

2005-2006 Annual Report

**SCHOOL OF ELECTRICAL AND
COMPUTER ENGINEERING**

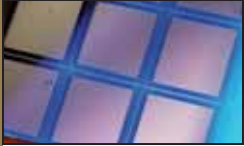


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(cover) Ph.D. student Ram Krithivasan examines a silicon germanium chip inside a cryogenic test station at the Georgia Electronic Design Center at Georgia Tech



from the chair

School of Electrical and Computer Engineering

Dear Colleagues,



***ECE faculty, staff,
and students lead the
way in research,
education, outreach,
and commercialization.***

This year has been extremely productive and very memorable for the School of Electrical and Computer Engineering. ECE is a prime catalyst in Atlanta's high-tech growth through our innovative research, educational, and commercialization activities conducted with our corporate and government partners and our alumni and friends.

Our research awards for FY 06 shattered yet another record, reaching almost \$58.2 million and topping last year's total by more than \$7 million. In the last year, two technologies developed in ECE were released as products. CardioMEMS, a company co-founded by ECE Regents Professor Mark Allen, introduced the EndoSure sensor into the market, a device that makes testing safer and more convenient for abdominal aortic aneurysm patients. Innovolt, a company co-founded by Professor Deepak Divan, rolled out the current-inrush voltage surge suppressor, a device designed to protect electronic equipment from both current and voltage surges.

On the educational front, ECE granted a total of 648 degrees in 2005-06 and over 2,300 students were enrolled. Our program remains the largest in the U.S., despite some recent declines in enrollment. To offset that trend, many faculty, staff, and students are creating a burgeoning portfolio of K-12 outreach programs that have reached several hundred students in the last year. Of particular note, faculty and students involved with the FIRST LEGO League Challenge, led by Professor Jeff Davis, were recognized with a special Education Partnership Award.

Students and faculty members again received many richly deserved awards and accolades during 2005-06. For example, our chapter of Eta Kappa Nu received an Outstanding Chapter Award for academic excellence and commitment to serving the community. Six faculty members were named Fellows in three professional societies, while 10 ECE faculty members received major awards from the Institute of Electrical and Electronics Engineers, the American Society for Engineering Education, and the National Society of Black Engineers in this last year. The most prestigious of these accolades went to Jim Meindl, who received the IEEE Medal of Honor, our profession's highest accolade, in June 2006.

It is a great honor and challenge to lead the School of ECE in these times of innovation, change, and extraordinary accomplishment. These achievements are culminations of many years of hard work and dedication, as well as harbingers of greatness to come.

Gary S. May
Steve W. Chaddick School Chair
School of Electrical and Computer Engineering
Georgia Institute of Technology



the numbers

ECE facts at a glance

The School of Electrical and Computer Engineering is the largest of nine schools and departments in the College of Engineering and the largest individual school at Georgia Tech. In addition to its headquarters in Atlanta, the School's scope extends to southeastern Georgia via Georgia Tech Savannah, into Europe through Georgia Tech Lorraine, and to China through Georgia Tech Shanghai. The School has a very diverse student population and is the largest producer of electrical and computer engineering graduates in the United States.

STUDENTS

Undergraduate (Fall Semester 2005) 1,428	
Electrical engineering.....	905
Computer engineering.....	523
Graduate (Fall Semester 2005) 914	
Doctoral.....	553
Special.....	5
Master of Science/M.S.E.C.E.	356
Degrees Awarded 648	
B.S.	358
M.S.	208
Ph.D.	82

FACULTY/STAFF

Tenure-Track Faculty *.....	115
Joint appointments.....	4
Professors Emeriti.....	25
Funded professorships.....	25
Georgia Research Alliance Eminent Scholars.....	7
National Academy of Engineering members.....	5
IEEE Fellows.....	31
Presidential Early Career Award in Science and Engineering recipients.....	4

Intellectual Products

Books.....	9
Refereed journal papers.....	371
Refereed conference papers.....	705
Patents and records of invention.....	90
Distance learning courses/hours 99/2,080	
Academic Professionals	9
Research Faculty	45
Administrative Staff	76

* Total includes faculty at GT Savannah and GT Lorraine.

ECE STATE BUDGET & EXPENDITURES

36.8 ECE's percentage of sponsored awards within the College of Engineering	20.8 ECE's percentage of sponsored awards for all of Georgia Tech excluding GTRI	339 Number of proposals submitted by ECE faculty during FY 06
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\$4.16M	\$58,175,453 ECE research grants, contracts, and gifts—a fifth record total
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STATE BUDGET (Initial FY 06 allocation - \$16,997,700)	
Salaries and Fringe	\$21,679,340
Travel	95,196
Materials and Supplies	1,798,224
Equipment	745,322
Total	\$24,318,082

Departmental Sales and Service	
Salaries and Fringe	\$32,920
Travel	66,713
Materials and Supplies	190,763
Equipment	92,365
Total	\$482,761

Research Consortium (State Research—GEDC)	
Salaries and Fringe	\$1,262,373
Travel	37,921
Materials and Supplies	505,031
Equipment	3,893
Total	\$1,809,218

Final State Expenditures	\$26,610,061
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SPONSORED EXPENDITURES*	
Salaries and Fringe	\$15,861,373
Travel	1,371,297
Materials and Supplies	8,068,635
Equipment	1,388,206
Other (GTF Direct)	652,230
Indirect (O/Head)	8,667,089
Georgia Tech Savannah	17,068
GEDC	2,800,502
Microelectronics Research Center	8,820,225

Total Sponsored Expenditures \$47,646,625

* Includes Georgia Tech Foundation & Agency Funds

Georgia Tech Wins ONR Award for Phononic Research



The Office of Naval Research awarded ECE Associate Professor **Ali Adibi** and his collaborators with \$4.16 million to conduct photonic and phononic crystal research. This multidisciplinary group from several universities is known as APEX, or Advanced Processing-tools for Electromagnetic/acoustic Xtals (crystals). Their goal is to develop very effective, yet relatively inexpensive tools for manufacturing three-dimensional photonic and phononic crystals.

Photonic crystals, with highly periodic structures that can be designed to control light, could revolutionize everything from computing to communications. However, researchers need more effective and affordable methods to create these promising crystals if they are to be used in personal computers or tiny sensors. Led by Dr. Adibi, APEX aims to develop 3-D crystal fabrication tools affordable enough to make them accessible to a much wider range of researchers. |

Meindl Awarded 2006 IEEE Medal of Honor



Medal of Honor

James D. Meindl was presented with the 2006 IEEE Medal of Honor—one of technology’s most prestigious accolades—at the annual IEEE Awards ceremony on June 24 in Minneapolis, Minn. He joins an august group of scientists and engineers—Guglielmo Marconi, Jack Kilby, Harry Nyquist, William Shockley, John Bardeen, and Andy Grove—who have received this award for their seminal accomplishments in science and technology.

Dr. Meindl and his extraordinary, 49-year career were celebrated on April 17 at the IEEE Medal of Honor Symposium, held on the Georgia Tech campus. Four distinguished guests—three who received their doctorates under Dr. Meindl’s supervision—reflected on his technical accomplishments, academic and interdisciplinary research leadership, commercialization activities, and graduate student guidance. Speakers included Rafael Reif, provost of the Massachusetts Institute of Technology and the Maseeh Professor of Emerging Technology; James Plummer, the Frederick Terman Dean of Engineering at Stanford University and the

John M. Fluke Professor of Electrical Engineering; Levy Gerzberg, co-founder, president, CEO, and director of Zoran Corporation; and Chuck Geschke, co-founder and chairman of the board of Adobe Systems, Inc.

Dr. Meindl’s pioneering contributions to microelectronics have transformed medical research, improved portable military devices, and resulted in the creation of a portable electronic reading aid for the blind. He joined Georgia Tech in 1993 as the Joseph M. Pettit Professor in Microelectronics for the School of ECE and was appointed director of the Microelectronics Research Center in 1996. His research at Tech explores solutions for problems that arise from trying to interconnect billions of transistors within a tiny chip. Already a well-respected leader of many on campus and multi-university research initiatives, Dr. Meindl was named the founding director of the Nanotechnology Research Center in May 2006. He will lead the Center’s efforts to fuse multiple scientific disciplines in pursuit of breakthrough nanotechnologies. |

James Meindl (above); and symposium speakers (t-b) Drs. Reif, Plummer, Geschke, and Gerzberg



CAREER MILESTONES

1955, 1956, 1958

Carnegie-Mellon University

Earned B.S., M.S., and Ph.D. degrees in electrical engineering

1959-67

U.S. Army Electronics Laboratories

Founding Director, Integrated Electronics Division

1967-86

Stanford University

John M. Fluke Professor of Engineering; Associate Dean for Research, School of Engineering; Co-Director, Center for Integrated Systems; Director, Electronics Laboratories; Founding Director, Integrated Circuits Laboratory

1971-84

Telesensory Systems, Inc.

Co-Founder and Member of the Board

1986-93

Rensselaer Polytechnic Institute

Senior Vice President for Academic Affairs and Provost

1993-present

Georgia Tech

School of Electrical and Computer Engineering, Joseph M. Pettit Chair in Microelectronics; Director, Microelectronics Research Center; Site Director, National Science Foundation National Nanotechnology Infrastructure Network; Founding Director, Nanotechnology Research Center

Life Fellow, IEEE

Life Fellow, American Assoc. for the Advancement of Science

Member, American Academy of Arts and Sciences

Member, National Academy of Engineering



updates

Projects in progress

Expansion

NANOTECHNOLOGY RESEARCH CENTER BUILDING

In June 2006, the Marcus Foundation announced a \$15 million commitment for the Georgia Tech Nanotechnology Research Center Building. The anticipated completion date for the facility is fall 2008.

Shortly after the Marcus Foundation announcement, James D. Meindl was named the founding director of the Nanotechnology Research Center. With this new facility, to be known as the Marcus Nanotechnology Research Center Building, Dr. Meindl believes that future breakthroughs that fuse discoveries in physical and biological science and engineering enabled by nanotechnology are very possible. Plans call for 20,000 square feet of space to be dedicated to nanotechnology focused on physical science and engineering adjacent to a 10,000-square-foot facility dedicated to biological and biomedical nanotechnology research, a combination believed not to exist anywhere else in the world.



James D. Meindl, founding director of the Nanotechnology Research Center; Georgia Tech President Wayne Clough; Bernie Marcus, founder and chairman of the Marcus Foundation; Georgia Governor Sonny Perdue; and Georgia Board of Regents Chancellor Erroll Davis break ground for the Marcus Nanotechnology Building.



CHRISTOPHER W. KLAUS ADVANCED COMPUTING BUILDING

Named for the founder of Internet Security Systems, the building features research and computer class labs, a 200-seat auditorium, an integrated parking structure, and an east-west walkway through the center of the building. The facility will house 34 faculty and staff members from ECE, primarily from the computer engineering group, the Center for Research on Embedded Systems and Technology, and the ECE computer support group.

When ECE faculty, staff, and students move into the Klaus Building, it will become the ninth building on the Atlanta campus where ECE personnel are located.

GEORGIA TECH INDIA

During the last two years, ECE Professor Vijay K. Madiseti has led fact-finding teams and visits to explore possibilities of establishing a Georgia Tech presence in India. In FY 06, two official visits were made, narrowing potential campus sites to Hyderabad and Pune.

The Georgia Tech India delegation visited Maharashtra Industrial Development Corporation-Pune in April 2006. Pictured are (L-R) Bhaskar Gadepally (Georgia Tech consultant for GT India effort), Rao Tummala, Kishore Ramachandran, Harry Vann, Bill Wepfer, Gary May, Howard Rollins.



GEORGIA TECH SHANGHAI

The Georgia Tech Shanghai Initiative gives Georgia Tech undergraduates an exciting opportunity to live and study in China and provides Shanghai Jiao Tong University students a chance to pursue a top-notch graduate education.

First initiated in May 2005, the Georgia Tech Shanghai Summer Program is an undergraduate study abroad experience. Fifty-two students (12 from ECE) enrolled in summer 2006, where Georgia Tech faculty members, including Yorai Wardi of ECE, taught regular Georgia Tech courses in engineering, humanities, Chinese language, and social sciences at SJTU Xuhui. In December 2005, a Georgia Tech delegation traveled to China and signed an agreement with SJTU, allowing SJTU students to work towards dual master's degrees from both institutions. In May 2006, eight SJTU students became the first to enroll in this dual degree program, where they can simultaneously receive a non-thesis master's degree from the School of Electrical and Computer Engineering at Georgia Tech and a thesis M.S. degree from the School of Electronic, Information, and Electrical Engineering at SJTU.

G. Tong Zhou, who served as co-director of the Shanghai Summer Program and was the primary coordinator for the dual M.S. program, was named director of the Georgia Tech Shanghai Initiative, effective July 1, 2006. |

Georgia Tech President G. Wayne Clough; Anne Clough; Leshelle May; Julia Juang; Gary S. May; Executive Assistant to the President Sue Ann Bidstrup Allen; Howard Rollins, director of the Office of International Education; and G. Tong Zhou were part of a Georgia Tech delegation that visited Shanghai, China in December 2005.

Campus

CENTERGY BUILDING

Located at 75 5th Street in Technology Square, the Centergy Building houses labs and offices for 31 digital signal processing and telecommunications faculty. They, along with associated administrative staff and researchers, moved to Centergy from the GCATT Building in November 2005. Specific research organizations associated with DSP and telecommunications include the Center for Signal and Image Processing, the Arbutus Center for Distributed Engineering Education, the Georgia Centers for Advanced Telecommunications Technology, and the Georgia Tech Broadband Institute.

GEORGIA TECH SAVANNAH

Georgia Tech Savannah is the Institute's presence in southeast Georgia, where students can earn degrees in ECE, civil and environmental engineering, and mechanical engineering. In FY 06, Monson H. Hayes, III, a professor in the Center for Signal and Image Processing since 1981, was appointed as GTS associate chair responsible for ECE programs. He will also lead development of continuing education courses and creation of distance learning initiatives and technologies. Elliot Moore, II, an assistant professor specializing in DSP, received a National Science Foundation CAREER Award, the first granted to a faculty member at GTS, for his work in voice source analysis.

GEORGIA TECH LORRAINE

Located in Metz, France, Georgia Tech Lorraine is integral to the Institute's emphasis on global education. In January 2006, ECE Professor Steven W. McLaughlin and Yves Berthelot, a professor in the George W. Woodruff School of Mechanical Engineering, were named deputy director and director of GTL, respectively. These leadership changes were made after Hans B. Püttgen, who led GTL since its establishment in 1990, announced his retirement.

Abdallah Ougazzaden and Paul L. Voss joined the ECE faculty and are permanently located at GTL. In addition, Dr. Ougazzaden was named director of a joint international research unit that will focus on telecommunications and innovative materials research. |



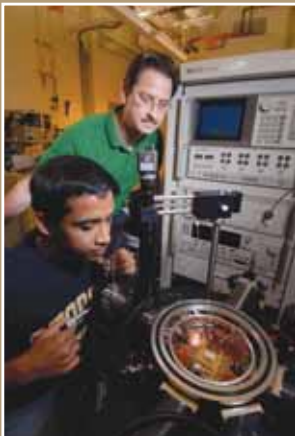
Located in Technology Square, the Centergy Building houses the DSP and telecommunications groups.

Research

Georgia Tech/IBM Team Demonstrates First 500 GHz Silicon-Germanium Transistors

A research team from IBM and Georgia Tech led by John D. Cressler demonstrated the first silicon-germanium transistor able to operate at frequencies above 500 GHz. Though the record performance was attained at extremely cold temperatures, results suggest that the upper bound for performance in SiGe devices may be higher than originally expected.

Ultra-high-frequency SiGe circuits have potential applications in many communications and defense systems, space electronics platforms, and remote sensing uses. Achieving such extreme speeds in silicon-based technology—which can be manufactured using conventional low-cost techniques—could provide a pathway to high-volume applications. This accomplishment was reported in the July 2006 issue of *IEEE Electron Device Letters*.



IBM, NASA, and the Georgia Electronic Design Center supported the research, which received worldwide media attention.

CardioMEMS Launches EndoSure Sensor into the Marketplace

After winning approval from the Food and Drug Administration, CardioMEMS launched its EndoSure sensor during FY 06. EndoSure is the first implantable pressure sensor that combines wireless and microelectromechanical systems to receive FDA clearance and now makes testing safer and more convenient for abdominal aortic aneurysm patients. The device is based on technology developed by Mark G. Allen, CardioMEMS co-founder and chief technical officer.

The company continues extending the technology's capabilities. Another sensor that measures intracardiac pressure in congestive heart failure patients is in the clinical trial stage and has been successfully implanted in a patient's pulmonary artery in Santiago, Chile. CardioMEMS is a 2005 graduate company from the Advanced Technology Development Center, one of the nation's top high-tech start-up company incubators. |



(top) Deborah McGee examines an EndoSure sensor in the company's clean room facility. The sensor is implanted to measure pressure in an aneurysm being treated by a stent graft.

(right) John Cressler and Ph.D. student Ram Krithivasan examine a silicon germanium chip inside a cryogenic test station at the Georgia Electronic Design Center at Georgia Tech.

ECE's 2006 Roger P. Webb Awards

On April 25, 2006, ECE celebrated the end of the academic year by holding the Roger P. Webb Awards Program in the School of Electrical and Computer Engineering. Steve W. Chaddick (BSEE 74, MSEE 82) and C. Meade Sutterfield (BEE 72), both members of the ECE Advisory Board, hosted the event, which honors the students, staff, and faculty who have shown exceptional dedication to their professions and studies, ECE, Georgia Tech, and the community as a whole. The 2006 award recipients are listed below.

STUDENT AWARDS

Outstanding ECE Sophomore Award
Christos Theodoridis

ECE Junior Scholar Award
Eric Fontaine

ECE Undergraduate Research Award
Sunny Jolly

Most Outstanding ECE Senior Co-op Award
Steven Finn



Outstanding Service to Georgia's Community Award
Jiayue Simon Chen

ECE Faculty Award
Angelique Yeung

Outstanding Electrical Engineering Senior Award
Tianyu Tom Wang

Outstanding Computer Engineering Senior Award
Anthony Hylick

ECE Senior Scholar Award
Eric Glass, Barrett Kimball, Patryk Prus

Colonel Oscar P. Cleaver Awards
Brian Gestner, Farasat Munir

ECE Graduate Teaching Assistant Excellence Award
Anna Stelzenmuller

ECE Graduate Research Assistant Excellence Award
Bing Dang, Babak Momeni, Siavash Pourkamali

STAFF AWARDS

Hats Off Performance Award
LaJauna Guillory, Angela Hughes

Research Spotlight Award
Larry Coffeen

Academic Spotlight Award
Thomas Collins

FACULTY AWARDS

Outstanding Junior Faculty Member Award
Faramarz Fekri, Hsien-Hsin Sean Lee

ECE Outreach Award
Bonnie Heck Ferri

ECE Distinguished Mentor Award
Krishna Palem

Richard M. Bass/Eta Kappa Nu Outstanding Teacher Awards
John A. Buck, Aaron D. Lanterman

Distinguished Faculty Achievement Award
Glenn S. Smith

2006 ECE Staff Award recipients (l-r) Larry Coffeen, Angela Hughes, LaJauna F. Guillory, and Thomas R. Collins are pictured with Gary S. May (center).

2006 ECE Graduate Student Award recipients (l-r) Farasat Munir, Robert Baxley, Angelique Yeung, Babak Momeni, Brian Gestner, and Anna Stelzenmuller are pictured with Gary S. May (center).

2006 ECE Faculty Award recipients (l-r) Hsien-Hsin Sean Lee, Aaron Lanterman, Bonnie Heck Ferri, John A. Buck, Glenn S. Smith, and Krishna V. Palem are pictured with Gary S. May (center).

2006 ECE Undergraduate Student Award recipients (l-r) Reeve Ingle, Jiayue Simon Chen, Barrett Kimball, Steven Finn, Patryk Prus, Chris Theodoridis, Eric Glass, Sunny Jolly, and Eric Fontaine are pictured with Gary S. May (center).



students

The lifeblood of the School

With a firm grounding in the basics of science and engineering, Georgia Tech ECE students are well prepared for further study in graduate school or employment with the world's top high-tech companies, research universities, governmental agencies, and entrepreneurial small businesses.

Over 2,300 students are enrolled in the School's graduate and undergraduate programs, and in the last academic year, 648 degrees were awarded to students at the main campus in Atlanta, Georgia Tech Savannah, and Georgia Tech Lorraine and to students enrolled in the online/video master's program. Undergraduate electrical engineering and computer engineering majors may participate in three different academic initiatives at Georgia Tech—the International Plan, Cooperative Education Plan, and Research Option (effective fall 2006). Students who successfully complete these programs receive special degree designations on their diplomas.

STUDENT BODY PROFILE

(Based on Fall 2005 Enrollment)

	Total	Asian	Black	Hispanic	American Indian/ Alaskan Native	White	Multi- Racial	Female
B.S.E.E.	875	290	104	42	1	435	3	98
B.S.Cmp.E.	501	131	53	29	0	280	8	28
B.S.E.E./GT Savannah	30	3	6	0	0	20	1	4
B.S.Cmp.E./GT Savannah	22	0	4	0	0	18	0	1
Total	1,428	30%	12%	5%	<1%	53%	<1%	9%
M.S./M.S.E.C.E.	353	116	15	23	1	189	12	48
Special	5	1	0	1	1	4	0	0
Ph.D.	543	312	28	17	1	193	2	62
M.S./M.S.E.C.E./GT Sav.	3	0	0	0	0	3	0	0
Ph.D./GT Savannah	10	7	1	0	0	2	0	2
Total	914	47%	5%	4%	<1%	42%	2%	12%
Grand Total**	2,342							

DEGREES AWARDED

(Summer 2005 - Spring 2006)

	Total	Asian	Black	Hispanic	American Indian/ Alaskan Native	White	Multi- Racial	Female
B.S.E.E.	248	84	39	9	0	115	1	34
B.S.Cmp.E.	91	35	7	3	0	43	3	10
B.S.E.E./GT Savannah	14	1	3	0	0	9	1	2
B.S.Cmp.E./GT Savannah	5	0	0	0	0	5	0	0
Total	358	34%	14%	3%	0%	48%	1%	13%
M.S. Bioengineering*	1	0	1	0	0	0	0	0
M.S.	45	27	0	8	0	10	0	10
M.S.E.C.E.	162	37	9	3	1	107	5	16
Ph.D.	82	48	2	1	0	31	0	7
Total	290	39%	4%	4%	0%	51%	2%	11%
Grand Total**	648							

* With home department in ECE.

** Degree and enrollment totals include GTL, GT Savannah, and online/video master's.

the numbers

Average Freshman
Electrical Engineering
Student

3.72 HS GPA
636 SAT verbal score
701 SAT math score

Average Freshman
Computer Engineering
Student

3.69 HS GPA
638 SAT verbal score
699 SAT math score

Average Entering Graduate
Student

3.62 Undergraduate GPA
4.5 GRE analytical
writing score
760 GRE quantitative
score
530 GRE verbal score

Campus/program ECE
Enrollments Fall 2005

65 Georgia Tech
Savannah
26 Georgia Tech
Lorraine
94 Online Master s/
Video





student awards

Scholarships, fellowships, and special awards

Rida Awarded IEEE MTT-S Scholarship

Amin Rida was awarded an IEEE Microwave Theory and Techniques Society Undergraduate/Pre-Graduate Scholarship at the 2006 International Microwave Symposium held in San Francisco, Calif. Advised by Emmanouil M. Tentzeris as an undergraduate, Mr. Rida conducted research in the design and modeling of Ultra High Band Frequency antennas for RFID and participated in the Summer Undergraduate Research Engineering/Science program. He plans to continue his graduate studies with Dr. Tentzeris.

Lugo Named Goizueta Foundation Fellow

Cesar Lugo was named a Goizueta Foundation Fellow, beginning in fall 2006. This fellowship program assists Georgia Tech in attracting and promoting exceptional graduate students of Hispanic/Latino origin. A Ph.D. student in John Papapolymerou's research group, Mr. Lugo develops design techniques for frequency selective circuits at microwave and millimeter wave frequencies. Applications include wireless and satellite communication systems, future generation X-band radars, surveillance systems, and cellular handset devices.

Intel and TI Announce ECE Fellowship Recipients

Ripal Nathuji and Deepak Sekar were named among the Intel fellowship recipients for 2006. Fellowships are awarded to Ph.D. candidates interested in semiconductor technology and manufacturing, systems technology and design, software technology and design, and information technology.

Mr. Nathuji is conducting research in active power management for multi-core chips, and is advised by Sudhakar Yalamanchili, Joseph M. Pettit Professor in ECE, and Karsten Schwan, a professor in the College of Computing. Mr. Sekar is advised by James D. Meindl, ECE's Joseph M. Pettit Chair in Microelectronics and director of the Microelectronics Research Center, and is looking for ways to improve interconnects in future IC chips.

Farhana Zaman was selected for a Texas Instruments Graduate Woman's Fellowship for Leadership in Microelectronics. Advised by James D. Meindl, Ms. Zaman received this honor based on her high grade point average, faculty endorsements, and her leadership and innovative research in nanogap fabrication. |

Muhammad, Baxley Earn Sigma Xi Honors

Abubakr Muhammad and Robert Baxley received the Best Ph.D. Dissertation Award and Best M.S. Thesis Award, respectively, at the annual banquet held by the Georgia Tech chapter of Sigma Xi on April 4, 2006. A fall 2005 Ph.D. graduate, Dr. Muhammad



was recognized for his thesis entitled "Graphs, Simplicial Complexes, and Beyond: Topological Tools for Multi-agent Coordination." He was advised by Magnus Egerstedt and is now a postdoctoral scholar in the Department of Electrical and Systems Engineering at the University of Pennsylvania in Philadelphia.

(top) A. Muhammad, M. Egerstedt, and (right) R. Baxley



Mr. Baxley was honored for his M.S. thesis entitled "Analyzing Selected Mapping for Peak-to-Average Power Reduction in OFDM." He completed his M.S. thesis under the supervision of G. Tong Zhou and is now a Ph.D. student in her research group. |

Women in Engineering Corporate-sponsored Scholarships

Sixteen female students received corporate-sponsored scholarships for their academic excellence at the March 30, 2006 Women in Engineering Excellence Awards Banquet, sponsored by Tech's College of Engineering.

- Divita Bhandari** (Texas Instruments)
- Ariel Corinne Brown** (Texas Instruments)
- Andrea Paige Carpenter** (Boeing)
- Allison Burr Chislett** (Northrop Grumman)
- Diana Del Carmen Fuentes** (Cisco)
- Rikai Huang** (Texas Instruments)
- Jin Joo Lee** (Cisco)
- Shane Colleen Mooney** (IBM)
- Mary Nguyen** (Alcoa)
- Amanda Louise Richards** (Boeing)
- Sujata Sen** (Hewlett-Packard)
- Amy Abraham Vaduthalakuzhy** (Cisco)
- Erin Elizabeth Walters** (IBM)
- Sugandh Windlass** (John Deere)
- Ana Maria Yepes** (Hewlett-Packard)
- Rebika Getachew Yitna** (John Deere)

Georgia Tech Awards and Scholarships

Nine ECE students received awards and scholarships at the 2006 Georgia Tech Student Honors Day, held on April 19.

Henry Ford II Scholar Award

Louis Michael Howe, Navraj Singh, Christos Theodoridis

Georgia Tech Faculty Women's Club Scholarship

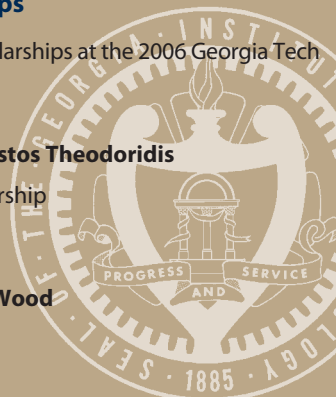
R. Reeve Ingle, John Holmes

James G. and Mary G. Wohlford Scholarship

Chetesh Devchand, Kevin Sinha, Elliot Wood

Auxiliary Services Single Parent Scholarship

Brandi Nicole Chubb





student organizations

Venues for socialization, support, and development

ECE student organizations work closely with the School's faculty and administration on many different issues ranging from everyday student concerns to K-12 outreach. These groups also provide social activities and many opportunities for personal and professional development.

ECE Student-Faculty Committee

The ECE Student-Faculty Committee promotes increased interactions and better relations among the School's students and faculty. During this past year, the Committee co-sponsored Family Weekend in early October, giving parents a chance to visit ECE facilities and to meet faculty and administrators. In April 2006, the Student-Faculty Committee organized the first ECE concert, held at Under the Couch, an on-campus, live music venue. The second annual ECE Fair was also held in April—giving students opportunities to learn about the School's 10 technical interest groups, Tech's various campuses and international programs, and diverse student organizations in ECE—and the day's activities were capped by a launch party of *ecesis*, a webzine produced by the Committee and the Undergraduate Professional Communications Program. Eric Liu and Jeffrey A. Davis were the student chair and faculty chair, respectively, of the 2005-06 ECE Student-Faculty Committee.

Students gather at the IEEE booth to learn more about the group's activities at the ECE Fair, which is sponsored by the the Student-Faculty Committee.



IEEE Student Branch

IEEE is the world's leading professional association for the advancement of technology. Maintaining its stature as the world's largest student branch of IEEE, the Georgia Tech chapter increased its membership from 750 at the start of fall 2005 to over 1,000 in spring 2006. Chaired by Sourjo Basu in 2005-06, IEEE provided regularly scheduled professional development activities and networking opportunities for ECE students and initiated an inter-organizational meeting with other ECE student groups to increase cooperation and coordination of activities in order to better serve the student body.

Eta Kappa Nu

Eta Kappa Nu is the international honor society for electrical and computer engineers. Led by President David Lindberg, HKN participates in both academic and community service oriented activities. The group held its regular Bridge to Business meetings that feature speakers from the corporate world and hosted the annual ECE Spring Picnic with support from Milliken and Altus Network Solu-

tions. A number of awards were given during the event, including the Richard M. Bass Eta Kappa Nu Outstanding Teacher Awards, which were presented to Aaron D. Lanterman and John A. Buck.



Eta Kappa Nu officers get ready for the 2006 Spring Picnic.

During 2005-06, HKN volunteers tutored students on schoolwork and reviewed materials for statewide exams each Saturday morning at Tull Waters Elementary School, located in southeast Atlanta, through Hopeworldwide-Georgia. Also in the last year, HKN hosted its first undergraduate research expo, featuring student projects, and gave its first scholarships to ECE juniors Niranjn Ganesh Kumar and Shardul Bhatia. The scholarships were funded by the HKN "chip project," where members packaged and sold lab supplies at discounted prices, saving students over \$16,500, while putting earnings into the chip project scholarship fund.

Women in Electrical and Computer Engineering

Women in Electrical and Computer Engineering aims to increase awareness of opportunities for women in electrical and computer engineering and to help women reach their full potential as engineers and leaders. In 2005-06, WECE ran an energetic program of outreach to female students in ECE and to prospective female students. The group's two major social events, a Halloween-Tech trivia party and a bowling party, attracted a wide cross-section of faculty, staff, and undergraduate and graduate students. To gain even further momentum in these outreach efforts, alumni and industrial sponsors—including Intel, GE, IBM, and Texas Instruments—are getting increasingly involved with WECE, helping to sponsor not only the group's two main social activities, but also funding smaller social gatherings and speaking at seminars on workplace issues, technical topics, and graduate school studies. Anita Chow served as WECE president during 2005-06. |



WECE's annual Halloween-Tech trivia party.

student news

Students strive for excellence

Eta Kappa Nu Named Outstanding Chapter

The Beta Mu chapter of Eta Kappa Nu, the honor society for ECE students, received an Outstanding Chapter Award for 2004-05, one of nine such awards given to HKN chapters in the U.S. A mark of significant distinction for a college chapter, Gary S. May, Steve W. Chaddick School Chair, accepted this award on behalf of HKN and the School of ECE at the Electrical and Computer Engineering Department Heads Association Annual Meeting, held in Kahuku, Oahu, Hawaii in March 2006.



Making Contact: Georgia Tech Amateur Radio Club



Members of W4AQL operate two HF radio stations using only solar power from the solar panels in the foreground during Field Day 2006. The goal of Field Day is to demonstrate and practice methods for emergency communication without using pre-existing infrastructure such as permanently mounted antennas, the power grid, or the Internet.

Operating a VHF repeater and a shack containing an assortment of HF, VHF, and UHF gear, W4AQL—the Georgia Tech Amateur Radio Club—is open to students, faculty, and staff. The group participates in various activities during the year, including Field Day, the Hurricane Watch Net, and many other regional and public service activities.

W4AQL made two contacts in space during 2005-06. On January 19, the club hosted students from Tech's School of Aerospace Engineering as they posed questions to Bill McArthur, an astronaut who was aboard the International Space Station and an MSAE '83 graduate of Georgia Tech. Several local media outlets covered the transmission, both during and after the event. On February 21, W4AQL assisted a student team from the Tokyo Institute of Technology with the orbital insertion of Cubical TITech Engineering Satellite version 1.7 that lifted off from the Uchinoura launch facility in Kagoshima, Japan. On the satellite's first two land crossings over Atlanta, the Amateur Radio Club provided its services and satellite tracking station to the Tokyo team, allowing everyone to hear signal reception when CUTE 1.7 entered orbit and began transmitting telemetry data.

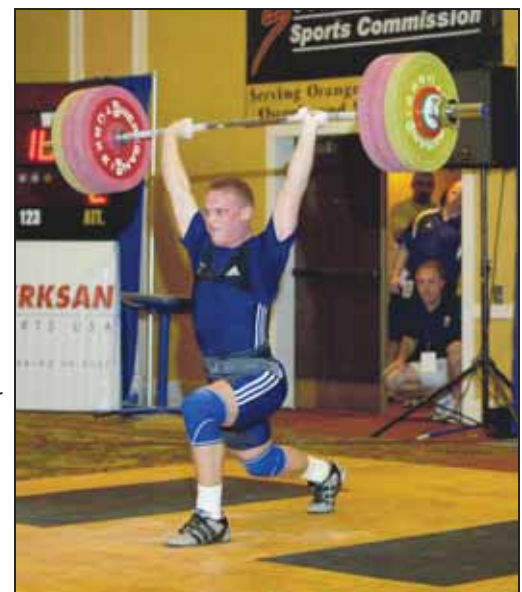
ECE Student Takes First Place in UROC Symposium

Steven Dalton, a member of George F. Riley's research group, won first place at the 2006 Undergraduate Research Opportunities in Computing Research Symposium on April 19. Mr. Dalton's project, "Validation of PFTK Equation in Large TCP Transfers," used network simulation tools to perform an empirical validation of a well known TCP throughput equation.

Alford Wins Top Honors at National Weightlifting Competition

Chandler Alford, a sophomore electrical engineering major, won three gold medals and the Junior National Championship at the USA Weightlifting Junior National Olympic Weightlifting Tournament. His performance at that event, held in March 2006 in Orlando, Fla., qualified him for a spot on the USA Team that competed internationally in Cali, Colombia at the end of April.

A Dean's List student from Conyers, Ga., Mr. Alford is training at the U.S. Olympic Training Center in Colorado Springs, Colo. While there, he attends classes at the University of Colorado and via Georgia Tech's online program. He will return to Georgia Tech at the end of 2006. |



Chandler Alford goes for a successful lift at the USA Weightlifting Junior National Olympic Weightlifting Tournament.



Ph.D. students graduated

82 students graduated with their doctoral degrees in 2005-06

Students are grouped by semesters of graduation; advisors, dissertation titles, and employment status are also listed.

SUMMER 2005

Oguz Altun	P. Allen	A 1.5V Multirate Multibit Sigma Delta Modulator for GSM/WCDMA in a 90nm Digital CMOS	Mixed signal IC design engineer, Texas Instruments, Dallas, Tex.
Brent Bachim	Gaylord	Characteristics, Applications, and Properties of Carbon Dioxide-Laser-Induced Long-Period Fiber Gratings	Self-employed consultant, Fort Worth, Tex.
Soumendu Bhattacharya	Chatterjee	Alternate Testing of Analog and RF Systems Using Extracted Test Response Features	Research scientist, School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, Ga.
Alessandro Brawerman	Copeland	A Fraud-Prevention Framework for Software Defined Radio Mobile Devices	Engineer, Argentine Telecom, Buenos Aires, Argentina
Chao Chen	Akyildiz	Advanced Routing Protocols for Satellite and Space Networks	Assistant professor, Department of Electrical and Computer Engineering, Indiana University-Purdue University Indianapolis
Yoonsu Choi	M. Allen	A Three-Dimensional Coupled Microelectrode and Microfluidic Array for Neuronal Interfacing	Technical development manager, Icon Interventional Systems, Inc., Cleveland, Ohio
Jianxuan Du	Li	Layered Space Time Structure for MIMO-OFDM Systems	Anritsu Company, Morgan Hill, Calif.
Wesley Gee	P. Allen	CMOS Integrated LC Q-Enhanced RF Filters for Wireless Receivers	Electrical engineer IV, Northrop Grumman Electronic Systems, Warner Robins, Ga.
Vinu Govind	Swaminathan	Design of Baluns and Low Noise Amplifiers in Integrated Organic Mixed-Signal Substrates	Senior design engineer, Jacket Micro Devices, Atlanta, Ga.
Arum Han	Frazier	Microfabricated Multi-Analysis System for Electrophysiological Studies of Single Cells	Assistant professor, Department of Electrical and Computer Engineering, Texas A&M University, College Station, Tex.
Mohamed Hilali	Rohatgi	Understanding and Development of Manufacturable Screen-Printed Contacts on High Sheet-Resistance Emitters for Low-Cost Silicon Solar Cells	Process development engineer, Advent Solar, Albuquerque, N.M.
Paul Hong	Mersereau	Octave-Band Directional Decompositions	The Analytic Sciences Corporation, Reston, Va.
Gregory Kilby	Gaylord	Infrared Methods Applied to Photonic Crystal Device Development	Assistant professor, Department of Electrical Engineering and Computer Science, U.S. Military Academy, West Point, N.Y.
Jaehong Kim	Brooke	Wide-Band and Scalable Equivalent Circuit Model for Multiple Quantum Well Laser Diodes	Teradyne, Los Angeles, Calif.
Shengyuan Li	P. Allen	RF On-Chip Filters Using Q-Enhanced LC Filters	Design engineer, Texas Instruments, Dallas, Tex.
Anthony Lieu	P. Allen	A New Architecture for Low-Voltage Low-Phase High-Frequency CMOS LC Voltage-Controlled Oscillator	Not known.
Jun Cheol Park	Mooney	Sleepy Stack: A New Approach to Low Power VLSI Logic and Memory	Component design engineer, Intel Corporation, Folsom, Calif.
Allen Petrin	Steffes	Maximizing the Utility of Radio Spectrum: Broadband Spectrum Measurements and Occupancy Model for Use by Cognitive Radio	Senior communications engineer, Northrop Grumman, Fairfax, Va.
Rana Pratap	May	Design and Optimization of Microwave Circuits and Systems Using Artificial Intelligence Techniques	Burn and test engineer, Intel Corporation, Phoenix, Ariz.
Hua Qian	Zhou	Power Efficiency Improvements for Wireless Transmissions	Senior design engineer, Marvell Semiconductor, Santa Clara, Calif.
David Robie	Mersereau	Error Correction and Concealment of Block Based, Motion-Compensated Temporal Prediction, Transform Coded Video	Pilot, Delta Air Lines, Atlanta, Ga.
Martin Saint Laurent	Swaminathan	Modeling and Analysis of High-Frequency Microprocessor Clocking Networks	Qualcomm, Austin, Tex.
Peter Sassone	D.S. Wills	Characterization and Avoidance of Critical Pipeline Resources	Graduate research intern, Intel Corporation, Austin, Tex.
Jaemin Shin	Brooke	Rapid, Predictive Modeling for High Frequency Interconnect on Low Cost Substrates	Intel Corporation, Austin, Tex.
Guocong Song	Li	Cross-Layer Resource Allocation and Scheduling in Wireless Multicarrier Networks	Motorola Labs, Libertyville, Ill.
Roland Sperlrich	Kenney	Adaptive Power Amplifier Linearization by Digital Pre-Distortion with Narrowband Feedback Using Genetic Algorithms	Wireless systems engineer, Texas Instruments, Dallas, Tex.



Guizhen Zheng	Papapolymerou	Low Power Reconfigurable Microwave Circuits Using RF MEMS Switches for Wireless Systems	Senior RF packaging engineer, Intel Corporation, Chandler, Ariz.
FALL 2005			
Antonios Argyriou	Madiseti	Transport Layer Optimizations for Heterogeneous Wireless Multimedia Networks	Mandatory military service, Greek army
Israfil Bahceci	Altunbasak	Multiple-Input Multiple-Output Wireless Systems Coding Distributed Detection and Antenna Selection	Postdoctoral associate, Department of Electrical and Computer Engineering, University of Waterloo (Canada)
Tianbing Chen	Cressler	Operation of SiGe BiCMOS Technology under Extreme Environments	Device engineer, National Semiconductor, Santa Clara, Calif.
Changhyuk Cho	P. Allen	A Power Optimized Pipelined Analog-to-Digital Converter Design In Deep Sub-micron CMOS Technology	Not known.
Kerkil Choi	Lanterman	Minimum I-Divergence Methods for Inverse Problems	Postdoctoral fellow, Department of Electrical and Computer Engineering, Michigan Technological University, Houghton, Mich.
Vinita Deodhar	Davis	Throughput-Centric Wave-Pipelined Interconnect Circuits for Gigascale Integration	CAD engineer, Intel Corporation, Hillsboro, Ore.
Graham Drozeski	Vachtsevanos	A Fault-Tolerant Control Architecture Applied to Unmanned Aerial Vehicles	Principal engineer, Karem Aircraft, Inc., Fort Worth, Tex.
Lisa Ehrman	Lanterman	An Algorithm for Automatic Target Recognition Using Passive Radar and an EKF for Estimating Aircraft Orientation	Research engineer, Sensors and Electromagnetics Applications Laboratory, Georgia Tech Research Institute, Atlanta, Ga.
Ethan Farquhar	Hasler	Summary and Impact of Large Scale Field-Programmable Analog Neuron Arrays	Assistant professor, Department of Electrical and Computer Engineering, University of Tennessee-Knoxville.
Michael Farrell	Mersereau	Analysis of Modeling, Training, and Data Reduction for Target Detection in Hyperspectral Imagery	National Security Agency, Fort Meade, Md.
Olivier Guerreau-Lambert	McLaughlin	Multidimensional Quantum Key Distribution with Single Side Pulse and Single Side Band Modulation Multiplexing	Research staff, Total, Paris, France.
Youngsik Hur	Laskar	Equalization and Near-End Crosstalk (NEXT) Noise Cancellation for 20-Gbit/Sec 4-PAM Backplane Serial I/O	Senior design engineer, Samsung Design Center, Atlanta, Ga.
Taewon Hwang	Li	Iterative Techniques Based on Energy Spreading Transform for Wireless Communications	Assistant professor, Department of Electrical and Electronic Engineering, Yonsei University, Seoul, South Korea
Cheng Jia	Milor	A Delay-Locked Loop for Multiple Clock Phases/Delays Generation	Design engineer, Videolarm, Atlanta, Ga.
Kihong Kim	Stüber	Interference Mitigation in Wireless Communications	Samsung, Suwon, South Korea
Young-Jun Lee	Riley	Routing and Efficient Evaluation Techniques for Multi-Hop Mobile Wireless Networks	Senior systems engineer, Motorola, Libertyville, Ill.
Jeffrey Lillie	Ralph	Highly Sensitive, Integrable, Multimode, Interferometric Chem/BioSensor	Milliken and Company, Spartanburg, S.C.
Shantidev Mohanty	Akyildiz	Architecture and Cross-Layer Mobility Management Protocols for Next-Generation Wireless Systems	Senior researcher, Intel Corporation, Hillsboro, Ore.
Abubakr Muhammad	Egerstedt	Graphs, Simplicial Complexes, and Beyond: Topological Tools for Multi-Agent Coordination	Postdoctoral fellow, Department of Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, Pa.
Bhyrav Mutnury	Swaminathan	Macromodeling of Nonlinear Driver and Receiver Circuits	Advisory engineer, IBM, Austin, Tex.
Yunseo Park	Laskar	Direct Conversion RF Front-End Implementation for Ultra-Wideband and GSM/WCDMA Dual-Band Applications in Silicon-Based Technologies	Senior design engineer, Quellan, Inc., Atlanta, Ga.
Eric Pichon	Tannenbaum	Novel Methods for Multidimensional Image Segmentation	Research engineer, General Electric, Paris, France.
Hossein Pishro-Nik	Fekri	Applications of Random Graphs to Design and Analysis of LDPC Codes and Sensor Networks	Assistant professor, Department of Electrical and Computer Engineering, University of Massachusetts at Amherst.
Jerapong Rojanarowan	Owen	MPLS-Based Best-Effort Traffic Engineering	Assistant professor, Assumption University, Bangkok, Thailand
Ronald Setia	May	Modeling and Diagnosis of Excimer Laser Ablation	Back-end layer owner defect metrology engineer, Intel Corporation, Hillsboro, Ore.
Deric Waters	Barry	Signal Detection Strategies and Algorithms for Multiple-Input Multiple-Output Channels	Systems engineer, Texas Instruments, Dallas, Tex.

Michael Weber	Callen	Analysis of Zincblende-Phase GaN, Cubic-Phase SiC, and GaAs MESFETs Including a Full-Band Monte Carlo Simulator	Director of Engineering, XT Racing, Atlanta, Ga.
SPRING 2006			
Kulsoom Abdullah	Copeland	Scaling and Visualizing Network Data to Facilitate in Intrusion Detection Tasks	Not known.
Henrik Axelsson	Egerstedt	Optimal Control for Switched Autonomous Systems Theory, Algorithm, and Robotic Applications	Senior software engineer, KenCast, Inc., Stamford, Conn.
Amit Bavisi	Swaminathan	Integrated Multi-Mode Oscillators and Filters for Multi-Mode Radios on Liquid Crystalline Polymer-Based Packaging	Advisory engineer, IBM, Burlington, Vt.
Ning Chen	Zhou	Bandwidth Efficiency and Power Efficiency Issues for Wireless Transmissions	Design engineer, Freescale Semiconductor, Inc., Austin, Tex.
Jinwoo Choi	Swaminathan	Noise Suppression and Isolation in Mixed-Signal Systems Using Alternating Impedance Electromagnetic Bandgap Structure	Electrical analysis engineer, IBM Corporation, Austin, Tex.
Cherita Corbett	Copeland	Securing Access to Wireless Local Area Networks Using a Passive Approach to Device Identification	Technical staff member, Sandia National Laboratory, Livermore, Calif.
Cenk Demiroglu	Anderson	Multi-Sensor Segmentation-Based Noise Suppression for Intelligibility Improvement in MELP Coders	Technical lead, Customspeech USA, Inc., Crown Point, Ind.
Mongkol Ekpanyapong	Lim	Microarchitecture Aware Physical Planning for Deep Submicron Technology	Component design engineer, Intel Corporation, Folsom, Calif.
Mason Graff	Frazier	Micromachined Electrical Field-Flow Fractionation Systems with On-Column Electrical and Resonance Light Scattering Detection Modalities	Research faculty, Auto and Robotics Research Institute, University of Texas at Arlington
Julian Grizzard	Owen	Towards Self-Healing Systems: Re-establishing Trust in Compromised Systems	Senior professional staff, Johns Hopkins University Applied Physics Laboratory, Laurel, Md.
Rongqiang Hu	Anderson	Multi-Sensor Noise Suppression and Bandwidth Extension for Enhancement of Speech	Research engineer, Ditech Networks, Mountain View, Calif.
Ajay Joshi	Davis	Wave-Pipelined Multiplexed Routing for Gigascale Integration (GSI)	Postdoctoral fellow, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, Mass.
Sung-Eun Kim	Copeland	Efficient and QoS Guaranteed Data Transport in Heterogeneous Wireless Mobile Networks	Not known.
Qiang Le	McClellan	Resource Management for Wireless Networks of Bearings-only Sensors	Assistant professor, Electrical and Computer Engineering Program, School of Engineering and Technology, Hampton University, Newport News, Va.
William Leven	Lanterman	Approximate Cramer-Rao Bounds for Multiple Target Tracking	Texas Instruments, Dallas, Tex.
Alexandre Locquet	Citrin	Chaotic Optical Communications Using Delayed Feedback Systems	Postdoctoral fellow, Centre National de la Recherche Scientifique, Metz, France
Rohan Mandrekar	Swaminathan	Modeling and Co-Simulation of Signal Distribution and Power Delivery in Packaged Digital Systems	Advisory engineer, IBM, Austin, Tex.
Uzoma Onunkwo	Li	Timing Jitter in Ultra-Wideband Systems	Sandia National Laboratories, Albuquerque, N.M.
Soner Ozgur	Williams	Reduced Complexity Sequential Monte Carlo Algorithms for Blind Receivers	Signal processing engineer, Atheros Communications, Santa Clara, Calif.
Gi-Ho Park	Peterson	P-Refinement Techniques for Vector Finite Elements in Electromagnetics	Seeking employment.
Chirag Patel	Stüber	Wireless Channel Modeling, Simulation, and Estimation	Senior engineer, Qualcomm, Inc., San Diego, Calif.
Yogesh Sankarasubramaniam	McLaughlin	New Capacity-Approaching Codes for Run-Length-Limited Channels	Technical staff member, Agere Systems, Allentown, Pa.
Dane Thompson	Papapolymerou	Characterization and Design of Liquid Crystal Polymer Based Multilayer RF Components and Packages	Application engineer, Ansoft Corporation, Atlanta, Ga.
Martin Tobias	Lanterman	Probability Hypothesis Densities for Multitarget Multisensor Tracking with Application to Passive Radar	Technical staff member, MIT Lincoln Laboratory, Lexington, Mass.
Babak Vakili-Amini	Ayazi	A Mixed-Signal Low-Noise Sigma-Delta Interface IC for Integrated Sub-Micro-Gravity Capacitive SOI Accelerometers	Member of technical staff/IC designer, Atheros Communications, Inc., Irvine, Calif.
Amit Verma	Callen	Theoretical and Numerical Studies of Semiconducting Carbon Nanotubes	Assistant professor, Department of Electrical Engineering, Texas A&M University-Kingsville.
Dongxue Wang	Ferguson	Optoelectronic Device Simulation Optical Modeling for Semiconductor Optical Amplifiers and Solid State Lighting	Technical staff member, Motorola, Schaumburg, Ill.
Qing Zhao	Stüber	Advanced Synchronization Techniques for Continuous Phase Modulation	Senior design engineer, Marvell, Santa Clara, Calif.



outreach

K-12 ¥ Undergraduates ¥ Community

Established in 2005, the ECE Outreach Office promotes engineering education and career opportunities to K-12 students and teachers and provides hands-on learning experiences for college undergraduates. Led by Leyla Conrad, the Office hosted many visits, both independently and in coordination with other groups. Major activities included the Hands-On Tech–HOT Days @ GT Camp, the Summer Teacher Experience in Packaging, Utilizing Physics Program or STEP-UP, and the Summer Undergraduate Research in Engineering/Science Program, better known as SURE.

Faculty, staff, and students took part in ECE-sponsored and Georgia Tech-sponsored programs focused on K-12 outreach to promote awareness of engineering and science education and career options. Student organizations participated vigorously in this effort. WECE conducted its own, targeted outreach to elementary, middle, and high school students throughout metro Atlanta by visiting students on-site, particularly magnet programs. In addition, the group provided on campus lab tours to groups from Mount Zion High School, Druid Hills High School, and South Gwinnett High School, and demonstrations to middle school groups and Girl Scout troops. Additionally, WECE hosts prospective female graduate students when they visit campus.

ECE Organizes FIRST LEGO League Competition

Faculty, Students Honored by CETL

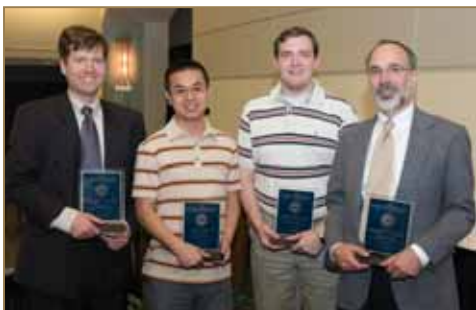
In 2002, ECE faculty and students first started the State of Georgia FIRST LEGO League pilot program for students aged 9 to 14, with just six teams participating. In this most recent competition, 70 teams—including over 500 elementary and middle school students—competed in five qualifier tournaments held prior to the final competition, narrowing the field to 42 teams that competed in January 2006.

Following the theme of “Ocean Odyssey,” student teams used the LEGO Mindstorms Robotics Invention System to build robots that took action to ensure the health, diversity, and productivity of the world’s oceans for present and future generations. This year, Robotik, a two-member team from Dunwoody, Ga., claimed first prize at the FIRST LEGO League Challenge. The competition was supported by the School of ECE/Student-Faculty Committee and grants from Shell, LSI Logic, and the Netherlands American Trust.

For their efforts, eight key FLL organizers received the Education Partnership Award at the Georgia Tech Faculty/Staff Honors Luncheon on April 12. The award, given by the Georgia

Tech Center for the Enhancement of Teaching and Learning, recognizes substantial and meaningful relationships between Tech faculty and students and the K-12 community. Thomas R. Collins and Jeffrey A. Davis were the faculty recipients honored for organizing the tournament and training volunteers and judges; Simon Chen, Eric Liu, Satya Bhan, Michael Rivera, and James Holland were the student members of the ECE Student-Faculty Committee honored for assisting with logistics, refereeing the tournament, and serving as research judges; and Jeff Rosen, of Wheeler High School, was the K-12 awardee honored for his support of Cobb County teams. |

(l-r) Jeffrey A. Davis, Simon Chen, James Holland, and Thomas R. Collins receive the Education Partnership Award at the Georgia Tech Faculty/Staff Honors Luncheon.



(l-r) Eric Fancher, age 11, and Jonathan Knope, age 12 accept their trophy from Thomas R. Collins, one of the faculty organizers of the event.





A 10-week long, NSF-sponsored program, **SURE** is designed to attract qualified minority undergraduates into engineering and science graduate studies. Students were paired with faculty and graduate student mentors on research projects in the College of Engineering, College of Sciences, and the Packaging Research Center. At the end of the program, the students prepare oral and written summaries of their research. To date, almost 90 percent of SURE participants continued to graduate school, with nearly 50 percent deciding to attend Tech.



STEP-UP is an eight-week, NSF-sponsored research program that taught nine physics teachers from Cobb, DeKalb, Fulton, and Gwinnett counties modern physics concepts, their applications to engineering, and their relevance to today's technology. STEP-UP also included research experience with Georgia Tech faculty members and graduate students.



During two separate weeklong sessions, **HOT Days@GT** introduced high school students to ECE concepts illustrated by activities like working with robots, using music synthesis technology, and building a speaker from common household parts. Thirty-eight students attended this camp, sponsored in part by the Motorola Foundation.



faculty

Faculty continue distinguished record of achievement



ECE faculty members are involved in 10 areas of research and education – bioengineering, computer engineering, digital signal processing, electric power, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, and telecommunications – and the School is either home to or a key player in 20 research centers and consortia.

One hundred fifteen faculty members were employed during 2005-06, with 80 percent holding tenure and all holding doctorates. The average age of the faculty was 47. Statistics detailing academic rank and diversity are provided.



New Faculty (pictured top to bottom)

Ayanna Howard is an associate professor in the systems and controls group. Before joining ECE, Dr. Howard was employed with NASA's Jet Propulsion Laboratory, where she was a senior robotics researcher and a deputy manager for the Strategic University Research Partnership Office. Her research focuses on humanized intelligence in robots, safe autonomous rover navigation for planetary surface exploration, and intelligent terrain assessment algorithms for landing on Mars.



Kevin T. Kornegay is the Motorola Foundation Professor and is a member of the electronic design and applications and the microsystems groups. He is involved with the Georgia Electronic Design Center, where his research interests are in mixed-signal IC design, RFIC design, millimeter-wave IC design, and broadband data communications systems. Prior to joining Georgia Tech, Dr. Kornegay was on the ECE faculty at Cornell University from 1998-2005.



Xiaoli Ma is an assistant professor in the Center for Signal and Image Processing, where she conducts research in signal processing for communications and networks, signal estimation algorithms, coding theory, wireless communication theory, and sensor and ad hoc networks. Before joining Georgia Tech, Dr. Ma was an ECE faculty member at Auburn University.

Patricio Vela is an assistant professor in systems and controls. Prior to his faculty appointment, Dr. Vela was a postdoctoral researcher specializing in computer vision in Tech's School of ECE. A specific goal of his work is to develop real time feedback strategies for autonomous aircraft using onboard cameras. His research also covers robotics, geometric estimation and control, and biologically inspired mechanics and computer vision.



ECE Adds Two Full-Time Faculty to GTL

Abdallah Ougazzaden and **Paul L. Voss** joined the ECE faculty during 2005-06 and are based full-time at Georgia Tech Lorraine, one of the Institute's European campuses.

A member of the optics and photonics and microsystems groups, Dr. Ougazzaden conducts research in epitaxial growth and design of device structures for telecommunications; fabrication of nanostructures; materials characterizations; epitaxial growth of nitride-based semiconductor materials by MOVPE growth; and semiconductor device physics. Prior to joining ECE in fall 2005, he was a professor at the University of Metz and deputy director of the Materials, Optics, Photonics, and Systems Laboratory, a joint lab of Supélec and CNRS in Metz, France. (see related story on page 24)



Dr. Voss is an assistant professor in the optics and photonics group and came to Georgia Tech in January 2006 after two years as a postdoctoral fellow at Northwestern University. His research involves the development of novel and improved devices and systems for optical communications and for quantum communications. In his short career, he has authored or co-authored more than 50 conference presentations and holds one patent in these areas |

the numbers

Rank

- 5 Regents Professors
- 60 Professors
- 32 Associate Professors
- 18 Assistant Professors
- 115 Total*

Tenured

- 5 Regents Professors
- 56 Professors
- 25 Associate Professors

Diversity

- 9 Female
- 4 African-American
- 21 Asian
- 2 Hispanic
- 1 Multi-racial

Faculty Distinctions

- 25 Funded chairs/ professorships
- 7 Georgia Research Alliance Eminent Scholars
- 5 National Academy of Engineering members
- 31 IEEE Fellows
- 4 Presidential Early Career Award in Science and Engineering recipients

* Includes GT Savannah faculty and all faculty members employed during FY 2006



faculty honors

6 faculty named Fellows, 4 receive CAREER awards

American Society for Engineering Education

ASEE named **Joseph L.A. Hughes** as a 2006 Fellow for his contributions to engineering education through program development, assessment, and accreditation activities. Since 1997, he has overseen ECE academic operations, including School accreditation and assessment, course planning and class/laboratory schedules, and faculty workload assignments.



Association for Computing Machinery

ACM named **Krishna V. Palem** a 2006 Fellow for his contributions to compiler optimization and embedded computing. He has led the development of a novel technology called Probabilistic CMOS that enables ultra low-energy, embedded computing.



Institute of Electrical and Electronics Engineers

IEEE elected four ECE professors to its 2006 Fellows class. Georgia Tech was one of only three universities to have four fellows elected in 2006.

Ye (Geoffrey) Li was elected for his contributions to signal processing for wireless communications. With research interests in statistical signal processing and wireless mobile systems, he has co-written two books, *Blind Equalization and Identification* and *OFDM for Wireless Communications*.



Gary S. May, Steve W. Chaddick School Chair of ECE, was elected for his contributions to semiconductor manufacturing and engineering education. He has written a textbook, *Fundamentals of Semiconductor Fabrication*, and was on the editorial board for *IEEE Transactions on Semiconductor Manufacturing*, spending four years as editor-in-chief.



Steven W. McLaughlin is the Ken Byers Professor in ECE and the deputy director for Georgia Tech Lorraine. He was elected for his contributions to information theory and applications to digital recording technology. Dr. McLaughlin is president of the IEEE Information Theory Society and has published more than 200 papers in journals and conferences and holds 24 U.S. patents.



Madhavan Swaminathan is the deputy director of the Microsystems Packaging Research Center and was elected for his contributions in design tools, design methodologies, and electromagnetic interference control for power delivery in digital and mixed-signal systems. He is the founder and chief scientist of Jacket Micro Devices, a company specializing in integrated devices and modules for wireless applications.



CAREER Award Recipients

Four ECE assistant professors received CAREER awards from U.S. governmental agencies during 2005-06. These award programs support the early career development activities of those teacher-scholars who are most likely to become the academic and research leaders of the 21st century.

Gregory D. Durgin received an NSF CAREER Award for his project, "Long-Range 5.8 GHz Backscatter RF Tag Systems." The goal of Dr. Durgin's work is to make RFID tags and RF sensors operate at higher frequencies and longer ranges. By building a RF tag testbed, his research group is inventing and testing methods for dramatically increasing range and reliability of these devices.



Hsien-Hsin Sean Lee was honored with a U.S. Department of Energy Early CAREER Award for his research, "Toward Highly Secure and Autonomic Computing Systems: A Hierarchical Approach." In this project, Dr. Lee investigates and addresses information security and reliability issues on emerging multi-core processor systems. His objectives are to build a secure computing system for digital rights protection and software confidentiality and to provide high availability network services with instruction-tolerance and self-healing capability.



Sung Kyu Lim received an NSF CAREER Award for his research entitled "Physical Design Automation for Fast and Reliable 3D Circuits." The 3D integrated circuit is an emergent technology that vertically stacks multiple die with a die-to-die interconnect. The goal of this project is to develop the first automatic physical layout tool for 3D ICs under performance, power, size, and reliability objectives.



Elliot Moore is the first faculty member at Georgia Tech Savannah to be granted an NSF CAREER Award. His project, "Extraction and Integration of Voice Source Features into the Acoustical Analysis of Spoken Affect," focuses on developing new techniques for extracting and integrating features of a voice source into assessing speaker affect/attitude. This research will help in analyzing speech for emotion and stress, detecting deception, improving human-computer interaction in dialogue applications, and clinical applications related to emotional and vocal disorders.



REGENTS' PROFESSORS**Mark G. Allen**

Joseph M. Pettit Professor in Microelectronics;
Co-Director, Center for MEMS and Microsystems
Technologies
Ph.D., Massachusetts Institute of Technology
Microsystems

Thomas K. Gaylord

Julius Brown Chair Professor
Ph.D., Rice University
Optics and photonics

Russell M. Mersereau

Joseph M. Pettit Professor
Sc.D., Massachusetts Institute of Technology
Digital signal processing

Ajeet Rohatgi

Georgia Power Distinguished Professor; Director
of the University Center of Excellence for
Photovoltaics Research and Education
Ph.D., Lehigh University
Electric power; microsystems

Glenn S. Smith

John Pippin Chair in Electromagnetics
Ph.D., Harvard University
*Electromagnetics; electronic design and
applications*
2006 ECE Distinguished Faculty
Achievement Award

PROFESSORS**Ian F. Akyildiz**

Byers Professor in Telecommunications
Ph.D., University of Erlangen
Telecommunications

Thomas P. Barnwell, III (Retired June 1, 2006)

Director, Arbutus Center for Distributed
Engineering Education; Arbutus Chair in
Distributed Engineering Education; and Georgia
Research Alliance (GRA) Eminent Scholar
Ph.D., Massachusetts Institute of Technology
Digital signal processing

Miroslav M. Begovic

Ph.D., Virginia Polytechnic Institute and State
University
Electric power

Douglas M. Blough

Co-Director, Center for Experimental Research
in Computer Systems
Ph.D., The Johns Hopkins University
Computer engineering

John A. Buck

Ph.D., University of California at Berkeley
Electromagnetics; optics and photonics
2006 Richard M. Bass/Eta Kappa Nu
Outstanding Teacher Award

Gee-Kung Chang

Byers Endowed Professor in Optical Networking
and GRA Eminent Scholar
Ph.D., University of California at Riverside
Optics and photonics; telecommunications

Abhijit Chatterjee

Ph.D., University of Illinois at Urbana-Champaign
Computer engineering

Mark A. Clements

Director, Interactive Media Technology Center
Sc.D., Massachusetts Institute of Technology
Bioengineering; digital signal processing

John A. Copeland

John H. Weitnauer, Jr. Technology Transfer Chair;
GRA Eminent Scholar; and Director,
Communications Systems Center
Ph.D., Georgia Institute of Technology
Telecommunications

John D. Cressler

Byers Professor
Ph.D., Columbia University
Electronic design and applications; microsystems

Stephen P. DeWeerth

Ph.D., California Institute of Technology
Bioengineering
Georgia Tech Class of 1934 Outstanding
Interdisciplinary Activities Award

Deepak Divan

Director, Intelligent Power Infrastructure
Consortium
Ph.D., University of Calgary
Electric power
2006 IEEE William E. Newell Power
Electronics Award "for leadership in the
development of soft-switching power
converters."

John F. Dorsey

Ph.D., Michigan State University
Systems and controls

Russell D. Dupuis

Steve W. Chaddick Endowed Chair in Electro-
Optics; GRA Eminent Scholar; and Director,
Center for Compound Semiconductors
Ph.D., University of Illinois at Urbana-Champaign
Microsystems; optics and photonics

Ian T. Ferguson

Ph.D., University of St. Andrews in Scotland
Microsystems; optics and photonics

Bonnie Heck Ferri

Associate Chair for ECE Graduate Affairs
(effective July 1, 2006)
Ph.D., Georgia Institute of Technology
Computer engineering; systems and controls
2005 Women of Distinction Faculty Award;
2006-07 Georgia Tech University
Leadership Program Fellow; 2006 ECE
Outreach Award

Elias N. Glytsis

Ph.D., Georgia Institute of Technology
Optics and photonics

Thomas G. Habetler

Ph.D., University of Wisconsin at Madison
Electric power

James O. Hamblen

Ph.D., Georgia Institute of Technology
Computer engineering
2006 Class of 1940 W. Roane Beard
Outstanding Teacher Award

Ronald G. Harley

Duke Power Company Distinguished Professor
Ph.D., London University
Electric power

Monson H. Hayes, III

Associate Chair for ECE Programs at Georgia Tech
Savannah
Sc.D., Massachusetts Institute of Technology
Digital signal processing

Joseph L.A. Hughes

Associate Chair for ECE Academic
Operations
Ph.D., Stanford University
*Computer engineering; microsystems;
telecommunications*
ASEE Fellow "for contributions to
engineering education through program
development, assessment, and
accreditation activities."

William D. Hunt

Ph.D., University of Illinois at Urbana-Champaign
Bioengineering; microsystems

Mary Ann Ingram

Ph.D., Georgia Institute of Technology
Telecommunications

Ramesh C. Jain

Rhesa "Ray" S. Farmer, Jr. Distinguished Chair in
Embedded Experiential Systems and GRA
Eminent Scholar
Ph.D., Indian Institute of Technology at
Kharagpur
Computer engineering; digital signal processing

Nikil S. Jayant

Executive Director, Georgia Centers for Advanced
Telecommunications Technology; Director,
Georgia Tech Broadband Institute; John Pippin
Chair in Wireless Systems; and GRA Eminent
Scholar
Ph.D., Indian Institute of Science, Bangalore
Computer engineering; telecommunications

Biing-Hwang (Fred) Juang

Motorola Foundation Chair Professor and GRA
Eminent Scholar
Ph.D., University of California at Santa Barbara
Digital signal processing; telecommunications

David C. Keezer

Ph.D., Carnegie-Mellon University
Computer engineering; microsystems

Bernard Kippelen

Associate Director, Center for Organic Photonics
and Electronics; Associate Director, Materials and
Devices for Information Technology Research
Center
Ph.D., Université Louis Pasteur
Microsystems; optics and photonics

Joy Laskar

Director, Georgia Electronic Design Center;
Joseph M. Pettit Professor in Electronics
Ph.D., University of Illinois at Urbana-Champaign
Electromagnetics; electronic design and applications; microsystems

W. Marshall Leach, Jr.

Ph.D., Georgia Institute of Technology
Electromagnetics; electronic design and applications; microsystems

Chin-Hui Lee

Ph.D., University of Washington
Digital signal processing

Vijay K. Madiseti

Ph.D., University of California at Berkeley
Computer engineering; digital signal processing
2006 ASEE Frederick Emmons Terman Award

Gary S. May

Steve W. Chaddick School Chair
Ph.D., University of California at Berkeley
Microsystems; systems and controls
IEEE Fellow "for contributions to semiconductor manufacturing and engineering education." 2006 NSBE Janice Lumpkin Educator of the Year Award.

James H. McClellan

Byers Professor in Digital Signal Processing;
Director, Center for Signal and Image Processing
Ph.D., Rice University
Computer engineering; digital signal processing

Steven W. McLaughlin

Byers Professor; Deputy Director, Georgia Tech Lorraine (effective January 15, 2006)
Ph.D., University of Michigan at Ann Arbor
Telecommunications
IEEE Fellow "for contributions to information theory and applications to digital recording technology."

James D. Meindl

Joseph M. Pettit Chair in Microelectronics;
Director, Microelectronics Research Center;
and Founding Director, Nanotechnology Research Center
Ph.D., Carnegie-Mellon University
Microsystems
2006 IEEE Medal of Honor – see story, page 3

A.P. Sakis Meliopoulos

Ph.D., Georgia Institute of Technology
Electric power; systems and controls
2005 IEEE Richard Harold Kaufmann Award
"for contributions to power system grounding design and testing procedures."

Henry L. Owen

Associate Director, Georgia Tech Information Security Center
Ph.D., Georgia Institute of Technology
Computer engineering; telecommunications

Krishna V. Palem

Director, Center for Research on Embedded Systems and Technology (through December 31, 2005)
Ph.D., University of Texas at Austin
Computer engineering
ACM Fellow "for his contributions to compiler optimization and embedded computing;" 2006 ECE Distinguished Mentor Award.

John B. Peatman

Ph.D., Case Western Reserve University
Computer engineering

Andrew F. Peterson

Associate Chair for ECE Faculty Development
Ph.D., University of Illinois at Urbana-Champaign
Electromagnetics

Hans B. Püttgen (Retired March 31, 2006)

Associate Chair for ECE External Affairs; President, Georgia Tech Lorraine; Director, National Electric Energy Testing Research and Applications Center; Georgia Power Distinguished Chair Professor
Ph.D., University of Florida
Electric power

William T. Rhodes (Retired August 1, 2005)

Ph.D., Stanford University
Optics and photonics

Waymond R. Scott, Jr.

Ph.D., Georgia Institute of Technology
Electromagnetics

Paul G. Steffes

Associate Chair for ECE Graduate Affairs (through June 30, 2006) and Associate Chair for ECE Research (effective July 1, 2006)
Ph.D., Stanford University
Electromagnetics; telecommunications

Gordon L. Stüber

Joseph M. Pettit Professor in Communications
Ph.D., University of Waterloo
Computer engineering; telecommunications
2005 IEEE Vehicular Technology Society Outstanding Service Award

Madhavan Swaminathan

Deputy Director, Microsystems Packaging Research Center
Ph.D., Syracuse University
Computer engineering; electromagnetics
IEEE Fellow "for contributions in design tools, design methodologies, and electromagnetic interference control for power delivery in digital and mixed signal systems."

Allen Tannenbaum

Julian Hightower Professor
Ph.D., Harvard University
Bioengineering; systems and controls

David G. Taylor

Ph.D., University of Illinois at Urbana-Champaign
Systems and controls

Rao R. Tummala

Director, Microsystems Packaging Research Center; Joseph M. Pettit Chair in Electronics Packaging; GRA Eminent Scholar
Ph.D., University of Illinois at Urbana-Champaign
Computer engineering; microsystems

George J. Vachtsevanos

Ph.D., The City University of New York
Bioengineering; systems and controls

Erik I. Verriest

Ph.D., Stanford University
Optics and photonics; systems and controls

Yorai Y. Wardi

Ph.D., University of California at Berkeley
Computer engineering; systems and controls; telecommunications

D. Scott Wills

Sc.D., Massachusetts Institute of Technology
Computer engineering

Sudhakar Yalamanchili

Co-Director, Center for Experimental Research in Computer Systems; Co-Director, Center for Research on Embedded Systems and Technology (effective January 1, 2006)
Ph.D., University of Texas at Austin
Computer engineering

G. Tong Zhou

Ph.D., University of Virginia
Bioengineering; digital signal processing

ASSOCIATE PROFESSORS**Ali Adibi**

Director, Advanced Processing-tools for Electromagnetic/Acoustic Xtals
Ph.D., California Institute of Technology
Optics and photonics

Yucel Altunbasak

Ph.D., University of Rochester
Digital signal processing

David V. Anderson

Ph.D., Georgia Institute of Technology
Computer engineering; digital signal processing

Farrokh Ayazi

Co-Director, Center for MEMS and Microsystems Technologies
Ph.D., University of Michigan at Ann Arbor
Electronic design and applications; microsystems

John R. Barry

Ph.D., University of California at Berkeley
Telecommunications

Oliver Brand

Co-Director, Center for MEMS and Microsystems Technologies
Ph.D., ETH-Zurich
Bioengineering; microsystems
2005 IEEE Donald G. Fink Prize Paper Award

LIST OF FACULTY

Robert J. Butera, Jr.
Ph.D., Rice University
Bioengineering; computer engineering

David S. Citrin
Ph.D., University of Illinois at Urbana-Champaign
Optics and photonics
Friedrich Wilhelm Bessel Research Award

Jeffrey A. Davis
Ph.D., Georgia Institute of Technology
Computer engineering
2006 Education Partnership Award

A. Bruno Frazier
Co-Director, Center for MEMS and Microsystems Technologies
Ph.D., Georgia Institute of Technology
Bioengineering; microsystems

Paul E. Hasler
Director, Georgia Tech Analog Consortium
Ph.D., California Institute of Technology
Computer engineering; electronic design and applications

Ayanna Howard
Ph.D., University of Southern California
Systems and controls
Women in Business Award (from the California State Assembly); 2006 Class of Young Global Leaders

Chuanji Ji
Ph.D., California Institute of Technology
Telecommunications

J. Stevenson Kenney
ON Semiconductor Junior Professor
Ph.D., Georgia Institute of Technology
Electronic design and applications; telecommunications

Arthur Koblasz
Ph.D., California Institute of Technology
Bioengineering

Kevin T. Kornegay
Motorola Foundation Professor
Ph.D., University of California at Berkeley
Electronic design and applications; microsystems

Ye (Geoffrey) Li
Ph.D., Auburn University
Telecommunications
IEEE Fellow "for contributions to signal processing for wireless communications."

Jennifer E. Michaels
Ph.D., Cornell University
Digital signal processing; systems and controls

Thomas E. Michaels
Ph.D., Washington State University
Systems and controls

Linda S. Milor
Ph.D., University of California at Berkeley
Electronic design and applications

Vincent J. Mooney, III
Co-Director, Center for Research on Embedded Systems and Technology
Ph.D., Stanford University
Computer engineering

Ioannis (John) Papapolymerou
Ph.D., University of Michigan
Electromagnetics; electronic design and applications

Stephen E. Ralph
Ph.D., Cornell University
Electromagnetics; microsystems; optics and photonics

David E. Schimmel
Ph.D., Cornell University
Computer engineering

Raghupathy Sivakumar
Ph.D., University of Illinois at Urbana-Champaign
Telecommunications

Emmanouil M. Tentzeris
Ph.D., University of Michigan at Ann Arbor
Electromagnetics
2006 IEEE MTT-S Outstanding Young Engineer of the Year Award

Douglas B. Williams
Associate Chair for ECE Undergraduate Affairs
Ph.D., Rice University
Digital signal processing

Linda M. Willis
Ph.D., Massachusetts Institute of Technology
Computer engineering

Anthony J. Yezzi, Jr.
Ph.D., University of Minnesota
Bioengineering; computer engineering; systems and controls

ASSISTANT PROFESSORS

W. Alan Doolittle
Ph.D., Georgia Institute of Technology
Microsystems
2006 Class of 1940 W. Howard Ector Outstanding Teacher Award

Gregory D. Durgin
Ph.D., Virginia Polytechnic Institute and State University
Electromagnetics
NSF CAREER Award

Magnus Egerstedt
Ph.D., Royal Institute of Technology, Stockholm, Sweden
Computer engineering; systems and controls

Faramarz Fekri
Ph.D., Georgia Institute of Technology
Digital signal processing; telecommunications
2006 ECE Outstanding Junior Faculty Member Award

Aaron D. Lanterman
Ph.D., Washington University in St. Louis
Digital signal processing
2006 Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award

Hsien-Hsin Sean Lee
Ph.D., University of Michigan at Ann Arbor
Computer engineering
U.S. Department of Energy CAREER Award; 2006 ECE Outstanding Junior Faculty Member Award

Sung Kyu Lim
Ph.D., University of California at Los Angeles
Computer engineering
NSF CAREER Award

Xiaoli Ma
Ph.D., University of Minnesota
Digital signal processing

George F. Riley
Ph.D., Georgia Institute of Technology
Computer engineering

Gabriel Rincón-Mora
Ph.D., Georgia Institute of Technology
Electric power; electronic design and applications
HENAAC Role Model of the Week, July 2005

Shyh-Chiang Shen
Ph.D., University of Illinois at Urbana-Champaign
Microsystems

Patricio Vela
Ph.D., California Institute of Technology
Systems and controls
2005 HENAAC Most Promising Engineer Award



GEORGIA TECH SAVANNAH FACULTY

ASSISTANT PROFESSORS

Randal T. Ablar
Ph.D., Georgia Institute of Technology
Computer engineering

Ghassan Al-Regib
Ph.D., Georgia Institute of Technology
Digital signal processing; telecommunications

Joel R. Jackson
Ph.D., Georgia Institute of Technology
Digital signal processing

Benjamin D.B. Klein
Ph.D., University of Illinois at Urbana-Champaign
Optics and photonics

Elliot Moore, III
Ph.D., Georgia Institute of Technology
Digital signal processing
NSF CAREER Award

ASSOCIATE PROFESSORS

Christopher F. Barnes
Ph.D., Brigham Young University
Digital signal processing

Ashraf Saad
Ph.D., Vanderbilt University
Computer engineering
2006 Georgia Tech Outstanding Undergraduate Research Mentor Award

P. Douglas Yoder
Ph.D., University of Illinois at Urbana-Champaign
Microsystems

PROFESSORS

Feodor Vainstein
Ph.D., Boston University
Computer engineering

Rahman Zaghoul
Ph.D., University of Nebraska at Lincoln
Computer engineering; optics and photonics



GEORGIA TECH LORRAINE FACULTY

ASSISTANT PROFESSOR

Paul L. Voss
Ph.D., Northwestern University
Optics and photonics

PROFESSOR

Abdallah Ougazzaden
Director, International Research Unit on Telecommunications and Innovative Materials Research
Ph.D., University of Paris VII
Microsystems; optics and photonics

JOINT FACULTY APPOINTMENTS

Gisele Bennett
Director, Electro-Optical Systems Laboratory
Georgia Tech Research Institute

James Foley
Professor and Stephen Fleming Chair in Telecommunications
College of Computing

Levent Degertekin
Associate Professor
George W. Woodruff School of Mechanical Engineering

Yogendra Joshi
Professor
George W. Woodruff School of Mechanical Engineering

PROFESSORS EMERITI/RETIRED FACULTY

Cecil O. Alford	1968-98
Phillip E. Allen	1984-2005
Thomas P. Barnwell, III	1971-2006 (Part-time employment with ECE)
Henry C. Bourne	1982-92
Aubrey Bush	1965-92 (Employed with the Georgia Centers for Advanced Telecommunications Technology)
W. Russell Callen, Jr.	1970-2005 (Part-time employment with ECE)
J. Alvin Connelly	1968-2001 (Part-time employment with ECE)
Robert K. Feeney	1970-2004 (Part-time employment with ECE)
Joseph L. Hammond	1955-84 (Employed with Clemson University)
David R. Hertling	1978-2004 (Part-time employment with ECE)
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 (Part-time employment with ECE)
Hans B. Püttgen	1981-2006 (Employed with the Swiss Federal Institute of Technology)
Dale C. Ray	1966-99
William T. Rhodes	1971-2005 (Employed with Florida Atlantic University)
George P. Rodrigue	1968-96



Mimi Philibos presents the 2006 WIE Leadership Award to William Sayle. Joyce Sayle is on the right.

William E. Sayle 1970-2003
(Part-time employment with ECE)
2006 ASEE ECE Distinguished Educator Award; 2006 Women in Engineering (WIE) Leadership Award

Ronald W. Schafer 1974-2004
(Employed with Hewlett-Packard)

Jay H. Schlag 1967-2004
(Part-time employment with ECE)

Kendall L. Su 1954-94

Roger P. Webb 1963-2004
(Part-time employment with the Georgia Tech Office of the Provost and Vice President for Academic Affairs)

Thirteen Faculty Promoted, Tenured as of July 1, 2005

Promotions to Professor

Miroslav M. Begovic
Mary Ann Ingram
David C. Keezer
G. Tong Zhou

Promotion to Associate Professor with Tenure

David V. Anderson
Farrokh Ayazi
Jeffrey A. Davis
John Papapolymerou
Raghupathy Sivakumar

Tenure

Ali Adibi
J. Stevenson Kenney
Bernard Kippelen
Ye Geoffrey Li



continuing education

Conferences, courses for engineering professionals

During 2005-06, both active and retired ECE faculty members offered and taught 31 professional education courses and conferences through the Georgia Tech Professional Education Office to a total number of 1,022 attendees. Below is a listing of dates, titles, and ECE-based instructors. All courses were taught at the Georgia Tech Atlanta campus unless indicated otherwise. Two ECE-sponsored conferences and three online courses are also included in this list.

2005

	Title	Instructors
September 7-October 24	<i>Fundamentals of Engineering</i>	W. Russell Callen, Jr.
September 12-December 17	<i>DSP for Practicing Engineers – Online Course</i>	Douglas B. Williams
September 20-22	<i>Power Distribution System Grounding and Transients</i>	A.P. Sakis Meliopoulos
September 26-30	<i>CMOS Analog Integrated Circuits</i>	Gabriel Rincón-Mora
September 26-30	<i>Near-Field Antenna Measurements and Microwave Holography</i>	Edward B. Joy (Boulder, Colo.)
October 3-6	<i>Fundamentals of Synthetic Aperture Radar Signal Processing</i>	Mark A. Richards
October 11-14	<i>Integrated Power Management Circuits: A Top-Down Design Approach</i>	Gabriel Rincón-Mora
October 18-21	<i>Power System Relaying: Theory and Application</i>	A.P. Sakis Meliopoulos
October 31-November 2	<i>Wireless Local Area Networks</i>	Benny Bing
November 7-11	<i>RF and Wireless Engineering</i>	Robert K. Feeney and David R. Hertling
November 7-11	<i>Ubiquitous Broadband Access Using Wi-MAX</i>	Benny Bing
November 14-17	<i>Fundamentals of Radar Signal Processing</i>	Mark A. Richards (Denver, Colo.)
November 15-18	<i>Fault Diagnosis and Prognosis for Engineering Systems</i>	George J. Vachtsevanos
November 16-18	<i>Modern Energy Management Systems</i>	A.P. Sakis Meliopoulos
December 5-9	<i>Far-Field, Anechoic Chamber, Compact, and Near-Field Antenna Measurements</i>	Edward B. Joy
December 6-9	<i>MEMS Boot Camp</i>	A. Bruno Frazier
December 12-14	<i>Emerging MEMS Fabrication Technologies</i>	A. Bruno Frazier

2006

January 21-March 4	<i>Electrical Engineering: Preparation for the P.E. Exam</i>	W. Russell Callen, Jr. and William E. Sayle
January 23-27	<i>Fundamentals of Radar Signal Processing</i>	Mark A. Richards
February 6-March 29	<i>Fundamentals of Engineering</i>	W. Russell Callen, Jr.
February 7-9	<i>Fundamentals of Enterprise Network Security</i>	John A. Copeland
February 20-July 14	<i>DSP for Practicing Engineers – Online Course</i>	Douglas B. Williams
March 15-July 31	<i>Fundamentals of Engineering – Online Course</i>	W. Russell Callen, Jr.
March 28-31	<i>Integrated Grounding System Design and Testing</i>	A.P. Sakis Meliopoulos
May 1-2	<i>Ninth Annual Fault and Disturbance Analysis Conference</i>	A.P. Sakis Meliopoulos
May 1-4	<i>MEMS Boot Camp</i>	A. Bruno Frazier
May 3-5	<i>60th Annual Protective Relaying Conference</i>	A.P. Sakis Meliopoulos
May 8-12	<i>Antenna Engineering</i>	Edward B. Joy, Waymond R. Scott, Jr., and Glenn S. Smith
May 15-18	<i>Fault Diagnosis and Prognosis for Engineering Systems</i>	George J. Vachtsevanos
May 16-18	<i>Grounding, Harmonics, and Electromagnetic Influence Design Practices</i>	A.P. Sakis Meliopoulos
June 26-29	<i>Fundamentals of Radar Signal Processing</i>	Mark A. Richards (Arlington, Va.)



research highlights

New developments with real world applications

Beating the Heat: New Technique Uses Microfluidic Channels Integrated onto Backs of Chips

A new technique for fabricating liquid cooling channels directly onto the backs of high-performance integrated circuits could allow denser packaging of chips while providing better temperature control and improved reliability. The wafer-level fabrication technique also includes micro polymer pipes that let electronic and cooling interconnections be made simultaneously using automated chip assembly processes.

The project involved ECE researchers Bing Dang, Muhannad Bakir, and James D. Meindl—at Tech’s Microelectronics Research Center—and was sponsored by the Microelectronics Advanced Research Corporation and the Defense Advanced Research Projects Agency.

The technology is expected to be used first in high-performance specialty processors that can justify the cost of the cooling system. The researchers have demonstrated cooling of test thermal chips with continuous liquid flow, but additional tests are still needed to confirm long-term reliability. Bing Dang and his coauthors received the Best Student Paper Award from the 2006 IEEE International Interconnect Technology Conference based on this work.



New System Delivers Simultaneous Super-Broadband Wired and Wireless Service



ECE researchers have developed a new hybrid system that could allow dual wired/wireless transmission of the same content such as high-definition television, data, and voice up to 100 times faster than current networks. The new architecture would reduce the cost of providing dramatically improved service to many public venues – and ultimately to homes and small offices.

Created by a team led by Gee-Kung Chang, this optical-wireless access network would connect to existing optical fiber networks that already serve much of the nation. But before entering a building, signals on the optical fiber would be optically up-converted in the central office from their normal infrared wavelengths to the millimeter-wave spectrum. Using a technique developed at Georgia Tech, wireless and baseband signals carried by multiple wavelengths would be

converted onto the millimeter-wave carrier simultaneously. This optical-wireless network could carry as many as 32 different channels, each providing 2.5 gigabit-per-second service.

New Technology Allows for More Versatile, Portable Spectrometers

Georgia Tech researchers developed a technology to help spectrometers analyze substances using fewer parts in a wider variety of environments, regardless of lighting. The technology can improve portability while reducing the size, complexity, and cost of many sensing and diagnostics systems that use spectrometers. For instance, the technology would make hand held devices possible for biomedical applications like carbon monoxide detection or on-the-spot blood analysis.

Led by ECE’s Ali Adibi, the team has a prototype for a lower-end spectrometer comparable to those currently on the market, but for a considerably lower cost. Their research will now focus on developing more complex systems by using specially designed volume holograms to improve the efficiency and sensitivity of the spectrometers. The project was funded by the National Institute on Alcohol Abuse and Alcoholism through the Integrated Alcohol Sensing and Data Analysis program. |





international research

Academic and industry collaborations on the global level

“ECE is a longtime leader in developing international programs at Georgia Tech. These initiatives not only benefit faculty collaborations, but most importantly, they provide unique learning opportunities for our students as they enter a high tech marketplace that is increasingly global in nature.”

Gary S. May
Steve W. Chaddick School
Chair, School of Electrical
and Computer Engineering

Georgia Tech Forms Research Unit with France’s CNRS

Georgia Tech and France’s Centre National de la Recherche Scientifique have created a joint international research unit (unité mixte internationale—UMI) to focus on telecommunications and innovative materials research.

Abdallah Ougazzaden, an ECE professor based at Georgia Tech Lorraine, directs the UMI. Two French engineering schools, ENSAM and SUPELEC, and two universities, Franche Comté University and Paul Verlaine University, are associate members.

The partnership between GTL and CNRS started in 1998 with a mixed research unit of CNRS focused on secure telecommunications networks through optical fibers. The new mixed international GT-CNRS unit is devoted to optics-based communication using the dynamics of chaos in optoelectronic components, quantum cryptography, and ultrafast optical communication.

UMI research will also focus on innovative materials related to optics, electronics, and mechanical engineering, with an emphasis on nanotechnology and intelligent materials. The research will target industrial applications for aeronautics, automotives, biomedical engineering, and energy.



Pirelli Signs R&D Agreement, Establishes Broadband Solutions Unit

Officials of Italian-based Pirelli and Georgia Tech signed a five-year strategic research and development partnership to develop new optical components and systems and new broadband access technologies for future high-speed telecommunications networks.

Pirelli has also consolidated all of its North American corporate staff activities in Atlanta, which are now housed at the Georgia Electronic Design Center, including the headquarters of Pirelli Broadband Solutions, a new company that engineers and markets the innovations conceived in Pirelli Labs. This alliance will help position Georgia to become a world-class center of research excellence in photonics and broadband technologies. Under the agreement, visiting researchers from both organizations will work in Georgia Tech laboratories and in the clean rooms of Pirelli Labs near Milan. |



Georgia Tech welcomed Pirelli officials to Technology Square September 22. Shown (l-r) are Joy Laskar, director of the Georgia Electronic Design Center; Kevin Riddett, president and chief executive officer of Pirelli North America Inc.; Jean-Lou Chameau, then provost of Georgia Tech; and Gary S. May, Steve W. Chaddick School Chair of ECE.



commercialization

Faculty members expand research into the marketplace

ATDC ECE Start-Up Companies

Asankya Networks

Co-Founder and CTO:
Raghupathy Sivakumar

GTronix

Co-Founder, CSO, and
Board Member: Paul E.
Hasler

Jacket Micro Devices

CSO: Madhavan
Swaminathan

ATDC ECE Graduate Companies

ASPI Digital (acquired by Polycom, 2001)

Co-Founders: Thomas P.
Barnwell, Russell M.
Mersereau, and Ronald W.
Schafer

CardioMEMS

Co-Founder and CTO:
Mark G. Allen

EGT

CSO: Nikil Jayant

Lancope

Founder: John A.
Copeland

Nexidia

Co-Founder and Board
Member: Mark A. Clements

Quellan

CTO, Founder, and Board
Member: Joy Laskar

RF Solutions (now the WiFi
Division for Anadigics)
Co-Founder and
Former CSO: Joy Laskar

ECE has a long and successful history of start-up company activity through the Advanced Technology Development Center, a nationally recognized science and technology incubator that helps Georgia entrepreneurs launch and build successful businesses. VentureLab, a one-stop center for technology commercialization, assists faculty in evaluating the commercial value of invention disclosures and in determining whether to license the technology to industry or to begin a start-up company.

An ATDC company is designated as "graduate" when it has reached over \$1 million of growing revenue, has become a value acquisition, has raised significant venture funding, or has received clearance to begin trials with the Food and Drug Administration. Seven companies (listed at the left) started by ECE faculty members have reached graduate status.

Focus on VentureLab Companies

ECE Clean-Tech Companies Show Promise for Future of Environmental, Sustainable Technologies

Volatile weather, summer smog alerts, soaring fuel prices, and rising greenhouse-gas levels have focused increased attention on cleaner, more sustainable technologies.

That concern can be seen among the start-up companies formed in Georgia Tech's VentureLab program, which is assisting more than a half-dozen early-stage companies that are pursuing clean-technology products and services. ECE faculty members lead two of these companies—LumoFlex and Ajeetco.

LumoFlex develops organic photovoltaic materials that could result in substantial power savings in a number of products. The company derives from research by ECE Professor Bernard Kippelen and Seth Marder, a professor in the School of Chemistry and Biochemistry.

Ajeetco is a solar energy company that uses high-efficiency polycrystalline silicon films to produce large-scale photovoltaic solar panels. It is based on research by Ajeet Rohatgi, who directs the University Center of Excellence for Photovoltaics Research and Education.



Innovolt to Market Surge Protection Device

Innovolt, a Georgia Tech Venture Lab company established in 2005, received a technology license from Georgia Tech Research Corporation and is beginning to test and market the next generation of surge protection technology for protecting electronic equipment. Deepak Divan is the chief technology officer and co-founder of the company.

The Innovolt device, called a current-inrush voltage surge suppressor, is designed to protect electronic equipment from both current and voltage surges. The CVSS combines current-inrush suppression with the traditional transient voltage surge suppression found in existing surge suppressors.

Innovolt released its commercial CVSS product into the market in June 2006. Company executives envision a line of equipment protection devices that will help protect anything containing electronics, from televisions and computers to industrial equipment.

VentureLab received financial support from the Georgia Research Alliance to assist in commercializing the current-inrush technology under license to Innovolt, and the company is now raising a first round of funding from venture capitalists. |





support activities

Academic, research, and administrative support

ECE academic professionals, researchers, and administrative staff support the School's mission to provide quality education, research, and service to our many constituents. Three vital programs include the ECE Outreach Office (details on pages 14 and 15, the Undergraduate Professional Communications Program, and the Graduate Professional Communications Program.

Communicating Academic, Professional Excellence

The missions of the Undergraduate Professional Communications Program and the Graduate Professional Communications Program are to provide ECE students with the instruction and resources required to master written, oral, visual, and communications tasks. These skills will be essential for students, as they become the next generation engineers who will address the world's complex and changing high tech challenges.

In UPCP, students develop their written, oral, and critical thinking skills through assignments that are integrated with five required ECE undergraduate courses. Led by Christina Bourgeois and Michael Laughter, the UPCP has proactively shaped engineering education by creating a state-of-the-art multimedia studio (see page 30 for more details).

Under the direction of Gail Palmer, the GPCP collaborates with the Digital Media Lab to provide instantaneous feedback on student presentations by using video capture facilities and real-time coaching through time-stamped annotation and markup. Ms. Palmer also provides guidance to students needing assistance during the Ph.D. proposal exam process.



(top) Gail Palmer assists graduate student Farhana Zamen with an assignment. (bottom) Christina Bourgeois (l) and Michael Laughter are shown in the new Coleman Family Professional Communications Studio, as students work on different projects.

Staff Stories

Employees Broaden Knowledge, Skills through Training Programs

Throughout FY 2005, five ECE staff members graduated from certification programs offered through the Georgia Tech Office of Organizational Development and through the Georgia Tech Office of Sponsored Programs. These courses of study are designed to enhance interpersonal and communications skills in the workplace and to increase knowledge of policies and procedures at the Institute.

Supervisory Development Certificate

C. Elaine Hicks

Management Development Certificate

Tina Clonts

Financial Management Certificate

Tina Clonts, Sheree Posey, Carla Zachery

Departmental Certification in Sponsored Programs

Leslie Schlag

ECE Staff Recognized with Mentor Tech Honors

Five present and past ECE staff members were recognized at the Mentor Tech 10th Anniversary Celebration on May 25, 2006.

Protégés

Bethany Davis, Christy Ellis, C. Elaine Hicks

Individual Participation Award

Lynda Buescher

Mentor and Individual Participation Award

LaJauna Guillory

Additionally, ECE received a Department Participation Award for having the third highest participation in the Mentor Tech program, which encourages employees to further their career development by matching them with other successful Georgia Tech employees who serve as their mentors.



external affairs

Alumni and friends help keep ECE growing

The ECE Development Office cultivates and coordinates the School's development and fundraising efforts with industry, alumni, and other interested individuals and organizations. This office also manages the School's Industrial Partnership Program, and it supports and coordinates all ECE consortia organized under the IPP umbrella. In addition, this office plans twice-yearly ECE Advisory Board meetings and the annual James R. Carreker Distinguished Lecture, and it also works in cooperation with the College of Engineering and the Institute's Central Development Office to produce events of interest to both alumni and current and prospective donors.

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. Led by C. Meade Sutterfield, the Board had 23 members in FY 06.

The School of ECE added one new advisory board member and one member departed during the last fiscal year. Holmes J. Hawkins, III (BEE '90), a partner in King & Spalding's Intellectual Property Practice Group, joined the Board in spring 2006. Specializing in patent litigation, Mr. Hawkins is listed in the 2005-06 edition of *The Best Lawyers in America* and in *Chambers USA: America's Leading Business Lawyers*. *Atlanta Magazine* has also recognized him as a "Georgia Super Lawyer". After five years of much appreciated service and guidance, Jim Maran stepped down from the Board in spring 2006. He has served as president and CEO for the Gwinnett County Chamber of Commerce since 2003, leading economic development initiatives for one of the fastest growing counties in Georgia and the U.S.

The 2005-06 advisory board members and their affiliations are listed below.

C. Dean Alford

Allied Utility Network
Conyers, Ga.

Antonio R. Alvarez

Cypress Semiconductor
(Retired)
San Jose, Calif.

Michael B. Bartlett

Texas Instruments, Inc.
(Retired)
Richardson, Tex.

Michael Buckler

Lucent Technologies
Cary, N.C.

Steve W. Chaddick

Vice Chair, ECE Advisory Board
Ridgewood Advisors, LLC
Atlanta, Ga.

Mel Coker

BellSouth
Telecommunications
Atlanta, Ga.

Michael A. Coleman

Orlando, Fla.

H. Allen Ecker

Scientific-Atlanta, Inc.
Lawrenceville, Ga.

Holmes J. Hawkins, III

King & Spalding
Atlanta, Ga.

Kelvin C. Hawkins, Sr.

IBM
Research Triangle Park, N.C.

Leonard Haynes

The Southern Company
Atlanta, Ga.

Sherra E. Kerns

Olin College
Needham, Mass.

Fred Kitson

Motorola
Schaumburg, Ill.

Scott Madigan

Tphone.us
Cumming, Ga.

Theresa Maldonado

Texas A&M University
College Station, Tex.

Jim Maran

Gwinnett County Chamber
of Commerce
Duluth, Ga.

Michael R. McQuade

DuPont Company
Wilmington, Del.

Joe Neel

Smith Barney
Birmingham, Ala.

E. Jock Ochiltree

St. Augustine, Fla.

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

Chair, ECE Advisory Board
SSPCS Corporation
Atlanta, Ga.

New Development Staff Join ECE

Marci B. Reed joined the ECE staff as director of development in April 2006. Ms. Reed came to Georgia Tech from Southface Energy Institute, where for almost six years she served as director of development and communications. At Southface, she was responsible for operational and program directed fundraising, as well as a recent capital campaign to expand the Southface campus in Midtown Atlanta. Ms. Reed replaced Suzy Briggs who is now the director of business and research development initiatives in the Georgia Tech Provost's Office.



Etta Pittman joined ECE's Development Office in July 2006 as the associate director of development, where she is responsible for the School's industrial relations and fundraising activities. Prior to joining ECE, Ms. Pittman assisted the director of corporate relations in the overall development and fundraising efforts of the Georgia Tech Office of Corporate Development. Ms. Pittman replaced Nancy Sandlin who was named director of development for the School of Industrial and Systems Engineering.





capital campaign

Positioning Georgia Tech for the future



Constantly striving to remain among the highest-ranking engineering institutions in the nation, as well as to attract and retain the brightest students and faculty, Georgia Tech is currently in the quiet phase of an ambitious capital campaign. Several ECE alumni are serving on the Institute Steering Committee: Rod Adkins (BEE '81); Warren Batts (BEE '61); Brook Byers (BEE '68); and Ken Byers, Jr. (BEE '68). While they help guide the strategy for the campaign for Georgia Tech toward the \$1 billion goal, ECE aims to raise at least \$60 million in the following categories:



STUDENT SUPPORT

■ Undergraduate Scholarships	\$1 – \$2.5M \$100,000-\$400,000 / per endowed
■ Graduate Fellowships	\$7.5 – \$10M \$500,000 / per endowed \$25,000 / year non-endowed
Topping grants	\$100,000 / per endowed \$5,000 / year non-endowed
Total	\$8.5 – \$12.5M



FACULTY SUPPORT

■ Endowed chairs 3-4 needed	\$4.5 – \$6M \$1.5M
■ Mid career faculty awards 5-7 needed	\$3.75 – \$7.5M \$750,000 / award
■ Junior faculty awards 2-3 needed	\$1 – \$1.5M \$500,000 / award
Total	\$9.25 – \$15M



OTHER NEEDS

■ Facilities/Equipment	\$20M
Nanotechnology Research Center Building	\$10M
Van Leer Building	\$7.5M
Equipment	\$2.5M
■ Programmatic needs	\$4 – \$8.5M
■ Current operations	\$18.25M
Total	\$42.25 – 46.75M



Total Campaign Goal \$60M

Please direct any inquiries regarding how you can support ECE and Georgia Tech to Marci Reed, director of development, at 404.894.0274 or marci.reed@ece.gatech.edu.





grants and gifts

Giving through the Georgia Tech Foundation

During FY 2006, corporations, non-profit organizations, and individual donors contributed \$9,711,170 to ECE through the Georgia Tech Foundation. 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.

Gift Category	Total
Endowment	\$146,894.90
Equipment	\$269,719.56
Faculty Support	\$2,379,326.63
Fellowships	\$486,906.00
General Support	\$49,845.82
Consortia Memberships	\$5,202,500.00
Program Support	\$586,029.82
Scholarships/Awards	\$532,973.80
Student Support	\$56,975.00
Grand Total	\$9,711,169.53

COMPANIES

3M Worldwide
 4U Services
 Altera Corporation
 Aluminum Company of America
 Ameren Corporation
 American Electric Power Company, Inc.
 Analog Devices, Inc.
 Applied Materials, Inc.
 Asahi Chemical Industry Company, Ltd.
 Asahi Glass Company, Ltd.
 AT&T Corporation
 Atotech Deutschland GMBH
 Baltimore Gas and Electric Company
 BARCO Display Systems
 BellSouth Corporation
 BellSouth Telecommunications, Inc.
 Bioquantix Corporation
 Boeing Company
 Brainlike Surveillance Research, Inc.
 Broadcom Corporation
 Cadence Design Systems, Inc.
 Centrum Technical Solutions
 ChevronTexaco Corporation
 Ciena Corporation
 Cingular Wireless
 Cirronet, Inc.
 Cisco Systems, Inc.
 Comcast Cable Corporation
 ComEd
 Consolidated Edison Company of New York, Inc.
 Cooper Power Systems
 Cox Communications, Inc.-Cable
 DoCoMo Communications Labs
 Duke Energy Company
 Eaton Corporation
 EG Technology, Inc.
 EMS Technologies, Inc.
 Entergy Corporation
 Exxon Mobil Corporation
 Florida Power and Light Company
 Ford Motor Company

Framatome ANP, Inc.
 Freescale Semiconductor, Inc.
 Georgia Power Company
 GRESCO
 Hewlett-Packard Company
 Homac Manufacturing Company
 IBM Corporation
 ICON Interventional Systems, Inc.
 Intel Corporation
 Jacket Micro Devices, Inc.
 Kimberly-Clark Corporation
 Li Creative Technologies, Inc.
 Lockheed Martin Corporation
 LSI Logic Corporation
 Matsushita Electric Industrial Company, Ltd.
 Michelin North America
 Microsoft Corporation
 Milliken and Company, Inc.
 National Rural Electric Cooperative Association
 National Semiconductor Corporation
 NEC Corporation
 NEC Laboratories America, Inc.
 NGK Spark Plug Company, Ltd.
 Nokia Americas
 Nortel Networks
 Northrop Grumman Corporation
 Nova-Borealis Compounds, LLC
 Oak-Mitsui
 Pacificorp
 Parr, Richey, Obremsky, & Morton
 Pawn World
 Pirelli S.P.A.
 Polaris Wireless, Inc.
 Prysmian Power Cables and Systems
 Public Service Electric and Gas Company
 Quellan, Inc.
 Rohm and Haas Company
 Samsung SDI Company, Ltd.
 SC Power Systems
 SCANA Services, Inc.
 Schlumberger
 Schlumberger Technologies

Semiconductor Research Corporation
 Sharp Labs of America
 Siemens Corporation
 Siemens Information and Communications Mobile, LLC
 Sony Corporation
 South Carolina Electric and Gas Company
 Southern California Edison Company
 Southern Company
 Southern States, Inc.
 Southwire Company
 STMicroelectronics
 Sun Microsystems, Inc.
 Taiwan Semiconductor Manufacturing Company, Ltd.
 Tellabs
 Texas Instruments, Inc.
 Thomas and Betts Corporation
 Trace Photonics, Inc.
 Tyco Electronics Corporation
 Union Carbide Corporation
 Veeco Compound Semiconductor
 Vestel Elektronik Sanayi Ve Ticaret A.S.
 Wabash Valley Power Corporation

PROFESSIONAL, RESEARCH, AND ACADEMIC ORGANIZATIONS

Emory University
 Information Storage Industry Consortium
 SRC Education Alliance
 University of Pennsylvania
 Wheeler High School

FOUNDATIONS/NON-PROFIT ORGANIZATIONS

Caterpillar Foundation
 Community Foundation for Greater Atlanta
 Community Foundation Silicon Valley
 Eaton Charitable Fund
 Gwinnett Chamber of Commerce

John and Mary Franklin Foundation, Inc.
 GE Foundation
 Harris Foundation
 Holland + Knight Charitable Foundation, Inc.
 Intel Foundation
 Motorola Foundation
 National Instruments Foundation
 Netherlands-America Community Trust
 Otto and Jenny Krauss Charitable Foundation Trust
 Procter and Gamble Fund
 Purdue Research Foundation
 Square D Foundation
 Texas Instruments Foundation
 Vanguard Charitable Endowment

INDIVIDUALS

Amal A. Alyamani
 Phillip E. Allen
 Antonio R. Alvarez
 Michael B. Bartlett
 Harry L. Beck
 Teresa Beck
 Stanley Belyeu
 Benjamin J. Blalock
 Barbara Evelyn Boyd-Vann
 Kevin Brennan (posthumous)
 Suzy Briggs
 Michael J. Buckler
 Lynda D. Buescher
 Robert J. Butera
 Steve W. Chaddick
 Mary Melinda Coker
 Harriett C. Coleman
 Michael A. Coleman
 Thomas R. Collins
 J. Alvin Connelly
 Mary Nelle Connelly
 Sharon K. Crouch

continued on page 32



gift spotlights

Alumni and corporate gifts support students and research

ECE Industrial Partnership Program

Among some of the corporate donors represented on page 29 are members of ECE's Industrial Partnership Program. A multi-level support structure, IPP is designed to create an environment conducive to enhanced and accelerated technology and knowledge transfer between academia and industry. Relationships developed through the IPP also facilitate increased student recruiting opportunities and stronger research collaborations with our faculty.

The program allows industry to participate at various membership levels. Membership provides flexible and tailored access to students, research, faculty, publications, seminars, workshops, and conferences. To learn the latest about membership options, visit the Alumni and External Relations section of the ECE web site and click on Industrial Partnership Program. |

Coleman Family Provides Support for Professional Communication Studio

In August 2006, the Coleman Family Professional Communication Studio opened its doors to serve all ECE undergraduates in their written, oral, graphical, digital, and electronic communication tasks associated with their studies. Located on the fourth floor of the Van Leer Building, the studio is led by Christina Bourgeois, founder and coordinator of the ECE Undergraduate Professional Communications Program.

The new Coleman Family Professional Communication Studio is made possible by a generous gift from Michael Coleman (BSEE '82), his wife, Jennifer, and his mother, Harriett Coleman. Michael's late father, Jeff Coleman, was also a Georgia Tech graduate (BSEE '56). While on campus for Family Weekend in 2004, Michael and his mother, Harriett, heard about the proposal for the Professional Communication Studio and enthusiastically supported the plans. Since that time, the family's financial generosity has made the long-held goal of creating this state-of-the-art facility a reality.



(l-r) Michael Coleman, Jennifer Coleman, Harriett Coleman, and Victoria Coleman, age 13.

Outfitted with the latest technologies, the Coleman Family Professional Communication Studio has wireless Internet throughout the entire space; a presentation rehearsal studio employing video capture technology for students to record, replay, and critique individual and group presentations; and computer clusters equipped with standard XP operating systems and all relevant ECE software. As the hub where undergraduate communication instruction and ECE meet, the Coleman Family Professional Communication Studio will be key to training the next generation of engineering professionals. |

Harris Corporation Donates \$250,000 for Nanotechnology Research Center

Georgia Tech is attracting international attention as it sets new standards in nanotechnology research and education, and Harris Corporation has taken a leadership role by committing to a building naming opportunity for the Nanotechnology Research Center. In FY 06, Harris continued its generous, longstanding support of the Institute and ECE by designating \$250,000 for the Nanotechnology Research Center to be housed in the Marcus Nanotechnology Building. In recognition of the company's \$250,000 gift, Georgia Tech will name a laboratory in the facility after Harris.

The Center is the first of its kind in the southeastern United States, and the research that will be conducted in the Center has the potential to touch nearly every aspect of everyday life. Nanotechnology research could produce materials 10 times stronger than steel but much lighter in weight, digital storage units the size of sugar cubes that can hold all the information in the Library of Congress, and tiny medical devices that can detect individual cancer cells and target them with specialized treatments. With one of the nation's largest clean room facilities, the Center will be available to scientists throughout the University System of Georgia and in the private sector who are welcome to join ECE and Georgia Tech in creating innovations that will promote a better quality of life for humankind. |





development activities

Events celebrate achievements of alumni, corporate friends

Seven ECE Alumni Honored at College of Engineering Alumni Awards

The College of Engineering held its annual alumni awards induction ceremony in November 2005 at the Grand-Hyatt Atlanta. Seven ECE alumni were inducted into the CoE Academy of Distinguished Engineering Alumni and the CoE Council of Outstanding Young Engineering Alumni.

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. Four were ECE alumni.

Christopher J. Bowick

B.E.E. '77

Senior Vice President-Engineering and CTO
Cox Communications, Inc.

William N. Cantrell

B.E.E. '74

President
Peoples Gas System

Raouf Halim

M.S.E.E. '85

CEO
Mindspeed Technologies

J. Philip Mobley

B.E.E. '75, M.S.E.E. '77

Senior Vice President, R&D
Alfred Mann Foundation

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 eight inductees, three were ECE alumni.

John Ball

M.S.E.E. '92

Founder & CEO
Netonomy

R. Thomas Dyal

B.E.E. '88

General Partner
Redpoint Ventures

Leslie Rosas Sibert

B.E.E. '85

Vice President, Transmission
Georgia Power Company

James R. Carreker Distinguished Lecture

Stan Williams: Electronics Can Operate Perfectly Despite Manufacturing Defects

R. Stanley Williams, HP Senior Fellow and director of the Quantum Science Research (QSR) Group at Hewlett-Packard Laboratories, spoke to a standing room only crowd at the James R. Carreker Distinguished Lecture on November 15, 2005.

Dr. Williams spoke on "Defect Tolerant Nanoelectronics," where he focused on the tremendous business incentive to invent new, nanoscale electronic devices and circuits and the new fabrication techniques that are needed to inexpensively produce and connect these devices in vast quantities. To address these two challenges, Dr. Williams and the QSR Group have incorporated defect tolerance—the capability to operate perfectly even in the presence of manufacturing mistakes in the circuit—into the design of the system, since it is prohibitively expensive to fabricate a perfect network of billions of nanoscale components.

Dr. Williams was a co-organizer and co-editor of the workshop and book, *Vision for Nanotechnology in the 21st Century*, which led to the establishment of the U.S. National Nanotechnology Initiative. He was also named to the inaugural *Scientific American* 50 Top Technology leaders in 2002, and the molecular electronics program that he leads was named the Technology of the Year for 2002 by *Industry Week* magazine. |



(l-r) Gary S. May, R. Stanley Williams, and James R. Carreker socialize at a reception prior to the lecture. Mr. Carreker (BEE '69) supports this annual event and also serves on the Advisory Board to Georgia Tech President G. Wayne Clough.



glossary of acronyms

Meanings of abbreviations found throughout this 2005-06 annual report

Georgia Tech/ECE

APEX – Advanced Processing-Tools for Electromagnetic/Acoustic Xtals
 ATDC – Advanced Technology Development Center
 CETL – Center for the Enhancement of Teaching and Learning
 CNRS – Centre National de la Recherche Scientifique
 CoC – College of Computing
 CoE – College of Engineering
 DML – Digital Media Lab
 ECE – Electrical and Computer Engineering
 GEDC – Georgia Electronic Design Center
 GPCP – Graduate Professional Communications Program
 GTL – Georgia Tech Lorraine
 GTRI – Georgia Tech Research Institute
 GTS – Georgia Tech Savannah
 NRCB – Nanotechnology Research Center Building
 STEP-UP – Summer Teacher Experience in Packaging, Utilizing Physics Program
 SURE – Summer Undergraduate Research in Engineering/Science Program
 UMI – Unité Mixte Internationale/International Research Unit
 UPCP – Undergraduate Professional Communications Program
 UROC – Undergraduate Research Opportunities in Computing
 WECE – Women in Electrical and Computer Engineering

Companies and Organizations

ACM – Association for Computing Machinery
 ASEE – American Society for Engineering Education
 FIRST – For Inspiration and Recognition of Science and Technology
 FLL – FIRST LEGO League
 GRA – Georgia Research Alliance
 HKN – Eta Kappa Nu
 IEEE – Institute of Electrical and Electronics Engineers
 MTT-S – Microwave Theory and Techniques Society (a technical interest society of IEEE)
 NSBE – National Society of Black Engineers
 TI – Texas Instruments

Governmental Agencies and Universities

FDA – Food and Drug Administration
 MIT – Massachusetts Institute of Technology
 NASA – National Aeronautics and Space Administration
 NSF – National Science Foundation
 ONR – Office of Naval Research
 SJTU – Shanghai Jiaotong University

Technical or General Abbreviations

3D – Three-Dimensional
 BiCMOS – Bipolar Complementary Metal Oxide Semiconductor
 CEO – Chief Executive Officer
 CMOS – Complementary Metal Oxide Semiconductor
 CSO – Chief Science Officer
 CTO – Chief Technical Officer
 CUTE 1.7 – Cubical TiTech Engineering Station, Version 1.7
 CVSS – Current-Inrush Voltage Surge Suppressor
 DSP – Digital Signal Processing
 EKF – Extended Kalman Filter
 GaN – Gallium Nitride
 GHz – Gigahertz
 GSM – Global System for Mobile Communications
 HF – High Frequency
 I/O – Input/Output
 IC – Integrated Circuit
 LC – Low Cost
 LDPC – Low-Density Parity Check
 MELP – Mixed-Excitation Linear Predictive
 MESFET – Metal-Semiconductor Field Effect Transistor
 MIMO – Multiple Input Multiple Output
 MEMS – Microelectromechanical Systems
 MOVPE – Metal Organic Phase Epitaxy
 MPLS – Multi Protocol Label Switching
 OFDM – Orthogonal Frequency Division Multiplex
 PCMOS – Probabilistic Complementary Metal Oxide Semiconductor
 PFTK – Jitendra Padhye, Victor Firoiu, Don Towsley, Jim Kurose
 (the last names of the designers of the PFTK equation)
 Q – Quality
 QoS – Quality of Service
 RF – Radio Frequency
 RFIC – Radio Frequency Integrated Circuit
 RFID – Radio Frequency Identification
 SiC – Silicon Carbon
 SiGe – Silicon Germanium
 SOI – Silicon-on-Insulator
 TCP – Transmission Control Protocol
 UHF – Ultra Highband Frequency
 V – Volt
 VHF – Very Highband Frequency
 VLSI – Very Large Scale Integration
 WCDMA – Wideband Code Division Multiple Access

GIFTS: INDIVIDUALS...from page 29

Robert G. Dawson	Betty Lee	John B. Minatra	Harris Todd Schneiderman
Howard G. Dean	Thomas R. Lee	William E. Moultrie	Paul Sheehy
R. Thomas Dyal	Judith Lorier	Richard O. Neel	Elizabeth A. Slaymaker
Thomas A. Edwards	Kenneth E. MacKenzie	E. Jock Ochiltree	Ronald S. Slaymaker
Janice L. Gaylord	Scott N. Madigan	Demetrius T. Paris (posthumous)	Stefan V. Stein
Thomas K. Gaylord	Lynn C. Maddox	Elsie E. Paris	James A. Stratigos
Robert M. Gemmell	Theresa A. Maldonado	John B. Peatman	C. Meade Sutterfield
Kelvin C. Hawkins	James Maran	Claude A. Petty	Michael Tuley
David V. Kerns	Edward P. Martin	Hans B. Püttgen	Therese P. Tuley
Frederick L. Kitson	Joseph E. Mayes	Thomas J. Quigley	Kristin Turgeon
Alan F. Krauss	Norma J. McLees	Nancy J. Sandlin	Harry L. Vann
Frederick G. Krauss	Michael R. McQuade	Joyce C. Sayle	Patricia T. Webb
Kathleen A. Kreus	Benjamin R. McRee	William E. Sayle	Roger P. Webb



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2005-06 Annual Report

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- 404.894.4697 Associate Chair for ECE Faculty Development, Andrew F. Peterson
- 404.894.3145 Associate Chair for ECE Graduate Affairs, Bonnie Heck Ferri
- 404.894.4740 Associate Chair for ECE Undergraduate Affairs, Douglas B. Williams
- 404.894.3128 Associate Chair for ECE Research, Paul G. Steffes
- 404.894.9485 Associate Chair for ECE Facilities, Jay Schlag
- 404.894.2946 Undergraduate Affairs
- 404.894.2983 Graduate Affairs
- 404.894.4733 Business Operations
- 404.894.4769 Accounting
- 404.894.7574 Human Resources
- 404.894.0274 Director of Development
- 404.894.6888 Associate Director of Development
- 404.894.2906 Communications

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Tech**  **College of
Engineering**
School of Electrical and
Computer Engineering
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