Company, Wilmington, Del. |
| Joe Neel | ON Semiconductor, Phoenix, Ariz. |
| E. Jock Ochiltree | Capital Valley Ventures, El Dorado Hills, Calif. |
| Randall E. Poliner | Antares Capital Corporation, Melbourne, Fla. |
| Thomas J. Quigley | Broadcom Corporation, Franklin, N.C. |
| Ronald S. Slaymaker | Texas Instruments, Inc., Dallas, Tex. |
| C. Meade Sutterfield | SSPCS Corporation, Atlanta, Ga. |

*Chair, ECE Advisory Board

College of Engineering Alumni Awards

The College of Engineering (CoE) held its annual alumni awards induction ceremony in October 2003 at the Grand-Hyatt Atlanta. Six ECE alumni were inducted into distinct groups of honor—the CoE Hall of Fame, the CoE Academy of Distinguished Engineering Alumni, and the CoE Council of Outstanding Young Engineering Alumni.

College of Engineering Hall of Fame

Membership in the College of Engineering Hall of Fame is reserved for individuals who have made sustained and meritorious engineering and/or managerial contributions during their careers. Of a total of 10 inductees, one was an ECE alumni.

M. John Willner
BEE '50
Senior Scientist (Retired)
Hughes Aircraft Company
Santa Ana Calif.

Academy of Distinguished Engineering Alumni

The College awards membership in the Academy of Distinguished Engineering Alumni to persons whose contributions to Georgia Tech, the engineering profession and field, and/or society have brought distinction to themselves and to the Institute. Of 15 total inductees, three were ECE alumni.

Robert Lee Dixon
BEE '77
Vice President, Information Technology
The Procter and Gamble Company
Cincinnati, Ohio

David L. Foote
BEE '80
Chief Technology Officer
Hitachi Telecom USA
Norcross, Ga.

Leonard Haynes
BEE '72
Executive Vice President and Chief Marketing Officer
Southern Company
Atlanta, Ga.

Council of Outstanding Young Engineering Alumni

Membership in the Council of Outstanding Young Engineering Alumni is bestowed upon alumni under 40 years of age who have demonstrated outstanding professional achievements. Of a total of 13 inductees, two were ECE alumni.

Thomas A. Corker
BEE '89, MSEE '90
Vice President and General Manager, Access Products
Calix Networks, Inc.
Petaluma, Calif.

Michael R. Tinskey
MSEE '91
Manager, Global Business Development
Ford Motor Company
Dearborn, Mich.

Georgia Tech Foundation Grants and Gifts

During FY 2004, various corporations, non-profit organizations, and individual donors contributed \$40,703,119 to ECE through the Georgia Tech Foundation. The majority of this total is a \$36 million contribution that will fund the construction of the Nanotechnology Research Center, to be located on the Georgia Tech campus. The first table shows the amount of funds designated for specific categories. The second table alphabetically lists the various companies, constituencies, and individuals that donated funds to ECE.

COMPANIES

Advanced Optical Systems, Inc.
Agilent Technologies, Inc.
Altera Corporation
American Electric Power Company, Inc.
AT&T Corporation
AVX Corporation
Baltimore Gas and Electric Company
Bellwether Technologies
Big Fun Development Corporation
Boeing Company
Broadcom Corporation
Carolina Power and Light Company
Chevron Texaco Corporation
Cirronet, Inc.
Cisco Systems, Inc.
ComEd
Dominion Virginia Power
EMS Technologies, Inc.
Etenna Corporation
Exxon Mobil Corporation
Ford Motor Company
Georgia Power Company
Global Technology Connection, Inc.
GRESKO
Hewlett-Packard Company
Hitachi Telecom USA
Honeywell International, Inc.
IBM Corporation
Icon Interventional Systems, Inc.
ILCC Company, Ltd.
Indium Corporation of America
Intel Corporation
Intersil, Inc.
Kimberly-Clark Corporation
Kyma Technologies
Kyocera Corporation
Lancope, Inc.
Lockheed Martin Corporation
Microsoft Corporation
Milli Sensor Systems and Actuators
Motorola, Inc.
National Semiconductor Corporation
Nokia, Inc.
Northrop Grumman Corporation
Nova-Borealis Compounds LLC
Pataphysics Unlimited, Ltd.
Pepco
Polaris Wireless, Inc.
Priest and Smith, LLC
Promerus LLC
Public Service Electric and Gas Company

Quellan, Inc.
Rambus, Inc.
Raytheon Company
Rockwell Collins
Rogers Corporation
Rubicon Technology
Samsung SDI Company, Ltd.
Schlumberger
Schlumberger Laboratories
Schwartz, Simon, Edelstein, Celso, and Kessler, LLP
Semiconductor Research Corporation
Siemens AG
SoC Solutions
Sony Corporation
Southern Company
Southern States, Inc.
Southwire Company
Sumitomo Chemical Company, Ltd.
Suntrust Bank
Taiwan Semiconductor
Manufacturing Company, Ltd.
Texas Instruments, Inc.
Toyota Technical Center USA, Inc.
Triad Designs
Tyco Electronics Corporation
United Parcel Service
VT Silicon, Inc.
Weissman Realty, LLC

FOUNDATIONS/NON-PROFIT ORGANIZATIONS

Community Foundation for Greater Atlanta
John and Mary Franklin Foundation, Inc.
GE Foundation
General Motors Foundation
Georgia Pacific Foundation
Harris Foundation
Netherlands-America Community Trust
Otto and Jenny Krauss Charitable Foundation Trust
Procter and Gamble Fund
Scientific-Atlanta Foundation, Inc.

PROFESSIONAL, RESEARCH, ACADEMIC ORGANIZATIONS

American Society for Engineering Education
40th Design Automation Conference
Jackson County Board of Education

National Storage Industry Consortium
Purdue University
Rutt Bridges Family Foundation
Southeastern Center for Electrical Engineering Education

INDIVIDUALS

Sara F. Anderson
Elaine M. Baran
Harry L. Beck
T.J. Becker
Stanley Belyeu
Rita C. Brennan
Rebecca S. Briggs
Michael J. Buckler
Robert J. Butera, Jr.
W. Russell Callen, Jr.
Rebecca V. Caravati
Richard Catrambone
Rebecca A. Champion
Michael A. Coleman
Thomas R. Collins
Stephen E. Cross
Sharon K. Crouch
Thomas A. Edwards
Darleen C. Ferry
Thomas K. Gaylord
Stephen M. Goodnick
Karl Hess
Donna M. Hoblack
W. Timothy Holman
Chi-Ti Hsieh
J. Wilson Hughes
Joseph L.A. Hughes
Benjamin R. Jordan
Ann R. Karagozian
Terrence R. Kenney
Jan Kolnik
Suzanne Koziatek
Diane Krakower
Alan F. Krauss
David N. Ku
Karen Ku
Thomas R. Lee
Marsha T. Lindberg
Caroline M. Little
Judith Lorier
Kenneth E. Mackenzie
Gary S. May
Joseph E. Mayes
Maria L. McGaha
Ann B. McKeon

GIFTS

GIFT CATEGORY

| | |
|--|---------------------|
| Awards | \$1,000 |
| Endowment | \$66,335 |
| Equipment | \$599,378 |
| Faculty Support | \$1,888,084 |
| Fellowships | \$164,092 |
| General Support | \$76,901 |
| Land Purchases/ Building Projects | \$36,000,000 |
| Memberships | \$1,730,804 |
| Scholarships | \$156,300 |
| Student Support | \$20,225 |
| Grand Total | \$40,703,119 |

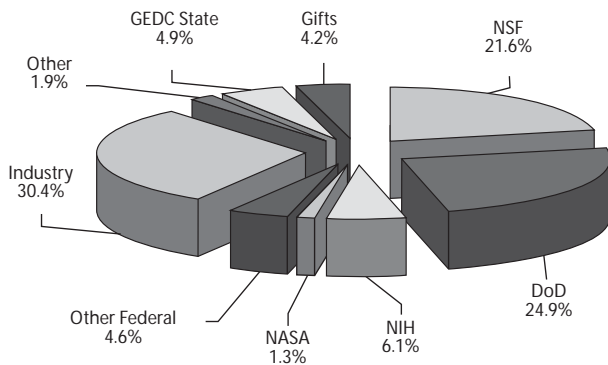
Norma J. McLees
William L. McLees
A.P. Sakis Meliopoulos
Jean T. Miller
Hugh M. Monteith
Stephanie Morgan
Julian C. Nall
Jacqueline L. Nemeth
Ismail H. Oguzman
Douglas W. Palmer
James W. Palmer
John A. Palmer
Elsie E. Paris
Linda G. Parris
John B. Peatman
Charles K. Pharr
Glenn E. Prescott
Hans B. Püttgen
Thomas J. Quigley
Delta S. Reedy
Marvin O. Richter
Pamela D. Rountree
Ali F. Salem
William E. Sayle
Paul Sheehy
Leslie R. Speidel
James A. Stratigos
Lee G. Suddath
Harry T. Sullivan
Christopher J. Summers
Wendy L. Suzman
Daniel B. Toon
Kristin S. Turgeon
Harry L. Vann
Johnny Vardeman
Dong X. Wang
Roger P. Webb
Monroe J. Willner

Research Funding

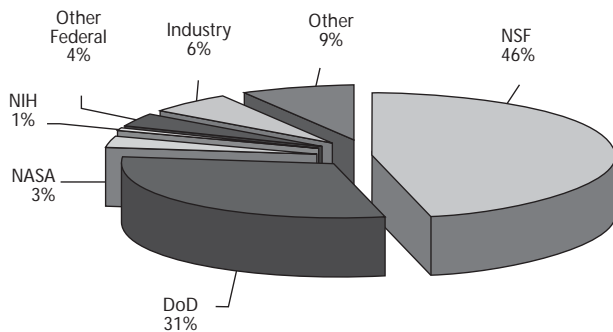
For the third year in a row, the School of ECE broke records in both research grants and contracts and research proposal activity. In FY 2004, ECE faculty acquired a record-breaking \$46,067,597 in research grants and contracts, which represented 39.9 percent of the research funding in the College of Engineering, 24.2 percent of the research funding in units receiving resident instruction funding, 19.9 percent of Georgia Tech awards excluding the Georgia Tech Research Institute (GTRI), and 12.2 percent of all Georgia Tech sponsored awards, including those of the GTRI. During FY 04, ECE faculty members submitted 325 proposals, totaling \$194,941,178, to various governmental agencies and industrial sources.

These totals include research dollars acquired and proposed by ECE faculty in Atlanta, the Microelectronics Research Center, the Georgia Tech Broadband Institute, ECE faculty based at Georgia Tech Savannah, and the Georgia Electronic Design Center.

Funded Grants and Contracts



Proposals



TOTAL ECE RESEARCH FUNDING \$46,067,597

ECE Expenditures for FY 2004

| | |
|--|---------------------|
| General Operations..... | \$25,741,144 |
| Research Consortium..... | 2,247,926 |
| Special Initiative..... | 106,096 |
| Departmental Sales..... | 321,531 |
| Total Expenditures for State-Funded Operations..... | \$28,416,697 |
| Georgia Research Alliance Expenditures..... | \$2,418,716 |
| Sponsored Expenditures*..... | 34,736,794 |
| Total ECE Expenditures for FY 2004..... | \$65,572,207 |

*Includes Georgia Tech Foundation expenditures

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| 404.894.4468 | Program Manager / Assistant to the Chair, LaJauna F. Guillory |

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| | |
|--------------|--|
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| 404.894.4740 | Undergraduate Affairs, Douglas B. Williams |
| 404.894.2975 | Academic Operations, Joseph L.A. Hughes |
| 404.894.9485 | Operations, Jay Schlag |
| 404.894.4697 | Faculty Development, Andrew F. Peterson |
| 404.894.2927 | External Affairs, Hans B. Püttgen |

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