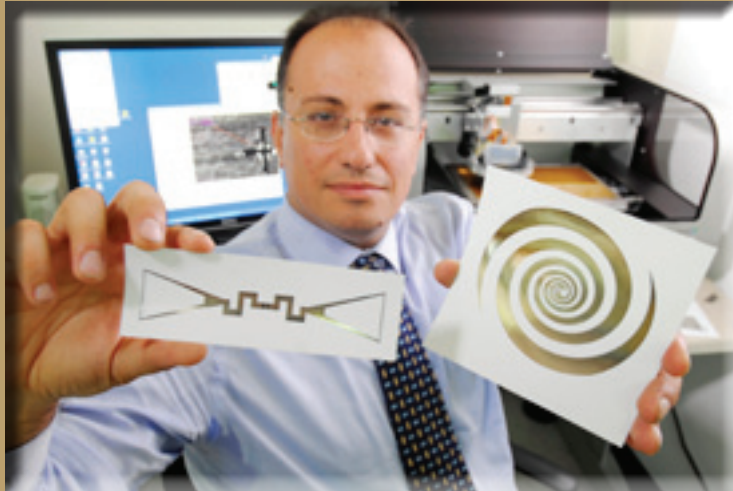


2011-2012 annual report



The School of Electrical and Computer Engineering at the Georgia Institute of Technology is located in the heart of Atlanta, one of the most diverse high-tech markets in the United States. As the largest producer of electrical engineers and computer engineers in the nation, ECE leads the Institute in many different aspects of research, education, and commercialization, including key areas of focus such as energy, microsystems and nanotechnology, bioengineering, and information technology.

The statistics at the right detail the size and scope of the School's operations and represent the Atlanta campus, Georgia Tech-Savannah, Georgia Tech-Lorraine, the Georgia Tech Shanghai Initiative, and the dual degree programs with Politecnico di Torino in Italy, the Technical University of Munich in Germany, and the Korean Advanced Institute of Science and Technology.

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I am very pleased to share with you the many and diverse accomplishments of the ECE faculty, staff, and students during 2011-12. Throughout this report, you will see how our people demonstrate an unwavering commitment to excellence in efforts that are rooted in traditional strengths and that are pushing into new and exciting territories.

Our faculty brought an extraordinary amount of national and international acclaim to Georgia Tech. Four professional organizations elected nine faculty members to the rank of Fellow, with Ali Adibi being elected Fellow of two of these societies. Our junior faculty won honors such as the Office of Naval Research Young Investigator Award and the DARPA Young Faculty Award. Five individuals were tapped for top IEEE society leadership roles.

Our students were recognized with much-deserved accolades. Mitch Costley was chosen to attend the 2012 Lindau Meeting of Nobel Laureates, and Sean McGee was the recipient of the Tau Beta Pi Cup, the highest honor given to a College of Engineering student at Georgia Tech. Nine of our students received prestigious fellowships from professional societies and governmental agencies, and for the seventh year in a row, Eta Kappa Nu won a national Outstanding Chapter Award.

We granted 723 degrees and had over 2,400 students enrolled in our academic programs, all of which remain in the top 10 of their respective rankings in *U.S. News & World Report*. Two teams with ECE undergraduate students—DEFT Pad and Stylii—were finalists in the 2012 InVenture Prize Competition, with Stylii taking second place in the event. The Opportunity Research Scholars Program celebrated its 10th year of matching ECE undergraduates

interested in conducting research with Ph.D. mentors and faculty advisors.

Faculty acquired over \$51.6 million in research awards during FY 12, and two startup companies with ECE roots—Asankya and Axion Biosystems—“graduated” from the Advanced Technology Development Center. With ECE in the lead, Georgia Tech is expanding its commercialization ambitions overseas to Georgia Tech-Lorraine with the creation of the Lafayette Institute, a state-of-the-art facility that will develop optoelectronics technologies and applications.

I began my service as interim chair on July 1, 2011 and turned over the leadership reins to Steve McLaughlin on September 1. It has been an honor to serve in this role during the last year, and I am excited to work with Steve and our entire community to make Georgia Tech the best technological university in the world. (see related article on page 2).



Doug Williams
Professor and Senior Associate Chair

Faculty/Staff

- 115 Number of faculty (tenure-track)
- 6 Joint appointments
- 28 Professors Emeriti
- 31 Funded professorships
- 8 Georgia Research Alliance Eminent Scholars
- 5 National Academy of Engineering members
- 43 IEEE Fellows
- 6 Presidential Early Career Award in Science and Engineering recipients
- 9 Academic professionals
- 66 Research faculty
- 81 Administrative staff

Students

- 1,310 Undergraduate Students** (Fall Semester 2011)
 - 881 Electrical engineering
 - 429 Computer engineering
- 1,157 Graduate Students** (Fall Semester 2011)
 - 590 Doctoral*
 - 4 Special
 - 563 Master's*
- 723 Degrees Awarded** (Summer 2011-Spring 2012)
 - 65 B.S.Cmp.E.
 - 203 B.S.E.E.
 - 347 M.S./M.S.E.C.E.
 - 108 Ph.D.

* Totals include enrollments in interdisciplinary degree programs in bioengineering and robotics.

Intellectual Products

- 28 Patents
- 3 Advanced Technology Development Center (ATDC) start-up companies
- 9 ATDC graduate companies

Research Summary

\$51,648,254 Total funds received from external grants, contracts, and gifts—\$49,331,361 in sponsored research alone—this total represents: 25% of College of Engineering awards, 17% of Resident Instruction awards, 15% of all Georgia Tech awards (excluding GTRI), 8% of all Georgia Tech Research awards (including GTRI)



ECE Earns High Marks in Annual Rankings

For the first time ever, in the *U.S. News & World Report* 2013 graduate program rankings, our electrical engineering graduate program moved up to fifth place and our computer engineering graduate program held steady at sixth place. The College of Engineering ranked fourth for the eighth consecutive year. This year marked the first time that all Georgia Tech graduate engineering programs ranked in the top 10.

In the *USNWR 2012 Best Colleges* issue, which includes undergraduate engineering program rankings, our electrical engineering program moved up to fourth. Computer engineering also remained strong at sixth place. The College of Engineering ranked fifth, and Georgia Tech retained its seventh place standing among public universities.

ECE FY12 State Budget and Expenditures

State* (Initial FY 12 allocation of \$19,207,800)		Sponsored*	
Salaries & Fringe	\$24,849,888.34	Salaries & Fringe	\$19,088,215.46
Travel	251,509.87	Travel	1,771,494.49
Materials & Supplies	2,263,644.32	Materials & Supplies	14,656,466.19
Equipment	1,661,253.30	Equipment	1,431,545.29
Sub-Total	\$29,026,295.83	Other (GTF Direct)	226,563.44
		Indirect (O/H)	11,102,887.41
		Georgia Tech-Savannah	877,755.88
		Georgia Electronic Design Center	1,014,164.68
		Microelectronics Research Center/ Nanotechnology Research Center	1,670,682.24
		Sub-Total	\$51,839,775.08
		Total	\$81,261,605.27

*Includes tuition



Education

B.S.E.E., Northwestern University, 1985
 M.S.E., Princeton University, 1986
 Ph.D., University of Michigan, 1992

Academic Career

Georgia Institute of Technology
 School of Electrical and Computer Engineering
 Steve W. Chaddick School Chair, 2012–present
 Ken Byers Professor, 2004–2012
 Associate Professor, 1999–2004
 Assistant Professor, 1996–1998
 Office of the Provost, Vice Provost for International Initiatives, 2007–2012
 Georgia Tech Global, President, 2009–2012
 Georgia Tech-Lorraine, Deputy Director and Director of Research, 2004–2007
 Whisper Communications, LLC, Co-Founder and Chairman, 2009–present
 Calimetrics, Inc., Principal Scientist, 1999–2005
 Rochester Institute of Technology, Department of Electrical Engineering
 Assistant Professor, 1992–1994; Associate Professor 1994–1996

On September 1, 2012, I began my tenure as the Steve W. Chaddick School Chair of the School of Electrical and Computer Engineering at Georgia Tech. It is a huge honor to have been chosen for this position, and the opportunity to work with so many exceptional people to make our School even more prominent is thrilling. In ECE, I firmly believe that we are at the right place at the right time in terms of education, research, and economic development impact in Georgia, the nation, and around the globe.

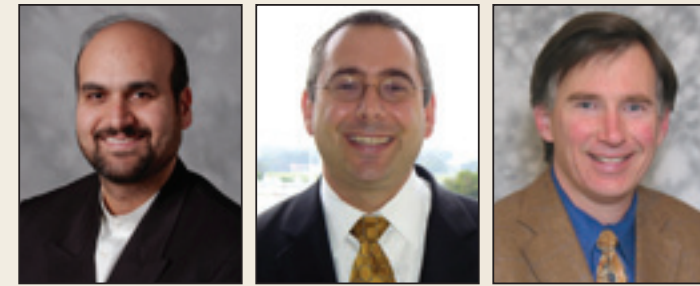
In my previous position as the vice provost for international initiatives at Georgia Tech, it was clear to me that ECE sets the Georgia Tech “Gold Standard” in terms of reputation, people, students, and balance. Our sense of collegiality is well known and respected across campus and at other institutions around the globe, which is a wonderful tribute to our longstanding tradition of fair and steady leadership. By many measures, we have the biggest presence on campus, which makes it possible for us to accomplish many things. My vision for ECE is to “think bigger”—and to leverage our size to lead and excel in many areas.

In the future, I plan to focus on how undergraduate students learn, how faculty members teach, how to provide the best possible experiences for our students, and how to attract more students from underrepresented groups to ECE. For our graduate program, we must continue to recruit the very best Ph.D. students from both inside and outside the U.S. and be ready to take advantage of the growing emphasis on professional master’s programs.

We have a key role to play in creating solutions to engineering grand challenges that will involve a constant balance of defining, leading, and chasing trends, while maintaining our traditional core strengths. Our long history of startup company development is also critical to the success of our faculty and students and for our economic development role in Georgia. Finally, service to our discipline and professional communities is very important to our success and visibility. Not only is it the right thing to do, but it also contributes greatly to others wanting to know what Georgia Tech and ECE think about the key technical challenges of today and tomorrow.

ECE is regarded as a leader in many different arenas in Georgia and the United States, and throughout the world. By “thinking bigger”—and with our faculty, staff, students, alumni, and friends working together, I believe that we, as the best academic unit on campus and best ECE school anywhere, can move the needle and have a tremendous impact on the world.

Steven W. McLaughlin
 Professor and Steve W. Chaddick School Chair



Three ECE Faculty Members Elected as AAAS Fellows

Ali Adibi, “for distinguished contributions to the fields of integrated nanophotonics, photonic crystals, and volume holography.”

Robert J. Butera, Jr., “for advances in computational neuroscience and neurotechnology, promoting engineering through society, editorial, and university leadership, and contributing to STEM policy and educational initiatives.”

Paul G. Steffes, “for contributions to the understanding of planetary atmospheres through innovative microwave measurements.”

Adibi Named OSA Fellow

Effective January 1, 2012, **Ali Adibi** was named as an OSA Fellow “for numerous contributions to the field of integrated nanophotonics, lab-on-chip sensing, and volume holography.”

OSA was founded more than 90 years ago as the Optical Society of America and has evolved into a global enterprise. The honor of OSA Fellow is reserved for no more than 10 percent of the total membership.



Akyildiz Tapped for Top Turkish Accolade

Ian F. Akyildiz (*right*) received the top academic award in the Republic of Turkey, the 2011 TUBITAK Exclusive Award, for outstanding scholarship and research contributions by an internationally recognized scholar of Turkish origin. Honored specifically for his significant and pioneering work in telecommunications spanning 27 years, Dr. Akyildiz was presented with this award by Turkey’s president Abdullah Gül (*left*) on December 5, 2011 at Cankaya Palace in Ankara.



ECE FACULTY HOLD KEY IEEE LEADERSHIP ROLES

During 2011–12, five ECE faculty members took on top leadership roles within their IEEE professional societies:

■ **Miroslav M. Begovic**
 Elected president of the IEEE Power and Energy Society.

■ **Thomas M. Conte**
 First vice president of the IEEE Computer Society.

■ **John D. Cressler**
 Editor-in-chief of *IEEE Transactions on Electron Devices*.

■ **Joseph L.A. Hughes**
 Appointed to the IEEE Educational Activities Board.

■ **John Papapolymerou**
 Appointed to the IEEE TAB Periodicals Review and Advisory Committee and as editor-in-chief of *IEEE Microwave and Wireless Components Letters*.

FIVE ECE FACULTY MEMBERS ELEVATED TO IEEE FELLOWS

■ **Magnus Egerstedt**,
 “hybrid and networked control, with applications in robotics.”

■ **Mark A. Richards**,
 “radar signal processing education.”

■ **Erik I. Verriest**,
 “delay systems and modeling time varying and nonlinear systems.”

■ **G. Tong Zhou**,
 “analysis of nonlinear signals and systems.”

■ **Yucel Altunbasak**,
 “super-resolution imaging, color filter array interpolation, and error-resilient video communications.”
 (*not pictured*)





Ferri, Zhang Win Teaching Excellence Awards

Bonnie Ferri and Ying Zhang were honored with campus-wide teaching excellence awards in spring 2012.

Dr. Ferri received a 2012 Faculty Award for Excellence in Teaching at the Women in Engineering Excellence Awards Banquet, held on March 29 at the Georgia Tech Hotel and Conference Center. This annual event is hosted by College of Engineering. A member of the ECE faculty since 1988, Dr. Ferri also serves as the School's associate chair for graduate affairs.

Dr. Zhang received the Lockheed Dean's Excellence in Teaching Award. The purpose of this award is to recognize outstanding educators from among the untenured junior faculty at the assistant professor level from the Schools of Aerospace Engineering, Electrical and Computer Engineering, and Mechanical Engineering, as well as the College of Computing. Dr. Zhang has been a member of the ECE faculty since 2006.



TUBITAK is the leading research management and funding agency in Turkey and is closely equivalent to the National Science Foundation in the U.S. It is also comprised of many R&D institutes focused on engineering, sciences, and industrial management.

Muhannad Bakir Chosen for DARPA Award, NAE Symposium

Muhannad Bakir was chosen for a DARPA Young Faculty Award and as a participant in the National Academy of Engineering's 18th annual U.S. Frontiers of Engineering Symposium.



The objective of the DARPA YFA program is to identify and engage rising research stars in junior faculty positions at U.S. academic institutions and expose them to Department of Defense needs, as well as DARPA's program development process. Dr. Bakir was among 51 awardees chosen from a pool of 560 applicants.

The award will fund his project, "Radical Silicon Interconnection Platform for Ultimate Performance Electronics." The goal of the research is to design and experimentally demonstrate a novel system-level interconnect platform to enable ultimate performance computing systems. The research will explore radical 3D interconnect components and monolithic thermal management technologies for the integration of logic,

memory, and silicon nanophotonics. The proposed research will establish a new paradigm for how computing systems are designed and interconnected, leading to increased system throughput while consuming lower energy and volume.

Dr. Bakir was among 78 engineers aged 30 to 45 selected to participate in the NAE's 18th annual U.S. Frontiers of Engineering Symposium. This symposium was held September 13-15 at the General Motors Technical Center in Warren, Mich. and will examine serious games, vehicle electrification, climate engineering, and engineering materials for the bioengineering interface.

Mukhopadhyay Named as ONR Young Investigator

Saibal Mukhopadhyay was named as one of 26 professors from across the U.S.—and the sole winner from Georgia Tech—to receive a 2012 Office of Naval Research Young Investigator Award. Dr. Mukhopadhyay's research project is entitled "OROEB: On-Line Real-Time Optimal Energy Balancing for Self-Powered Environment Adaptive Sensor Node."

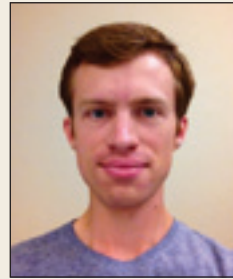
The objective of this work is to design a self-powered, environment-adaptive sensor node that maintains a target Quality-of-Service in a time-varying environment. A wireless image sensor node will be designed that incorporates a



CMOS imager, a digital signal processing unit, and a RF transceiver and is powered using energy harvested from the environment. The self-powered sensor node and reliable energy-efficient image transmission principles created in this work will allow deployment of image sensors and communication networks to cyber-physical systems in various military and civilian applications.

Costley Chosen for Lindau Meeting of Nobel Laureates

Mitch Costley was selected to attend the Lindau Meeting of Nobel Laureates, which took place July 1-6 in Lindau, Germany. He is a Ph.D. student advised by Santiago Grijalva.



Since 1951, Nobel Laureates in chemistry, physics, and physiology/medicine convene annually to have open, informal meetings with Ph.D. students and young researchers. The Laureates lecture on specific topics and then participate in less formal, small group discussions with the students and researchers. The U.S. delegation attending this meeting consisted of U.S. doctoral students whose research is funded by NSF, the U.S. Department of Energy, or Mars, Inc. or who attend an Oak Ridge Associated Universities institution.

McGee Wins Tau Beta Pi Cup

Sean Austen McGee was awarded the 2011 Tau Beta Pi Cup at the Georgia Tech Student Honors Day on April 19. This honor is the most prestigious award given to an undergraduate engineering student at Georgia Tech for academic excellence, leadership, service to the field and the Institute, and potential for continuing growth.

Over the years, Mr. McGee held several leadership roles in Eta Kappa Nu, and he also co-founded Georgia Tech StartUp, a business leadership mentoring program. He studied abroad at Oxford University and conducted bioengineering research at



both Georgia Tech and Stanford University. In addition, he worked on robotics projects as a graduate research assistant in GTRI.

Mr. McGee graduated with his master's degree during spring semester 2012 via the B.S./M.S. program and earned his bachelor's degree in summer 2011. He now attends Harvard Business School in its prestigious 2+2 program.

NSF Graduate Research Fellowships

Four ECE students were among 37 Georgia Tech students to receive NSF Graduate Research Fellowships in 2012. They are LaVonda Brown and Sergio Garcia for their work in electrical and electronic engineering, David Inouye for his work in data mining and information retrieval, and Micah Jenkins for his work in optical engineering.

WECE Wins "Up with the White and Gold" Award

Women in Electrical and Computer Engineering received a 5-Star Organization Award at the Up with the White and Gold Ceremony held on April 23 at the Student Center Ballroom.

WECE won this award for their high level of activity and engagement with the School of Electrical and Computer Engineering and Georgia Tech. Established in 2004 by five women students, WECE has created a community within the School where women—from undergraduates to Ph.D. students—can seek friendship, support, and advice regarding their academic, professional, and personal development. (see related article, page 18).



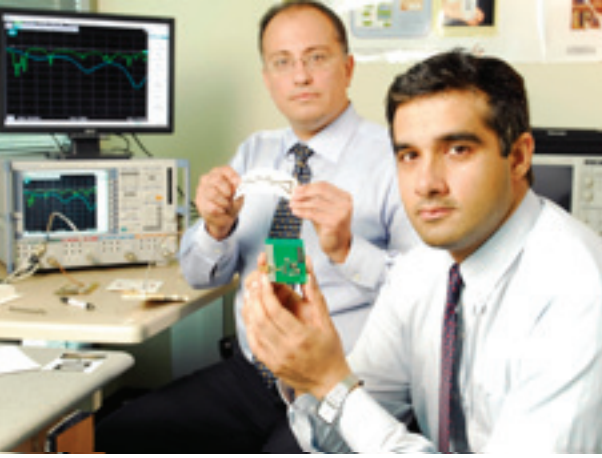
WECE President Prabha Viswanathan accepted the Up with the White and Gold award.

Eta Kappa Nu Wins Outstanding Chapter Award for the Seventh Year in a Row

For the seventh year in a row, the Beta Mu Chapter of Eta Kappa Nu was named a recipient of the Outstanding Chapter Award. A mark of great distinction, this award recognizes a chapter's service to their fellow students, school, university, and the surrounding community during 2010-11. The award was formally presented at the Electrical and Computer Engineering Department Heads Association Annual Meeting in March 2011 at the University of Texas at Austin.

HKN is one of the largest honor societies in the country, with 173 active university chapters, a variety of committees, many active member volunteers, and thousands of student members. Only five other chapters have received the Outstanding Chapter Award seven years in a row.





Captured Ambient Electromagnetic Energy Drives Small Electronic Devices

Researchers have discovered a way to capture and harness energy transmitted by such sources as radio and television transmitters, cell phone networks, and satellite communications systems. By scavenging this ambient energy from the air around us, the technique could provide a new way to power networks of wireless sensors, microprocessors, and communications chips.

Emmanouil M. Tentzeris (*back*) and his team are using inkjet printers to combine sensors, antennas, and energy-scavenging capabilities on paper or flexible polymers. The resulting self-powered wireless sensors could be used for chemical, biological, heat, and stress sensing for defense and industry; RF identification tagging for manufacturing and shipping;



and monitoring tasks in fields such as communications and power usage.

Scientists' Work Will Help NASA Interpret Atmospheric Data from the Juno Mission

In August 2016, when NASA's Juno Mission begins sending back information about the atmosphere of the planet Jupiter, research done by Paul G. Steffes (*left*) and his research team using a 2,400-pound pressure vessel will help scientists understand what the data means. The Juno probe was launched August 5, 2011 from Cape Canaveral Air Force Station in Florida.

Because Jupiter has been largely unchanged since its formation at the birth of our solar system, scientists hope Juno will resolve unanswered questions not only about the massive planet, but also about how our solar system evolved. Among

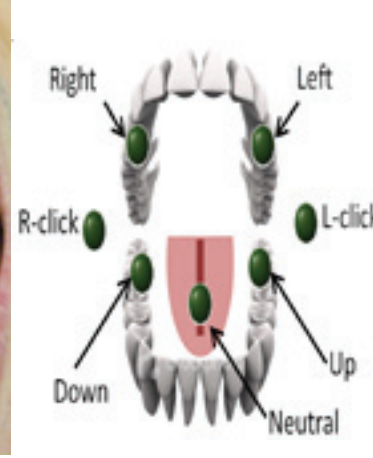


the key questions which will be answered using microwave radiometry are how much water exists there, and how that water evolved from the hydrogen-rich early solar system.

Tongue Drive System Goes Inside the Mouth to Improve Performance and User Comfort

The Tongue Drive System is getting less conspicuous and more capable. Tongue Drive is a wireless device that enables people with high-level spinal cord injuries to operate a computer and maneuver an electrically powered wheelchair simply by moving their tongues.

Developed by Maysam Ghovanloo and his research team, the newest prototype of the system allows users to wear an inconspicuous dental retainer embedded with sensors to control the system. The

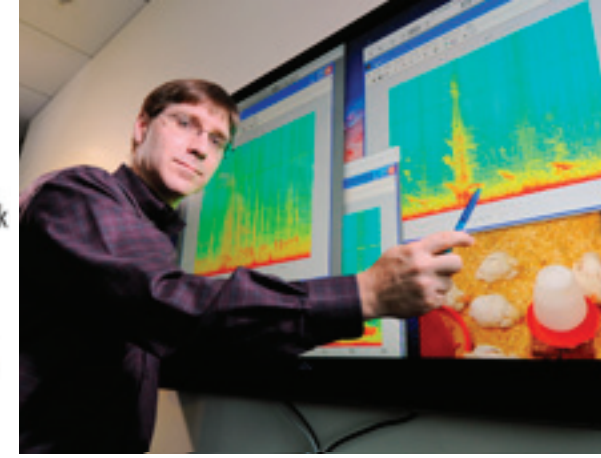


sensors track the location of a tiny magnet attached to the tongues of users. In earlier versions of the Tongue Drive System, the sensors that track the movement of the magnet on the tongue were mounted on a headset worn by the user.

Bird Vocalization Research Could Improve Poultry Production, Lower Costs

Chickens can't speak, but they can definitely make themselves heard. Most people who have visited a poultry farm will recall chicken vocalization—the technical term for clucking and squawking—as a memorable part of the experience.

Researchers now believe that such avian expressiveness may be more than idle chatter. A collaborative project conducted by Georgia Tech and the University of Georgia is investigating whether the birds' volubility can provide clues to how healthy



and comfortable they are. David V. Anderson is involved with the audio signal processing technology portion of this activity.

Economically, chickens rule the roost in Georgia, where poultry is the top agricultural product with an estimated annual impact of nearly \$20 billion statewide. The industry is concerned about the welfare of the animals they raise; anything that helps growers reap a maximum return on every flock—while maintaining an environment conducive to their well-being—can translate to important dividends for the state's economy.

Stable Electrodes Could Pave Way for Lower Cost, More Flexible Devices

Researchers in the Center for Organic Photonics and Electronics have introduced a universal technique to reduce the work function of a conductor. This technique has led to

the development of the first-ever, completely plastic solar cell.

The team, led by Bernard Kippelen (*left*), spread a very thin layer of a polymer, approximately one to 10 nanometers thick, on the conductor's surface to create a strong surface dipole. The interaction turns air-stable conductors into efficient, low-work function electrodes.

The commercially available polymers can be easily processed from dilute solutions in solvents such as water and methoxyethanol. Inexpensive and environmentally friendly, they are compatible with existent roll-to-roll mass production techniques. Replacing the reactive metals with stable conductors, including conducting polymers, completely changes the requirements of how electronics are manufactured and protected, paving the way to lower cost and more flexible devices.



Stylii team members – Christopher Vollo (left), an electrical engineering major; Matthew Stoddard, an industrial design major.



DEFT Pad team members – David Burke, computer engineering; Bradley Keller, electrical engineering; Sarosh Ali Shahbuddin, electrical engineering; Michael Barrington Stone, electrical engineering; Jarred Vallbracht, electrical engineering.



ECE Teams Advance to 2012 InVenture Prize Finals

Two teams with students from ECE—Stylii and DEFT Pad—were among the six finalists in the 2012 InVenture Prize Competition, with Stylii eventually taking home the second place prize of a free U.S. patent filing by Georgia Tech; automatic acceptance into Flashpoint, a Georgia Tech startup accelerator; and a \$10,000 cash prize. The event took place March 13 at the Ferst Center for the Arts on the Georgia Tech campus and was televised live on Georgia Public Broadcasting.

Stylii: An extraordinarily precise and pressure-sensitive capacitive stylus, Stylii can be used for any touch screen device (like an iPad or an Android tablet) and would allow a user to treat that touch screen like using a ball point pen on a piece of paper. The team is made up of **Matthew Stoddard**, an industrial design major from Clarksville, Tenn., and **Christopher Vollo**, an electrical engineering major from Alpharetta, Ga.

DEFT Pad: Short for Digital Effects Touch Pad, this device is mounted on a guitar and is a touch screen version of foot pedals that guitarists use to manipulate sound effects on a guitar. One or multiple effects can be used on the DEFT pad. The team is made up of **David Burke**, a computer engineering major from Canton, Ga., and electrical engineering majors **Bradley Keller** of Gainesville, Ga.; **Sarosh Ali Shahbuddin** of Rock Hill, S.C.; **Michael Barrington Stone** of Augusta, Ga.; and **Jarred Vallbracht** of Covington, Ga.

ECE Graduate Students Win Honors at Georgia Tech Research and Innovation Conference

Our ECE graduate students earned awards at the 2012 Georgia Tech Research and Innovation Conference, held at the Georgia Tech Student Center on February 7. Over 400 graduate students were involved with research presentations at this event. This display of excellence in a diverse range of applications showcases the high quality of the breadth and depth of work in ECE.

Luis Carlos Cobo Rus won a GTRIC 2012 Fellowship Award, for his research poster, "Automatic State Abstraction from Demonstration." His Ph.D. advisors are Charles L. Isbell and Aaron D. Lanterman.

The following ECE Ph.D. students won GTRIC 2012 Travel Awards for their outstanding posters:

Gareth Guvanasen - "The Development of a Stretchable Micro-Needle Electrode Array for Intramuscular Recording." His advisors are Stephen P. DeWeerth and T. Richard Nichols.

Lane Thames - "SAPC: A High-Speed Low-Power Multidimensional Packet Classification System for Next Generation Internet Protocol Networks." His advisor is Randal Abler.

Ping-Chang Shih - "Computer Vision for Ocean Sciences: 4-D Variational Stereo Reconstruction of Ocean Waves." His advisors are Anthony Yezzi and Francesco Fedele.

Commercialization is deeply ingrained in the ECE community. Our faculty and students have developed numerous startup companies with the help of the Advanced Technology Development Center, a nationally recognized science and technology incubator that helps Georgia entrepreneurs launch and build successful businesses.

Nine ATDC "graduate companies" have originated out of ECE, while three are currently members of the incubator. Most of these companies are headquartered in Georgia, thus contributing to the state's economic growth in areas like bioengineering, energy, and digital media. In addition, ECE has 17 start-up opportunities in various stages of development that are being evaluated by VentureLab, a service of ATDC.



Whisper Communications Provides Stronger Security for Wireless Financial Transactions

The quality of signals transmitted from devices such as smart phones can degrade dramatically with distance. Whisper Communications is taking advantage of that basic law of physics to provide more secure wireless communication, including protection for financial transactions that use the "digital wallet" technology now under development.

Based on patent-pending technology co-developed by Steven W. McLaughlin (*above left*) and alumni of his research group Demijan Klinc and Cenk Argon, this VentureLab company has developed an encoding methodology that makes data signals transmitted beyond its "cone of silence" useless to any eavesdroppers. Whisper is working with First Data, a major payment processing provider, to demonstrate this layer of security using two of the newest Android phones.

Digital wallet technology will enable consumers to use their smart phones and other devices to make financial transactions, replacing traditional plastic credit cards. But without strong security, transferring data from the phones to merchant terminals could expose it to theft from "sniffer" devices that can capture wireless information.

Whisper's software would be installed on mobile devices carrying the digital wallet technology. It would automatically encode the users' credit card information, which would then be decoded by similar software on the merchant side of the transaction. Because of the company's proprietary coding, the information would only be readable within two or three feet of the merchant terminal—and hopelessly garbled beyond that distance.

Lafayette Institute Established at Georgia Tech-Lorraine

Key officials from the Lorraine region of France met at Georgia Tech-Lorraine in April 2012 to sign a Statute of Incorporation, which legally established the Lafayette Institute, a €28 million (approximately \$37 million) facility that will facilitate the commercialization of innovations in optoelectronics. Bernard Kippelen was named as the new Institute's president, with Yves Berthelot and Abdallah Ougazzaden named as its vice presidents.

The Lafayette Institute will be housed in a newly constructed 20,000-square-foot building on the GT-L campus, which will include a 5,000-square-foot clean room, fully equipped with state-of-the-art semiconductor growth capabilities. Georgia Tech is to provide support via the Enterprise Innovation Institute and from the Nanotechnology Research Center.

The Lafayette Institute will focus on the development of compound and organic semiconductors for technologies at the intersection of materials, optics, photonics, electronics, and nanotechnology. These new technologies will have applications in the energy sector, new display technologies, and sensors and medical technology.



Asankya, Axion Biosystems among Class of 2012 ATDC Graduates

Asankya and Axion Biosystems were among eight member companies to graduate from ATDC on May 14 at the Center's 2012 Startup Showcase, one of Atlanta's premier industry events, at the Georgia Tech Hotel and Conference Center.

Asankya was partially acquired by EMC in August 2011. Prior to the acquisition, Asankya was the premier application delivery partner for network-intensive Internet applications. The company's patented technology powers the RAPIDnet Application Delivery Network, which is used by leading providers of Storage-as-a-S, online file servers, virtual desktops, private enterprise applications, and by agencies of the U.S. federal government.

dinCloud, a cloud services provider, also selected Asankya to help their business. By using Asankya's RAPID solution, the company has been able to significantly increase the throughput of file transfers and deliver a superior cloud storage environment. Asankya's ability to accelerate encrypted traffic—another critical feature—allows dinCloud to maintain their application security without complex layers of connectivity.

Axion Biosystems developed the first multi-well microelectrode array system, known as the Maestro MEA, for use in safety assessment and drug screening. The company's MEA systems can replicate a brain-wave or a heartbeat in a dish. As a result, toxicity and efficacy can be assessed earlier in the drug development process, and with greater sensitivity and accuracy. These comprehensive system-level evaluations also provide an in vitro solution to reducing animal testing.

In 2011, Axion entered into a Cooperative Research and Development Agreement with the U.S. Environmental Protection Agency, and in 2012, they presented their findings to date at the Society for Toxicology Conference held in San Francisco. Using Axion's MEA, the EPA tested 30 chemicals and confirmed high specificity and sensitivity for detecting neuroactivity in test compounds. Another highlight of the year was Axion's receipt of the 2012 Tibbetts Award, an honor given by the U.S. Small Business Administration that recognizes small businesses and individuals that exemplify models of excellence through participation in SBA's Small Business Innovation Research program.

ATDC ECE Graduate Companies

Asankya* | Co-Founder and CTO: Raghupathy Sivakumar

ASPI Digital (acquired by Polycom, 2001) | Co-Founders: Thomas P. Barnwell, Russell M. Mersereau, and Ronald W. Schafer

Axion Biosystems* | Board of Directors: Mark G. Allen

CardioMEMS | Co-Founder and CTO: Mark G. Allen

EGT | CSO: Nikil Jayant

Innovolt* | Chair, CTO, and Co-Founder: Deepak Divan

Lancop | Founder: John A. Copeland

Nexidia | Co-Founder and Board Member: Mark A. Clements

Suniva* | Founder and CTO: Ajeet Rohatgi

ATDC ECE Start-Up Companies

GTronix* | Co-Founder, CSO, and Board Member: Jennifer O. Hasler

Qualtré* | Co-Founder and CTO: Farrokh Ayazi

VQLink* | Co-Founder and Interim CEO: Nikil Jayant

* Companies are also graduates of VentureLab, an initiative of ATDC.

2011-2012 ECE Professional Education

During 2011–12, both active and retired ECE faculty members offered 26 professional education courses and four conferences through the Georgia Tech Professional Education Office. These courses and conferences help professionals and their organizations keep pace with the latest developments in their fields and stay globally competitive. The following list includes details on course and conference titles that were offered during FY 12. For more information, visit www.gtpe.gatech.edu/short-programs.

- Antenna Engineering** | Edward B. Joy
- Electrical Engineering: Preparation for the PE Exam, Power Option** | W. Russell Callen, Jr.
- Far-Field, Anechoic Chamber, Compact and Near-Field Antenna Measurement Techniques** | Edward B. Joy
- Fundamentals of Engineering** | W. Russell Callen, Jr.
- Fundamentals of Radar Signal Processing** | Mark A. Richards
- Fundamentals of Synthetic Aperture Radar Signal Processing with MATLAB** | Mark A. Richards
- Grounding, EMI, and Power Quality** | A.P. Sakis Meliopoulos
- Image Processing Using TI DM6437** | Ghassan Al-Regib
- Integrated Grounding System Design and Testing** | A.P. Sakis Meliopoulos
- Modern Energy Management Systems** | A.P. Sakis Meliopoulos
- Near-Field Antenna Measurement Techniques** | Edward B. Joy
- Power Distribution System Grounding and Transients** | A.P. Sakis Meliopoulos
- Power Systems Relaying: Theory and Application** | A.P. Sakis Meliopoulos
- Power Systems Relaying: Theory and Application** | A.P. Sakis Meliopoulos
- Radar Signal Processing: Fundamentals–NAWC** | Mark A. Richards
- Radar Signal Processing: Applications and Advanced Topics–NAWC** | Mark A. Richards
- Signal Processing Refresher** | Mark A. Richards
- Synthetic Aperture Radar Image Formation Processing** | Christopher F. Barnes

2011 IEEE Bipolar/BiCMOS Circuits and Technology Meeting | John D. Cressler

2012 Fault and Disturbance Analysis Conference | A.P. Sakis Meliopoulos

2012 Annual Protective Relaying Conference | A.P. Sakis Meliopoulos

The ECE Development Office cultivates and coordinates the School's development and fundraising efforts with industry, alumni, and other interested individuals and organizations, including the College of Engineering and the Institute's Central Development Office. This office also manages the School's Corporate Affiliates Partnership Program and plans twice-yearly ECE Advisory Board meetings, the annual James R. Carreker Distinguished Lecture, and the ECE Career Fair.

2011-12 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 21 representatives, provides feedback in these areas during its formal, semiannual meetings and throughout the year.

C. Dean Alford—Allied Utility Network, Conyers, Ga.

Antonio R. Alvarez—Leadis Technology, Inc., San Jose, Calif.

Michael B. Bartlett—Texas Instruments, Inc. (Retired) Richardson, Tex.

Michael Buckler—TekMark Global Solutions, Cary, N.C.

Steve W. Chaddick—Chair, ECE Advisory Board, Ridgewood Advisors, LLC, Atlanta, Ga.

Mel Coker—AT&T, Atlanta, Ga.

H. Allen Ecker—Cisco Service Provider Video Technology Group (Retired), Lawrenceville, Ga.

Mat Hans—DTS, Calabasas, Calif.

Holmes J. Hawkins, III—King & Spalding, Atlanta, Ga.

Kelvin C. Hawkins, Sr.—IBM, Austin, Tex.

Sherra E. Kerns—Olin College, Needham, Mass.

W. Wayt King, Jr.—FSB Legal, Atlanta, Ga.

Michael R. McQuade—DuPont Company, Wilmington, Del.

Joseph Parks—Intel Corporation, Beaverton, Ore.

Randall E. Poliner—Antares Capital Corporation, Melbourne, Fla.

Sheryl S. (Sheri) Prucka—Prucka Engineering (sold to General Electric Medical Systems), Park City, Utah

Thomas J. Quigley—Broadcom Corporation (retired), Franklin, N.C.

T.E. (Ed) Schlesinger—Department of ECE, Carnegie-Mellon University, Pittsburgh, Pa.

Leslie Sibert—Georgia Power, Atlanta, Ga.

Ronald S. Slaymaker—Texas Instruments, Inc., Dallas, Tex.

Alek Szlam—Szlam Enterprises, Inc., Alpharetta, Ga.



On April 25, the School of ECE held its eleventh annual Roger P. Webb Awards Program. Georgia Power Vice President Leslie Sibert, BEE '85 (pictured below, second from the right) and Agilent Technologies District Manager and Applications Engineer Keefe Bohannon, BEE '95 (pictured below, second from left) hosted the event, which honors the students, staff, and faculty who have shown exceptional dedication to their professions and studies. Support for this event was provided by the ECE Advisory Board.



Award Winners



STUDENT AWARDS

Outstanding ECE Sophomore Award Pooja Modi

ECE Junior Scholar Award Allison Del Giorno

ECE Undergraduate Research Award Sebastian Palacios

Most Outstanding ECE Senior Co-op Award Shaleen Jain

Outstanding Service to Georgia's Community Award Blake Marshall

ECE Faculty Award Viktoriya Sherman

Outstanding Electrical Engineering Senior Award Sean Austen McGee

Outstanding Computer Engineering Senior Award Brett W. Dutro

ECE Senior Scholar Award David Inouye, Sean Maxon, Pranav Ramesh, Justin Waller

Colonel Oscar P. Cleaver Awards Chia-Chen Chou, Xuchen Zhang

ECE Graduate Teaching Assistant Excellence Award Jenna Fu

ECE Graduate Research Assistant Excellence Award Shaloo Rakheja, Mashhour Solh



STAFF AWARDS

Hats Off Performance Award Andrea Burch, Tasha Torrence

Research Spotlight Award Ali Eftekhari

Academic Spotlight Award James Steinberg

FACULTY AWARDS

Outstanding Junior Faculty Member Award Saibal Mukhopadhyay, Justin Romberg

ECE Outreach Award Tom Collins

Richard M. Bass/Eta Kappa Nu Outstanding Junior Teacher Award Oliver Brand

W. Marshall Leach, Jr./Eta Kappa Nu Outstanding Senior Teacher Award Allen Robinson

D. Scott Wills ECE Distinguished Mentor Award James H. McClellan

Distinguished Faculty Achievement Award Ajeet Rohatgi

1 Undergraduate: (back row) Brett Dutro, Sean Austen McGee, David Inouye, Pranav Ramesh, (middle row) Sean Maxon, Interim ECE School Chair Doug Williams, Regents' Professor Tom Gaylord, Alex Defreese, Shaleen Jain, (front row) Allison Del Giorno, Pooja Modi, Viktoriya Sherman, Sebastian Palacios

2 Graduate: (back row) Borislav Alexandrov, Brian Beck, Interim ECE School Chair Doug Williams, Amir Atabaki, Andrew Matteson, (front row) Mashhour Solh, Jenna Fu, Shaloo Rakheja, Chia-Chen Chou

3 Faculty: (l-r) Justin Romberg, Tom Collins, Bonnie Ferri, Allen Robinson, Interim ECE School Chair Doug Williams, Ajeet Rohatgi, Saibal Mukhopadhyay, Oliver Brand

4 Staff: (back row) Interim ECE School Chair Doug Williams, Ali Eftekhari, (front row) James Steinberg, Andrea Burch, Tasha Torrence

ECE GTA AWARDS

Outstanding ECE Graduate Teaching Assistant Awards Safayet Ahmed, Borislav Alexandrov, Brian Beck, Kevin Brenner, Yi Du, Andrew Matteson, Mark Omernick, Vivek Prasad

GEORGIA TECH FACULTY/STAFF AWARDS

Class of 1934 Outstanding Use of Innovative Education Technology Award Bonnie Ferri

Senior Faculty Outstanding Undergraduate Research Mentor Award Shyh-Chiang Shen

Outstanding Management in Action Award David S. Webb

Steven A. Denning Faculty Award for Global Engagement G. Tong Zhou

GEORGIA TECH STUDENT AWARDS

Tau Beta Pi Engineering Cup Sean Austen McGee

James G. and Mary G. Wohlford Scholarships Kyle Coogan and Samir Siddiqui

Henry Ford II Scholar Awards Clark Adam Kerr and Jason Robert McElrath

Sigma Xi Best Master's Thesis Award Danny Duong (Advisor: Paul Steffes)

Sigma Xi Best Doctoral Thesis Award Amir Atabaki (Advisor: Ali Adibi)



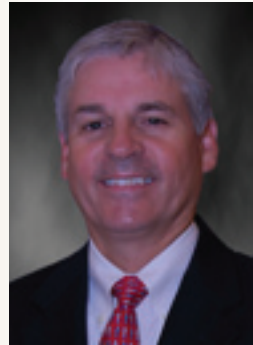
ECE GRADUATES HONORED AT 2012 COLLEGE OF ENGINEERING ALUMNI AWARDS

Two ECE alumni—Mark A. Randolph (BSECE '81) and Lanny S. Thomas (BSEE '74) were honored with the Academy of Distinguished Engineering Alumni Award at the 2012 College of Engineering Alumni Awards Ceremony. This event, held on April 28 at the Ritz Carlton in downtown Atlanta, also featured the induction of new members into the Engineering Hall of Fame and the Council of Outstanding Young Engineering Alumni by CoE Dean Gary May.

The Academy of Distinguished Engineering Alumni Award recognizes alumni for significant contributions to the profession or the field, the Institute, or society at large. Recipients are highly placed executives and are actively involved in engineering or management, industry, academia, or government.

Dr. Randolph is the managing director for DTS Licensing Pte, Ltd. and vice president for technology of DTS, Inc., a digital entertainment technology development company. After completing his bachelor's degree at Tech, he earned a Ph.D. at MIT. His career path led him from engineering to management positions at Motorola, which motivated him to pursue an M.B.A. from the University of Chicago. While at Motorola, he was a fellow of the technical staff and a managing director at the Motorola Singapore Innovation Center. He now heads DTS in Singapore, where he has lived since his time with Motorola.

Mr. Thomas is the chairman of Allison Smith, LLC in Atlanta. He became a design engineer for commercial and industrial power systems and participated in such notable Atlanta projects as the Georgia World Congress Center and Hartsfield-Jackson International Airport. Mr. Thomas then went to work in the electrical contracting business, eventually becoming an owner, president, and now chairman of Allison Smith LLC, a nearly 70-year old electrical contracting company. He has been involved with the National Electrical Contracting Association, an organization serving over 4,000 members, and has held offices both locally and nationally.



2012 JAMES R. CARREKER LECTURE

Gary B. Smith President and CEO, Ciena

Gary B. Smith, president and CEO of Ciena, delivered the eleventh annual James R. Carreker Distinguished Lecture on March 8 in the Van Leer Building Auditorium.

Mr. Smith spoke on "Navigating Change," which focused on the last decade in telecom, the changes brought to the industry via the Internet and globalization, and his experiences in dramatically transforming Ciena against this backdrop. Twice, Ciena's value plummeted faster and farther than most other companies' in other sectors, but by leveraging his sales and marketing acumen and an unwavering belief that his small company could be a disruption in the market, Mr. Smith led Ciena through some intense economic challenges by taking substantial, calculated risks to establish a well-positioned platform for growth.

To view the video of Mr. Smith's talk, visit www.ece.gatech.edu/stream/carreker2012/main.htm.



(l-r) Interim ECE Chair Doug Williams, Ciena President and CEO Gary Smith, and founder and chairman of Arbutus Hospitality Group James Carreker.



ORS PROGRAM CELEBRATES ITS 10TH ANNIVERSARY AND ITS INDUSTRY PARTNERSHIPS

The Opportunity Research Scholars Program celebrated its 10-year anniversary during FY 12. An innovative program that matches ECE undergraduates, Ph.D. mentors, and faculty advisors for a two-semester research experience, ORS has had 132 undergraduates and 48 Ph.D. mentors take part since its inception in 2002. Each team develops a project, attends enrichment workshops, and develops oral and written communication skills.

Industry support for ORS is a critical component of the undergraduate research model. Funding is used to support both undergraduate research stipends and Ph.D. mentor supplements. This partnership with industry includes several opportunities to interact with students and creates a direct pipeline to students who have ongoing research experience.

During 2011-12, the Intel Foundation provided \$65,300 for the ORS program, which is administered through the Semiconductor Research Corporation Education Alliance. To support the Intel initiative, SRC provided funds for two students to attend the 2011 Techcon Conference in Austin, Tex. to present their research. Other industry funding was provided by Corning, Inc. (\$10,000). National Science Foundation REU funding was used to support four students.

GRANTS AND GIFTS

Corporations, non-profit organizations, and individual donors enthusiastically and generously supported ECE and its research, educational, and service missions by contributing \$6,324,080 through the Georgia Tech Foundation. The first table shows the amount of funds designated for specific uses. The second table alphabetically lists the various companies, groups, and individuals that donated funds to ECE in FY 12.

Companies

ABB, Inc.
Advanced Micro Devices, Inc.
Agilent Technologies, Inc.
Allied Energy Services, LLC
AOC Technologies, Inc.
AT&T Labs, Inc.
Bechtel Corporation
Boeing Company
Chevron
Cisco Systems, Inc.
ConocoPhillips Corporation
Corning, Inc.
ExxonMobil Corporation
Ford Motor Company
FutureWei Technologies, Inc.
Gamer Economic Systems
GE Multilin
Harris Corporation
HESM&A, Inc.
I&C Technology
IBM Corporation
Integrated Device Technology, Inc.
Intel Corporation
Intersil Corporation
Linear Technology Corporation
Lockheed Martin
Lockheed Martin Aeronautics Company

MacLean Power Systems - Bethea
National Instruments
NetApp, Inc.
Northrop Grumman
NVIDIA Corporation
Oracle America, Inc.
Pitney Bowes, Inc.
Pixel Sand, Inc.
Procter & Gamble Company
Raytheon
RF Micro Devices
Robert Bosch Corporation
Smart Wire Grid, Inc.
Southern Company Services, Inc.
Taylor Exhibition Services, Inc.
Texas Instruments, Inc.
Union Pacific Railroad
United Technologies Corporation
Viakable
Williams Benator & Libby, LLP
ZTE USA, Inc.

Foundations/Non-Profit Organizations

ARCS Foundation
Caterpillar Foundation
Chih Foundation
Community Foundation for Greater Atlanta

For Endowment	\$4,208,763
\$88,017 Faculty/Student Support	
\$51,000 Program Enrichment	
\$4,069,746 Unrestricted	
For Facilities and Equipment	\$51,025
For Current Operations	\$2,064,292
\$1,490,688 Faculty and Student Support	
\$510,523 Program Enrichment	
\$63,081 Unrestricted	
Total	\$6,324,080

Eaton Charitable Fund
Fidelity Investment Charitable Gift Fund
Harris Foundation
International Foundation for Telemetry
Jewish Federation of Greater Atlanta
John and Mary Franklin Foundation, Inc.
Lockheed Martin Corporation Foundation
Norfolk Southern Foundation
Otto & Jenny Krauss Charitable Foundation Trust
SCEEE
Shanghai Jiao Tong University Foundation of America
Silicon Valley Community Foundation
Square D Foundation
SRC Education Alliance
Textron Charitable Trust
The Grammy Foundation

Professional, Research, and Academic Organizations

Electric Power Research Institute
Korea Electric Power Research Institute

Individuals

C. Dean Alford
Debbie Alford
Mark G. Allen
Antonio R. Alvarez
Kathryn Alvarez
Eloise Batts
Warren L. Batts
Harry L. Beck
Teresa Beck
Sue Ann Bidstrup Allen
Benjamin T. Brackett
Suzy Briggs
H. Austin Brown
Gwyneth Butera
Robert J. Butera
Carol Cantrell
Pierce E. Cantrell
Yee Sut Cheng
Ying Cheng
Amy Chih
Samuel Chih
Christopher R. Clark
Lauren Clark
Harriett C. Coleman
Leyla S. Conrad
Gladys Crane
William B. Crane
Deana Dyal
R. Thomas Dyal
H. Allen Ecker
Sandra Ecker
Linda Faulstich
Raymond J. Faulstich
Aldo A. Ferri
Bonnie H. Ferri
Mary Elizabeth Nix Hollingsworth
Martina Emmerson Hubbarth
Ryan James
Bernd Kahn
Edward W. Kamen
Mary Sue Kamen
Adam Mohamed Said Kassim
Jan Kolnik
Alan Frederick Krauss

Christina Krauss
Frederick G. Krauss
Virginia Krauss
Ann Lanza
John D. Lanza
Eva Maddox
Lynn C. Maddox
Benjamin R. McRee
Jo McRee
Frederica Z. Meindl
James D. Meindl
A.P. Sakis Meliopoulos
Kathryn Meliopoulos
Kevin T. Morgan
Lisa Morgan
Cynthia Olsen
Douglas W. Olsen
John B. Peatman
Marilyn Peatman
Andrew F. Peterson
Debra Peterson
Beth Petty
Claude A. Petty, Jr.

Etta Pittman
Herman Pittman
Darrell W. Preble
Matthew W. Prucka
Sheryl S. Prucka
Gene Sapp
Patricia Sapp
Paul G. Steffes
James A. Stratigos
Janie Stratigos
Christopher Summers
Aleksander Szlam
Halina Szlam
Michael T. Tuley
Therese Tuley
Rao R. Tummala
Kristin A. Turgeon
Judith Vanderboom
Anita Wathen-Brownlee
Patricia T. Webb
Roger P. Webb
Douglas B. Williams
Kay Williams

Entrekins' Estate Gift Embraces a Wide Range of Priorities

Ken R. Entrekin, BEE '73, and wife Sue are passionate about supporting Georgia Tech and particularly the School of ECE.

"The electrical engineering program gave me a very solid technical knowledge that made it simpler to read and comprehend almost any situation," said Mr. Entrekin. "Thinking logically was part of the thought process at Georgia Tech, and that has helped tremendously in my career."

Mr. Entrekin is co-founder and CEO of Advantage Industrial Automation of Duluth, Ga., which provides automation solutions to industrial users, original equipment manufacturers, and system integrators that help to increase productivity and quality, reduce downtime, save energy, or provide a safer workplace.

In appreciation for the advantages Georgia Tech has provided him, the Entrekins have made a seven-figure estate commitment that will one day provide vital support for ECE, the co-op program, the Ernest Scheller Jr. College of Business, and intercollegiate athletics.

"ECE today appears to be very strong, with strong leadership coming from [former chair] Gary May in the past several years, and currently from Steve McLaughlin," Mr. Entrekin pointed out. "I believe ECE is preparing today's students well for their careers, but ECE has a strong disadvantage with their facility. The Van Leer building appears exactly as it did when I was in school 40 years ago!"

The Blake Ragsdale Van Leer Building—dedicated in 1962 to honor the legacy of the first engineer to serve as the Institute's president—is long overdue for renovation. Its classroom space pales in comparison to that of newer campus buildings, and the facility lacks adequate computer, electronic, and microelectronics labs.

The Entrekins envision his estate commitment providing crucial long-term support for a broad range of ECE needs, including not only facilities but also scholarships and faculty support.

"Ken and Sue Entrekin are wonderful friends of Georgia Tech and ECE," said Steven W. McLaughlin, Steve W. Chaddick School Chair of ECE. "This significant, long-term support they are providing will help ensure that our

school remains in the top tier nationally and globally. While ECE continues its tradition of providing the finest undergraduate and graduate education and fostering breakthrough research, we have many substantial needs going forward. The Entrekins' generosity will be a tremendous help in meeting those needs downstream."

The co-op program was also an important part of Mr. Entrekin's Tech experience. "I worked several quarters at Southwire Co. in Carrollton," he recalled. "I could not have attended Tech if it were not for the co-op program. My career decision after Georgia Tech was fabricated during my work quarters there. Also, I developed some excellent relationships at Southwire that have helped Advantage to enhance our business with them over the years."

As for his support for the Scheller College, Mr. Entrekin said, "As a businessperson, I want Georgia Tech to include finance and real-world education into their degrees. I think an engineering student should participate in some of the business curriculum before graduation."

He is also supporting athletics because "Tech students need to be well rounded—to get more than just book knowledge. It is a big strength of Georgia Tech to have the best of both academics and athletics. Very few schools can offer that." The Entrekins have been football and basketball season ticket holders for nearly 40 years.

The Entrekin family tradition has continued at Tech with daughter Angela Entrekin Medley, BIOL 1996; son-in-law Brian Medley, IE 1995; and son Cliff Entrekin, MS ECON 2006. The Medleys live in the Atlanta area with their three



Ken and Sue Entrekin with their Tech Tower mailbox. They are longtime, avid supporters of many Georgia Tech programs.

future Yellow Jacket children: Savannah, Nathan, and Jack. Cliff Entrekin currently lives and works in Hong Kong. Ken Entrekin's wife Sue, an avid Yellow Jacket fan, worked at the Alumni Association while he completed his final year at Tech, living in Married Student Housing. Mr. Entrekin also served on his 25th Reunion Committee in 1998.

"In addition to what Dad does for Georgia Tech through philanthropy, his heart for Tech also includes his family, whether that's doing things together with Mom or with all the kids and grandkids," said daughter Angela Entrekin Medley. "Tech gave my Dad a good foundation for starting his career and business, but we see that same passion in everything he does for others, whether it's family, friends, or employees. Everyone who knows my dad knows that he doesn't do anything halfway, and his support for Tech is a great example of that."

Reunion Gift to ECE Honors Memory of Mark Smith

The occasion of his 50th Georgia Tech reunion undoubtedly would have been particularly meaningful for Mark C. Smith, BEE '62, who died in 2007.

The retired chairman of ADTRAN Inc. in Huntsville, Ala., Mr. Smith was a strong supporter of higher education and credited Georgia Tech with laying the foundation for his career success at ADTRAN, a leading global provider of networking and communications equipment. Mr. Smith was named a College of Engineering Distinguished Alumnus in 1995 and he was inducted into Georgia Tech's Engineering Hall of Fame in 2006.

Thanks to his widow, Linda, Mr. Smith's legacy will become a permanent part of the Tech landscape with the establishment of the Linda J. and Mark C. Smith Chair in the School of Electrical and Computer Engineering. Mrs. Smith's recent commitment will create an endowed faculty chair devoted to sustaining a world-class research and education program at the interface of ECE and the biosciences and bioengineering, an area of critical strategic importance to Georgia Tech's research and education agenda.

"We have identified this area of teaching and research as a strategic imperative for the ECE School in our efforts to retain our leadership position among the world's top programs," said Steven W. McLaughlin, Steve W. Chaddick School Chair of ECE. "Our School is the largest producer of electrical and computer engineers in the country, and we are consistently ranked among the nation's top ten programs. Thanks to commitments like this one from Linda Smith, we are bound to sustain and enhance our long track record of groundbreaking research and innovative education. We are very grateful to Linda and we are pleased to honor Mark's memory with this new faculty chair."

Mrs. Smith's commitment proved to be a pivotal force in the Class of 1962 setting a new Reunion Giving class record of \$28.6 million.

"I feel like this is the perfect time and an endowed faculty chair is the perfect way to honor Mark's memory," said Mrs. Smith, an honorary member of the Class of 1962 Reunion Committee. "His 50th reunion is, of course, the perfect time because Mark's Georgia Tech education and experience as a student meant so much to him. This faculty chair is the ideal legacy for Mark because it marries engineering and science. During the time that Mark was dealing with his cancer, he was fascinated by the degree to which engineering was driving cancer research. It is very gratifying for me to know that someone holding a chair with Mark's name could be finding ways of using engineering to advance the fight against cancer."



Mark and Linda Smith

Campaign Georgia Tech

Our time. Our legacy.

Georgia Tech is now in the public phase of a comprehensive fundraising campaign, which will last until December 31, 2015. The Institute has surpassed its original fund raising goal of \$1 billion, and ECE has also exceeded its goal of \$90 million, having raised over \$134 million as of the end of FY 12.

GIVING TO ECE AND GEORGIA TECH Some corporate donors represented in the "Grants and Gifts" table are members of the ECE Corporate Affiliates Partnership program. A multi-level support structure, CAP helps to create relationships conducive to enhanced and accelerated technology and knowledge transfer between academia and industry. To learn more about membership options, contact Etta Pittman.

Please direct any inquiries regarding how you can support the School and Georgia Tech to Martina Emmerson Hubbarth, director of ECE alumni development, at 404.894.0274 or martina.hubbarth@ece.gatech.edu, or to Etta Pittman, director of ECE corporate development at 404.894.6888 or etta.pittman@ece.gatech.edu.

Campaign Roll Out Events Information

The excitement generated by the public launch of Campaign Georgia Tech went on the road in 2011-2012, with dozens of campaign roll out events taking place across the region, the nation, and the world.

The School of ECE is grateful to our alumni listed below who helped host events throughout the last year.

Rodney Adkins , BEE '81, MSEE '83	Adriel Longo , BEE '58
Mike B. Bartlett , BEE '76	Mitchell D. Lukin , BEE '72, MSEE '76
Warren L. Batts , BEE '61	Lynn C. Maddox , BEE '63
Steve W. Chaddick , BEE '74, MSEE '82	William R. McCollum , BEE '73
Mel Coker , BEE '87	Lonnie S. McMillian, Jr. , BEE '55
William A. Coley , BEE '66	Wesley Cross Paxson , BEE '46
Robert L. Dixon, Jr. , BEE '77	Wesley Cross Paxson, Jr. , BEE '76
H. Allen Ecker , BEE '57, MSEE '58	Pedro A. Ray , PE, BEE '82, MSEE '83
John J. Hudiburg, Jr. , BEE '51	Gene Sapp, Jr. , BEE '59
Michael T. Kluber , PE, BEE '87	Ronald S. Slaymaker , BEE '82
John D. Lanza , BEE '87, MSEE '88	Stefan V. Stein , BEE '77
Michael Levy , BEE '69	C. Meade Sutterfield , BEE '72
	Howard A. Thrailkill , BEE '61

Student Body Profile

Students are ECE's most important products. Over 2,400 students were enrolled in our graduate and undergraduate programs during FY 12, making the School the largest of its kind in the U.S. In the last academic year, 723 degrees were awarded to students at the main campus in Atlanta, Georgia Tech-Savannah, Georgia Tech-Lorraine, and to students enrolled in the online master's/video 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. Students who successfully complete these programs receive special degree designations on their diplomas or transcripts. In 2011-12, ECE had one graduate of the international plan, one graduate who completed the research option, and 56 co-op graduates.

2,467 ENROLLED (Fall 2011)

	Total	Asian	Black	Hispanic	American Indian/ Alaskan Native	Native Hawaiian/ Other Pacific Islander	White	Two or More Races	Not Reported	Female
B.S.E.E.	848	285	81	59	1	0	389	28	5	111
B.S.Cmp.E.	424	115	56	33	0	0	202	13	5	39
B.S.E.E./GT-Savannah	33	0	8	0	0	0	24	1	0	3
B.S.Cmp.E./GT-Savannah	5	1	1	0	0	0	3	1	0	0
Total	1,310	31%	11%	7%	<1%	0%	47%	3%	<1%	12%
M.S./M.S.E.C.E.	559	307	15	24	0	0	189	13	11	87
M.S. Bioengineering*	4	0	0	0	0	0	4	0	0	2
Special	4	2	0	0	0	0	2	0	1	0
Ph.D.	570	307	25	21	0	0	197	10	10	71
Ph.D. Bioengineering*	10	2	0	0	0	1	6	1	0	5
Ph.D. Robotics*	10	3	1	0	1	0	5	0	0	1
Total	1,157	54%	4%	4%	<1%	<1%	35%	2%	2%	14%

723 DEGREES AWARDED (Summer 2011-Spring 2012)

	Total	Asian	Black	Hispanic	White	Multi-Racial	American Indian/ Alaskan Native	Not Reported	Female
B.S.E.E.	203	59	28	15	94	5	1	1	22
B.S.Cmp.E.	65	14	4	6	38	1	0	2	6
Total	268	27%	12%	8%	49%	2%	<1%	1%	10%
M.S./M.S.E.C.E.	343	177	12	9	132	10	1	2	58
M.S. Bioengineering*	4	1	0	0	3	0	0	0	2
Ph.D.	105	66	4	2	32	0	0	1	13
Ph.D. Bioengineering*	2	0	1	0	1	0	0	0	1
Ph.D. Robotics*	1	0	1	0	0	0	0	0	0
Total	455	54%	4%	2%	37%	2%	<1%	1%	16%

*with home departments in ECE.



Average Entering Freshman	
Electrical Engineering	Computer Engineering
3.92 High school GPA	3.81 High school GPA
652 SAT verbal score	645 SAT verbal score
728 SAT math score	709 SAT math score

Average Entering ECE Graduate Student	
3.71 Undergraduate GPA	
4.00 GRE analytical writing score	
775 GRE quantitative score	
557 GRE verbal score	

CURRICULA UPDATES ALLOW STUDENTS FLEXIBILITY

Providing students with more flexibility regarding which courses they take and when is at the heart of faculty-approved changes to the ECE curricula. Starting summer 2012, the School began rolling out changes to both the electrical engineering and computer engineering degree programs.

The updates reflect a national trend among collegiate engineering programs to provide curricula that are challenging, but also allow students more flexibility when it comes to taking electives or finding time to fit a co-op or study abroad experience into their schedules.

Two driving forces were behind the ECE curriculum changes. Previously, the two degree programs were too similar, and they either needed to be blended into one degree or made into distinctly different degree options. Another goal of the changes was to increase flexibility so that students could pursue minors or an international plan and still be able to graduate in a timely manner.

An electrical energy course and an advanced course in signals and systems will be added to the EE curriculum. Also, a required programming course and lab will be replaced by an ECE programming elective and a senior lab elective, allowing students greater flexibility, more upper level hands-on experience, and further options when choosing a specialization.

CmpE majors will now take foundational courses that focus on mathematical, physical, and design principles for computational systems. In addition, the number of ECE elective hours will increase from 10 to 22 hours and the number of free elective hours will increase from nine to 12.

Fellowships/Scholarships



Hsueh Earns IEEE Photonics Society Graduate Fellowship

Yu-Ting Hsueh was among 10 recipients honored with an IEEE Photonics Society Graduate Student Fellowship. As the second Ph.D. student from Gee-Kung Chang's Optical Networking Group to receive this honor, Ms. Hsueh is conducting research on radio over fiber and 100G optical transport systems. Her work has generated profound impacts in converged optical and wireless access networks that can provide both conventional and future-proof multi-gigabit/s wireless services over fiber and air space in a single system platform.

Chlieh, Banerjee Receive IEEE MTT-S Honors

Outmane Lemtiri Chlieh and Aritra Banerjee received top honors from the IEEE Microwave Theory and Techniques Society during 2011-12. Mr. Chlieh received an IEEE MTT-S B.S./M.S. Scholarship and Aritra Banerjee received an IEEE MTT-S Graduate Fellowship.

A master's degree student in John Papapolymerou's research group, Mr. Chlieh works on CMOS ultra-wide-band active baluns, an RF device that can convert a differential signal at the input to a single ended signal at the output. Applications of this device include connecting balanced devices such as television receivers, dipole antennas, or parallel wire

transmission lines to unbalanced devices such as coaxial cables, transmission lines, or antenna systems.

A Ph.D. student in Abhijit Chatterjee's research group, Mr. Banerjee works on designing and testing digitally assisted adaptive analog/RF circuits and systems for process variation tolerant, low power, and reliable operation which aims to leverage digital correction and calibration techniques to improve analog and RF performance. This technology will enable the development of ultra-low power, intelligent, and flexible RF communication systems.

Song Awarded NASA Fellowship

Peter Song, a Ph.D. student working in John D. Cressler's research group, was selected for the NASA Space Technology Research Fellowships Class of 2012. Mr. Song's project, "High-Frequency Silicon-Germanium MMIC Development for Next-Generation Space-based Radars," aims to exploit the unique capabilities of SiGe electronics to operate robustly in extreme environments such as space. The goal of this technology is to enable a new generation of space-based radar systems for remote sensing and which can provide dramatic reductions in mission size, weight, and power.

The goal of the NSTRF program is to provide the nation with a pipeline of highly

skilled engineers and technologists to improve America's technological competitiveness. Selected candidates perform graduate student research both on their respective campuses and at NASA Centers as interns. These highly competitive NASA fellowships provide full support for students during their Ph.D. study.

Chen Receives ASNT Fellowship

Xin Chen received a one-year fellowship from the American Society of Nondestructive Testing. This award supports his research on "Load-Enhanced Methods for Lamb Wave in situ Nondestructive Evaluation of Complex Components." He also won a travel grant from the Force and Motion Foundation that allowed him to present his research at the 39th Annual Review of Quantitative Nondestructive Evaluation.

A Ph.D. student in the Quantitative Ultrasonic Evaluation, Sensing and Testing Laboratory, Mr. Chen is co-advised by Thomas E. Michaels and Jennifer E. Michaels. His research has significantly pushed the state-of-the-art in developing in situ ultrasonic methods for damage detection, localization, and characterization over large areas of critical structures subjected to changing loading conditions.

ECE CAREER FAIR: A BIG HIT FOR STUDENTS, EMPLOYERS

Held on January 17-18 at the Klaus Building Atrium, the 2012 ECE Career Fair was a tremendous success, with over 100 companies taking part and over 1,200 students attending during this two-day event. A mini-career fair for Ph.D. students was also held in the same location on the evening of January 17, with 94 ECE Ph.D. students attending and 15 companies participating. The ECE Career Fair helps students who are seeking co-op, internship, summer, or permanent positions and helps to develop and sustain ongoing relationships with the School's corporate partners.

For more information, contact Etta Pittman, director of ECE corporate development, at 404.894.6888 or etta.pittman@ece.gatech.edu



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 to service to society as a whole. While these groups hosted many of their own professional development and social activities, they also united for several school-wide events, including Donut Fridays, cookouts, and a holiday party for the entire ECE community.



IEEE Student Branch

IEEE is the world's leading professional association for the advancement of technology. Chaired by Layla Marshall in 2011-12, the Georgia Tech branch of IEEE had over 800 members, making it the largest student branch in the nation and the third largest branch in the world. The group provided many opportunities for students to expand technical knowledge outside of the classroom, and industry presentations gave students the chance to interact with companies and connect with professionals in various fields.

Throughout the year, IEEE technical development and social events brought together students who cherished Georgia Tech and valued the ECE community that they established. The group held its annual Student-Professional Awareness Conference on January 17, and they attended the Region 3 IEEE SoutheastCon 2012 in Orlando, Fla., held from March 15-18. At SoutheastCon, the Georgia Tech IEEE student branch won the 2012 Exemplary Student Branch Region 3 Award, second place in the Open Hardware Competition, and third place in the web site competition.

Eta Kappa Nu

Eta Kappa Nu is the honor society for electrical and computer engineers. Led by Viki Sherman and Alex DeFreese during 2011-12, HKN organized both academic and community service-oriented activities. The group held its regular Bridge to Business meetings and hosted information sessions about applying to graduate school in engineering and M.B.A. programs, applying for fellowships, and learning about the Ph.D. preliminary exam.

For the seventh year in a row, the Beta Mu chapter of Eta Kappa Nu was named as a recipient of the Outstanding Chapter Award. A significant mark of distinction, this award recognizes a chapter's service to their fellow students, their department, their university, and the surrounding community during 2011-12 (see related article, page 5). HKN also continued with its highly successful "chip project," where members packaged and sold lab supplies at discounted prices, saving students over \$25,000, while putting earnings into the chip project scholarship fund. The group hosted the annual ECE Spring Picnic, where the 2012 Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award and the 2012 W. Marshall Leach, Jr./Eta Kappa Nu Outstanding Teacher Award were presented to Oliver Brand and W. Allen Robinson, Jr., respectively.



Women in Electrical and Computer Engineering

Women in Electrical and Computer Engineering supports and encourages the success of female ECE students. Prabha Viswanathan served as the organization's president during 2011-12.

In the last year, WECE hosted K-12 outreach events and also took part in similar activities sponsored by other organizations at Georgia Tech. They hosted lab tours for Northlake High School and Westlake High School students and co-sponsored the State of Georgia FIRST LEGO League Tournament. They also supported and participated in ECE Rush, an event held at the start of each academic year for ECE freshmen, FASET sessions, Team Buzz, National Engineers Week, and the Georgia Tech Women's Leadership Conference.

WECE also organized academic and professional development workshops and events on résumés and networking, co-oping and internships, and "What Not to Wear." They also hosted networking and information sessions with Harris Corporation, Eaton, Union Pacific, and WhaleShark Media.

WECE also made time for fun and socializing. The group held its annual Halloween party, movie and bowling night, a barbecue for freshmen, and pool party—which attract a wide cross-section of faculty, staff, and undergraduate and graduate students. For their tireless efforts in making ECE and Georgia Tech better places, WECE was honored with a 5-Star Organization Award at the Up with the White and Gold Ceremony on April 23 (see related article, page 5).

Solar Jackets Promote Green Energy While Stressing Teamwork and Leadership

The Georgia Tech Solar Jackets is a student competition team dedicated to designing, building, and racing solar-powered vehicles. After converting an Audi TT into a Solar-Assisted Electric Vehicle a few years ago, the group began working on Georgia Tech's first fully-functioning, 100 percent solar-powered racer. By the summer of 2011, the team had a bare-bones chassis, and throughout the 2011-12 school year, they assembled the suspension, mounted the motor, programmed the electronics, did numerous wet and dry fiberglass and carbon fiber layups, encapsulated the solar panels, and, with many long hours and a lot of dedication, built the SJ-1 Endeavor, the group's first solar car.

To build a solar car does not just take time and muscle—an enormous amount of design work must be done to ensure that the car is safe, efficient, and cost-effective. Students working in Mechanical, Composites, Electrical, and Solar sub-teams had the opportunity this year to take what they learned in and out of the classroom and apply it to something that they then get to build, test, and drive. This experience is invaluable in terms of making engineering come alive as well as building career skills for after graduation.

During summer 2012, the team took the SJ-1 to its first race, the 2012 Formula Sun Grand Prix and American Solar Challenge. This track/road race series tests solar cars on increasing levels of endurance and culminates with a long-distance road race, with this year's route being the 1,650 miles from Rochester, N.Y. to St. Paul, Minn. Due to some electrical problems at the race site, the team was unable to participate beyond passing most of the scrutineering tests, but looks forward to future events where they hope to fine tune the SJ-1 and get it into complete road-worthiness, as well as begin the design process for the next solar car.

Solar Jackets is proud to partner with numerous industry sponsors, Georgia Tech faculty and staff, and community members to help reach its goals. If you are interested in becoming involved, including joining or sponsoring the team or providing mentorship, please contact solarjackets@gmail.com and visit solarjackets.gatech.edu for more information.



GEORGIA TECH HOSTS FIRST LEGO LEAGUE STATE TOURNAMENT

On January 28, 2012, 48 student teams gathered at the Georgia Tech Student Center to compete in the State of Georgia FIRST LEGO League Tournament. The event is coordinated by ECE; the Center for Education Integrating Science, Mathematics, and Computing; and GTRI and is staffed by student, faculty, and staff volunteers from Georgia Tech and the Atlanta community.

This year's Challenge theme was "Food Factor: Keeping Food Safe," which gave students aged 9 to 14, a chance to explore ways to improve the quality of food and prevent contamination. Each team has built, tested, and programmed an autonomous robot using LEGO® MINDSTORMS® NXT to solve a set of food safety missions.

In this year's tournament, nearly 400 teams competed in 12 qualifiers and three super-regional contests, involving a total of 2,500 students. Through these qualifiers, the field was narrowed to 48 teams that advanced to the January 28 tournament at Georgia Tech. This year's winning team, pictured above, was Blazers 1 from St. Catherine of Siena Catholic School in Kennesaw, Ga. Second place winners, GENIUS—Girls Exploring New Ideas Using Science, were sponsored by the Girls Scouts of Greater Atlanta.

1st



2nd



Ph.D. Graduates

One hundred eight students graduated with their doctoral degrees in 2011-12 and have moved on to work at the world's top companies and universities, with start-up companies originating from research at Georgia Tech, and as consultants.

SUMMER 2011

Seyed Abdollah Aftabjahani	Milor	<i>Compact Variation-Aware Standard Cell Models for Statistical Static Timing Analysis</i>	Component Design Engineer, Intel Custom Foundry, Intel Corp., Portland, Ore.
Amir Hossein Atabaki	Adibi	<i>Reconfigurable Silicon Photonic Devices for Optical Signal Processing</i>	Technical Staff/Postdoctoral Fellow, Sinoora, Inc., Atlanta, Ga.
Karolyn Olatubosun Babalola	Butera	<i>Brain Computer Interfaces for Inducing Brain Plasticity and Motor Learning: Implications for Brain Injury Rehabilitation</i>	DSP Engineer, Zeta Associates, Fairfax, Va.
Muhammad Muqarrab Bashir	Milor	<i>Modeling Reliability in Copper/Low-K Interconnects and Variability in CMOS</i>	Yield Research Engineer, Intel Corp., Portland, Ore.
Luke Armitage Beardslee	Brand	<i>Liquid Phase Operation of MEMS Resonators for Biochemical Sensing in Point of Care and Embedded Applications</i>	Medical student, Albany Medical College, Albany, N.Y.
Sungho Beck	Tentzeris	<i>An Interference-Cancellation Receiver for Multi-Band and Multi-Standard Wireless Communications Systems</i>	Analog design engineer, Texas Instruments, Dallas, Tex.
Douglas Walter Brown	Vachtsevanos	<i>A Prognostic Health Management Based Framework for Fault-Tolerant Control</i>	Not known
Matthew Crane	Lu	<i>Automated Quantitative Phenotyping and High-Throughput Screening of C. elegans using Microfluids and Computer Vision</i>	Research Fellow, Center for Synthetic and Systems Biology, University of Edinburgh, Edinburgh, Scotland
Abhilash Goyal	Swaminathan	<i>Methodologies for Low Cost Testing and Self Healing of RF Systems</i>	SUN Oracle Research, Redwood Shores, Calif.
Stefan Grubic	Habetler	<i>Online Monitoring of Turn Insulation Deterioration in Mains-Fed Induction Machines using Online Surge Testing</i>	Not known
James Stroman Hall	J. Michaels	<i>Adaptive Dispersion Compensation and Ultrasonic Imaging for Structural Health Monitoring</i>	Owner, Hidden Solutions, LLC, Orlando, Fla.
Yan-Yu Huang	Kenney	<i>CMOS Based Amplitude and Phase Control Circuits Designs for Multi-Standard Wireless Communication Systems</i>	Analog Engineer, Intel Corp., Portland, Ore.
Seunghyun Eddy Hwang	Swaminathan	<i>Characterization and Design of Embedded Passive Circuits for Applications up to Millimeter-Wave Frequency</i>	Senior Signal Integrity Engineer, NVIDIA, Santa Clara, Calif.
Eung Jung Kim	Kornegay	<i>Highly Efficient Dynamic Supply Modulator for Mobile Communication Systems</i>	Design Engineer, Texas Instruments, Dallas, Tex.
Hyung Wook Kim	Tentzeris	<i>CMOS Radio-Frequency Power Amplifiers for Multi-Standard Wireless Communications</i>	Senior Engineer, Qualcomm, Santa Clara, Calif.
Jihwan Kim	Kornegay	<i>High Performance Radio-Frequency and Millimeter-Wave Front-End Integrated Circuits Design in Silicon-Based Technologies</i>	Senior Design (Analog) Engineer, Intel Corporation, Hillsboro, Ore.
Se Hun Kook	Chatterjee	<i>Low-Cost Test of High-Precision Analog-to-Digital Converters</i>	Not known
Kun Seok Lee	Kenney	<i>Wideband Phase-Locked Loops with High Spectral Purity for Wireless Communications</i>	Staff RFIC Designer, Marvell Semiconductor, Santa Clara, Calif.
Andrew Geier Melton	Ferguson	<i>Development of Wide Bandgap Solid-State Neutron Detectors</i>	Postdoctoral Fellow, Department of ECE, University of North Carolina at Charlotte, Charlotte, N.C.
Usman Saeed	Peterson	<i>Adaptive Numerical Techniques for the Solution of Electromagnetic Integral Equations</i>	GE, Florence, S.C.
Jyoti Sastry	Divan	<i>Direct AC Control of Grid Assets</i>	Power Electronics R&D engineer, ABB, Inc., Raleigh, N.C.
Ehsan Shah Hosseini	Adibi	<i>High Quality Integrated Silicon Nitride Nanophotonics Structures for Visible Light Applications</i>	Postdoctoral Fellow, Massachusetts Institute of Technology, Cambridge, Mass.
Zhi Sun	Akyildiz	<i>Reliable and Efficient Communication in Wireless Underground Sensor Networks</i>	Assistant Professor, Department of Electrical Engineering, State University of New York at Buffalo, Buffalo, N.Y.
Narayanan Terizhandur Varadharajan	Swaminathan	<i>Fast Methods for Full-Wave Electromagnetic Simulations of Integrated Circuit Package Modules</i>	Intel Corp., Chandler, Ariz.
Ryan Sloan Westafer	Hunt	<i>Investigation of Phononic Crystals for Dispersive Surface Acoustic Wave Ozone Sensors</i>	Research Engineer II, Advanced Concepts Laboratory, GTRI, Atlanta, Ga.
Stephen Vincent Williams	Howard	<i>Visual Arctic Navigation: Techniques for Autonomous Agents in Glacial Environments</i>	Postdoctoral Researcher, College of Computing, Georgia Tech, Atlanta, Ga.

Terence Wu	Tentzeris	<i>Antenna Integration for Wireless and Sensing Applications</i>	Not known
Yi Yang	Divan	<i>Power Line Sensor Networks for Enhancing Power Line Reliability and Utilization</i>	Specialist-Engineering, Eaton Corporation Innovation Center, Milwaukee, Wis.
Seungil Yoon	Kim	<i>Cross-Layer Dynamic Spectrum Management Framework for the Coexistence of White Space Applications</i>	Principal engineer, Samsung Electronics Co. Ltd., Suwon, South Korea
Youngchang Yoon	Kenney	<i>Reconfigurable CMOS RF Power Amplifiers for Advanced Mobile Terminals</i>	Senior Engineer, Qualcomm, San Diego, Calif.
Pan Zhou	Copeland	<i>Power Control and Capacity Analysis in Cognitive Radio Networks</i>	Research Engineer, Oracle Corporation, Nashua, N.H.; faculty member, Huazhong University of Science and Technology, Wuhan, Hubei Province, People's Republic of China

FALL 2011

Salman Muhammad Aslam	Barnes	<i>Target Tracking Using Residual Vector Quantization</i>	Lieutenant Colonel, Pakistan Army, Islamabad, Pakistan
Erman Ayday	Fekri	<i>Iterative Algorithms for Trust and Reputation Management and Recommender Systems</i>	Postdoctoral Fellow, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
Tapobrata Bandyopadhyay	Tummala	<i>Modeling, Design, and Characterization of Through Vias in Silicon and Glass Interposers</i>	Design Engineer, Texas Instruments, Dallas, Tex.
Charles Henry Camp	Adibi	<i>Label Free Flow Cytometry using Multiplex Coherent Anti-Stokes Raman Scattering Spectroscopy</i>	Postdoctoral Fellow, National Institute of Standards and Technology, Bethesda, Md.
David Chung	Papapolymerou	<i>Development of System Level Integration of Compact RF Components on Multilayer Liquid Crystal Polymer</i>	RF Systems Engineer, Space Electronics System Development, Naval Research Laboratory, Washington, D.C.
Rui Dai	Akyildiz	<i>Correlation-Based Communication in Wireless Multimedia Sensor Networks</i>	Assistant Professor, Department of Computer Science, North Dakota State University, Fargo, N.D.
Thomas Frederick Detwiler	Ralph	<i>Continuous Phase Modulation for High Speed Fiber-Optic Links</i>	Design Engineer, Adtran, Huntsville, Ala.
Kiruthika Devaraj	Steffes	<i>The Centimeter-and Millimeter-Wavelength Ammonia Absorption Spectra under Jovian Conditions</i>	Postdoctoral Scholar, Stanford University, Stanford, Calif.
Travis Jay Deyle	Kemp	<i>Ultra High Frequency Radio Frequency Identification for Robot Perception and Mobile Manipulation</i>	Postdoctoral Fellow, Duke University, Durham, N.C.
Gregory Frederick Diamos	Yalamanchili	<i>Harmony: An Execution Model for Heterogeneous Systems</i>	Research Scientist, NVIDIA Corporation, Santa Clara, Calif.
Salih Dikbas	Altunbasak	<i>A Low-Complexity Approach for Motion-Compensated Video Frame Rate Up-Conversion</i>	Systems Engineer, Texas Instruments, Dallas, Tex.
Ali Asghar Eftekhari	Adibi	<i>Nanoscale Light-Matter Interactions in the Near-Field of High-Q Microresonators</i>	Research Engineer, School of ECE, Georgia Tech, Atlanta, Ga.
Shu-Hao Fan	Chang	<i>Convergence of Millimeter-Wave and Photonic Interconnect Systems for Very-High-Throughput Digital Communication Applications</i>	Optical System Engineer, Clariphy, Los Altos, Calif.
Jason M. George	Anderson	<i>Harnessing Resilience: Biased Voltage Overscaling Probabilistic Signal Processing</i>	Partner, Cenobil, Acworth, Ga.
Rutchanee Gullayanon	T. Michaels	<i>A Calibration Methodology for Energy Dispersive X-Ray Fluorescence Measurements Based upon Synthetically Generated Reference Spectra</i>	Lecturer, King Mongkut's Institute of Technology Ladkrabang, Ladkrabang, Bangkok, Thailand
Gokce Gurun	Degertekin	<i>Integrated Electronics Design for High Frequency Intravascular Ultrasound Imaging</i>	IC Design Member of Technical Staff, Maxim Integrated Products, Hillsboro, Ore.
Myunghyun Ha	Swaminathan	<i>EM Simulation using Laguerre-FDTD Scheme for Multiscale 3-D Interconnections</i>	Analog Engineer, Intel Corporation, Santa Clara, Calif.
Lei Hou Hamilton	Romberg	<i>Reduced-Data Magnetic Resonance Imaging Reconstruction Methods: Constraints and Solutions</i>	Senior Member of Technical Staff, Draper Laboratory, Cambridge, Mass.
Syed Ali Hassan	Ingram	<i>Stochastic Modeling of Cooperative Wireless Multi-Hop Networks</i>	Not known
Stephen Jonathan Horst	Cressler	<i>Frequency Synthesis of SiGe BiCMOS Processes</i>	Research Engineer, NASA Jet Propulsion Laboratory, Pasadena, Calif.
Suzanne Lynn Huh	Swaminathan	<i>Design of Power Delivery Network for Noise Suppression and Isolation Using Power Transmission Lines</i>	Analog Engineer, Intel, Folsom, Calif.
Xueliang Huo	Ghovanloo	<i>Tongue Drive: A Wireless Tongue-Operated Assistive Technology for People with Severe Disabilities</i>	Hardware Engineer, Microsoft Corp., Redmond, Wash.

Michael Ross Hutsel	Gaylord	<i>Characterization of the Stress and Refractive-Index Distributions in Optical Fibers and Fiber-Based Devices</i>	Research Engineer II, Advanced Concepts Laboratory, GTRI, Atlanta, Ga.
Sandeep Kakumanu	Sivakumar	<i>Algorithms and Protocols for Multi-Channel Wireless Networks</i>	Postdoctoral Fellow, School of ECE, Georgia Tech, Atlanta, Ga.
Kaustubh Prakash Kalgaonkar	Clements	<i>Probabilistic Space Maps for Speech with Applications</i>	Speech Scientist, Microsoft Corp., Redmond, Wash.
Se Hun Kim	Wolf	<i>Accuracy-Energy Tradeoffs in Digital Image Processing using Embedded Computing Platform</i>	Samsung, South Korea
Sriram Lakshmanan	Chatterjee	<i>Cooperative Communication in Wireless Networks: Algorithms, Protocols, and Systems</i>	Senior Test Developer, Texas Instruments, Santa Clara, Calif.
Dongwon Lee	Wolf	<i>High-Performance Computer System Architectures for Embedded Computing</i>	Qualcomm, San Diego, Calif.
Chien-I Lin	Gaylord	<i>Characterization of the Surface Plasmon Modes in Planar Metal-Insulator-Metal Waveguides by an Attenuated Total Reflection Approach</i>	Postdoctoral Fellow, School of ECE, Georgia Tech, Atlanta, Ga.
Anuj Madan	Cressler	<i>Design and Reliability of High Dynamic Range RF Building Blocks in SOI CMOS SiGe BiCMOS Techniques</i>	Staff Engineer, Skyworks, Woburn, Mass.
Dwi Sianto Mansjur	Juang	<i>Statistical Pattern Recognition Approaches for Retrieval-Based Machine Translation Systems</i>	Software Engineer, IBM, Research Triangle Park, N.C.
Ramanathan Palaniappan	Jayant	<i>Scalable Video Communications Bitstream Extraction Algorithms for Streaming, Conferencing, and 3DTV</i>	Software Engineer, Cisco Systems, Inc., San Jose, Calif.
Ryan Daniel Palkki	Lanterman	<i>Chemical Identification under a Poisson Model for Raman Spectroscopy</i>	Technical Staff, MIT Lincoln Laboratory, Airborne Radar Systems and Techniques, Group 105, Lexington, Mass.
Ibrahim Ethem Pekkucuksen	Altunbasak	<i>Edge Directed Resolution Enhancement and Demosaicing</i>	Systems Engineer, Texas Instruments, Dallas, Tex.
Chung Hang Poh	Cressler	<i>SiGe HBT BiCMOS RF Front-Ends for Radar Systems</i>	Senior Member of Technical Staff, DSO National Laboratories, Singapore, Singapore
Anish Prasai	Divan	<i>Direct Dynamic Control of Impedance for VAR and Harmonic Compensation</i>	Principal Engineer, Varentec, Inc., San Jose, Calif.
Jayant Ratti	Vachtsevanos	<i>QV: The Quad Winged, Energy Efficient, Six-Degree of Freedom Capable Micro Aerial Vehicle</i>	Founder, TechJect, Atlanta, Ga./Consulting engineer, United States Air Force Academy, Colorado Springs, Colo.
Damien Jean Xavier Rontani	Citrin	<i>Communication with Chaotic Optoelectronic Systems: Cryptography and Multiplexing</i>	Postdoctoral Fellow, Duke University, Durham, N.C.
Shreyas Sen	Chatterjee	<i>Design of Process and Environment Adaptive Ultra Low Power Wireless Circuits and Systems</i>	Research Scientist, Circuit & System Research, Intel Labs, Intel Corporation, Hillsboro, Ore.
Osman Gokhan Sezer	Altunbasak	<i>Data-Driven Transform Optimization for Next Generation Multimedia Applications</i>	Member of Technical Staff, Texas Instruments Research Lab, Dallas, Tex.
Ramya Srinivasan	Blough	<i>Throughput Optimization in MIMO Networks</i>	Senior Engineer, Qualcomm, Santa Clara, Calif.
Arunkumar Subramanian	McLaughlin	<i>Coding Techniques for Information-Theoretic Strong Secrecy on Wiretap Channels</i>	Staff Engineer, Link_A_Media Devices Corporation, Santa Clara, Calif.
Sangwook Suh	Barry	<i>Low Power Discrete Fourier Transform and Soft-Decision Viterbi Decoder for OFDM Receivers</i>	Engineer, Samsung, Seoul, South Korea
Ye Tao	Meliopoulos	<i>Optimal Power Flow via Quadratic Modeling</i>	Senior Application Engineer, ABB, Inc., Santa Clara, Calif.
Matthew Shayaun Trotter	Durgin	<i>Range Finding in Passive Wireless Sensor Networks using Power Optimized Waveforms</i>	Postdoctoral Fellow, Disney Research, Pittsburgh, Pa.
Stuart Blanche Truax	Brand	<i>A Microscale Chemical Sensor Platform for Environmental Monitoring</i>	Scientific Staff, ETH Zurich, Zurich, Switzerland
Adam Daniel Wathen	Hunt	<i>Acoustic Wave Biosensor Arrays for the Simultaneous Detection of Multiple Cancer Biomarkers</i>	Senior Multi-Discipline Systems Engineer, Mitre Corporation, Aberdeen, Md.
Saunya Michelle Williams	Jayant	<i>Effects of Image Compression on Data Interpretation for Telepathology</i>	Consultant, Accenture, Atlanta, Ga.
Deryck Yeung	Verriest	<i>Maximally Smooth Transition: The Gluskabi Raccordation</i>	Software Engineering Consultant, San Antonio, Tex.
Yun Zhang	Shen	<i>Development of III-Nitride Bipolar Devices: Avalanche Photodiodes, Laser Diodes, and Double-Heterojunction Bipolar Transistors</i>	Professor, Institute of Semiconductors, Chinese Academy of Sciences, Beijing, China

Zheshen Zhang	Voss	<i>New Techniques for Quantum Communication Systems</i>	Postdoctoral Associate, Massachusetts Institute of Technology, Cambridge, Mass.
Xiangwei Zhou	Li	<i>Efficient Spectrum Sensing and Utilization for Cognitive Radio</i>	Senior Systems Engineer, Marvell Semiconductor, Santa Clara, Calif.

SPRING 2012

Sami M.A. Almalfouh	Stüber	<i>Interference-Aware Resource Management Techniques for Cognitive Radio Networks</i>	RF/Wireless Systems Engineer, Apple, Inc., Cupertino, Calif.
Arnaud Lucres Amadjikpe	Papapolymerou	<i>Integrated Antennas on Organic Packages and Cavity Filters for Millimeter-Wave and Microwave Communications Systems</i>	RF Systems Engineer, Autoliv Active Safety, Lowell, Mass.
Amol Anil Borkar	Hayes	<i>Multi-Viewpoint Lane Detection with Application in Driver Safety Systems</i>	Systems & Software Engineer, Intel Corporation, Santa Clara, Calif.
Byungki Byun	C.-H. Lee	<i>On Discriminative Semi-Supervised Incremental Learning with a Multi-View Perspective for Image Concept Modeling</i>	Research Software Development Engineer, Microsoft Corp., Redmond, Wash.
Siwei Cheng	Habetler	<i>Utilizing the Connected Power Electronic Converter for Improved Condition Monitoring of Induction Motors and Claw Pole Generators</i>	Motor Control Engineer, Ford Motor Company, Dearborn, Mich.
Debrup Das	Divan	<i>Dynamic Control of Grid Power Flow Using Controllable Network Transformers</i>	Senior R&D engineer, ABB, Inc., Raleigh, N.C.
Michael Joseph Gielniak	Howard	<i>Adaptation of Task-Aware, Communicative Variance for Motion Control in Social Humanoid Robotic Applications</i>	Postdoctoral Researcher, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, Atlanta, Ga.
Blake Raymond Gray	Kenney	<i>Design of RF and Microwave Amplifiers and Power Upconverters</i>	Senior Applications Engineer, Silicon Creations, Suwanee, Ga.
Azhar Hasan	Peterson	<i>Passive Wireless Sensor Based on Reflected Electro-Material Signatures</i>	Assistant Professor, National University of Sciences and Technology, Pakistan
Zhengyu He	Hong	<i>On Algorithm Design and Programming Model for Multi-Threaded Computing</i>	Software Engineer, Google, Mountain View, Calif.
Yu-Ting Hsueh	Chang	<i>Frontiers of Optical Networking Technologies: Millimeter Wave Radio Over Fiber and 100G Transport System for Next-Generation High Data Rate Applications</i>	Postdoctoral Fellow, Georgia Tech, School of ECE, Atlanta, Ga.
Ham Hee Jeon	Kenney	<i>Highly Efficient Linear CMOS Power Amplifiers for Wireless Communication</i>	Senior Design Engineer, RF Micro Devices, Torrance, Calif.
Ashley Nzinga Johnson	Vachtsevanos	<i>A Statistical Framework for the Analysis of the Neural Control of Movement with Aging and other Clinical Applications</i>	Process Control Systems Engineer, Corning, Inc., Corning, N.Y.
Dae Hyun Kim	Lim	<i>Through Silicon Via Aware Prediction and Physical Design for Multi-Granularity 3D Integrated Circuits</i>	Senior Member of Technical Staff, Cadence Design Systems, Inc., San Jose, Calif.
Hyun-Woong Kim	Tentzeris	<i>CMOS RF Transmitter Front-End Module for High-Power Mobile Applications</i>	Senior Engineer, RF Micro Devices, San Jose, Calif.
Stephen Taejin Kim	Tentzeris	<i>Energy-Optimized Design Techniques for Wireless Communication and Ubiquitous Sensing Nodes</i>	Research Scientist, Intel, Hillsboro, Ore.
Peter Matthias Kingston	Egerstedt	<i>Multi Agent Coordination: Fluid Inspired Optimal Control Approaches</i>	Senior Research Engineer, BAE Systems, Information and Electronic Systems Integration, Burlington, Mass.
Jehoon Lee	Yezzi	<i>Statistical and Geometric Methods for Visual Tracking with Occlusion Handling and Target Reacquisition</i>	Postdoctoral Associate, Boston University, Boston, Mass.
Jiaqi Liang	Harley	<i>Wind Energy and Power System Interconnection, Control, and Operation for High Penetration of Wind Power</i>	Scientist, ABB, Inc. Raleigh, N.C.
Mauricio Pardo Gonzalez	Ayazi	<i>MEMS-Based Phase-Locked-Loop Clock Conditioner</i>	Chair, Electrical Engineering School, Universidad del Norte, Barranquilla, Colombia
Mashhour Mohammad Solh	Al-Regib	<i>Depth-Based 3D Videos: Quality Measurement and Synthesized View Enhancement</i>	Computational Photography Systems Engineer, Texas Instruments, Inc., Dallas, Tex.
Philip Y.Twu	Egerstedt	<i>Control of Multi-Agent Networks: From Network Design to Decentralized Coordination</i>	Senior Professional Staff I, Johns Hopkins University Applied Physics Lab, Laurel, Md.
Jiaxi Xiao	McLaughlin	<i>Information Theoretic Approach in Detections and Security Codes</i>	Quantitative Analyst, IntercontinentalExchange, Atlanta, Ga.
Farhana Zaman	Meindl	<i>Characterization of Selective Epitaxial Graphene Growth on Silicon Carbide: Limitations and Opportunities</i>	Senior Graduate Engineer, Meggitt Systems, Rockmart, Ga.
Hao Zheng	Wu	<i>Prediction and Analysis of the Methylation Status of CpG Islands in the Human Genome</i>	Informatician, Baylor College of Medicine, Houston, Tex.

ECE faculty members are internationally recognized leaders in 11 areas of research and education—bioengineering, computer systems and software, digital signal processing, electrical energy, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, telecommunications, and VLSI systems and digital design—and the School is either home to or a key player in more than 20 research centers and consortia.

One hundred fifteen faculty members were employed during 2011-12, with 85 percent holding tenure and all holding doctorates. In the last year, ECE added four new faculty members to its ranks and one jointly appointed with the School of Computer Science, and seven faculty members were promoted and/or tenured. Statistics detailing academic rank and diversity are provided, in addition to a list of all tenure-track and tenured faculty members employed during the last fiscal year.

RANK	TENURED	DIVERSITY
5 Regents' Professors	5 Regents' Professors	14 Female
66 Professors	66 Professors	5 African-American
32 Associate Professors	27 Associate Professors	30 Asian
12 Assistant Professors		3 Hispanic
115 Total *		1 Multi-racial

* Includes all faculty members employed during FY 12, including those based at Georgia Tech-Savannah and Georgia Tech-Lorraine.

Academic Faculty

REGENTS' PROFESSORS

Mark G. Allen
Executive Director, Institute for Electronics and Nanotechnology; Co-Director, Center for MEMS and Microsystems Technologies; Joseph M. Pettit Professor in Microelectronics
Ph.D., Massachusetts Institute of Technology
Microelectronics/microsystems; bioengineering

Thomas K. Gaylord
Julius Brown Chair Professor
Ph.D., Rice University
Optics and photonics; electromagnetics; microelectronics/microsystems
2012 marks the 50th anniversary of *Applied Optics*, and as part of that celebration, the OSA recognized the 50 most prolific authors in the journal's history. Dr. Gaylord is the journal's 11th most prolific author, with 67 papers that have been cited 1,128 times.

Ronald G. Harley
Duke Power Company Distinguished Professor
Ph.D., London University
Electrical energy

Ajeet Rohatgi
Georgia Power Distinguished Professor; Director of the University Center of Excellence for Photovoltaics Research and Education
Ph.D., Lehigh University
Electrical energy; microelectronics/microsystems
2012 ECE Distinguished Faculty Achievement Award.

Glenn S. Smith (retired August 31, 2011)
John Pippin Chair in Electromagnetics
Ph.D., Harvard University
Electromagnetics

PROFESSORS

Ali Adibi
Director, Advanced Processing-Tools for Electromagnetic/Acoustic Xtals
Ph.D., California Institute of Technology
Optics and photonics; electromagnetics; microelectronics/microsystems
2012 OSA Fellow "for numerous contributions to the field of integrated nanophotonics, lab-on-chip sensing, and volume holography;" 2012 AAAS Fellow "for distinguished contributions to the fields of integrated nanophotonics, photonic crystals, and volume holography."

Ian F. Akyildiz
Byers Professor in Telecommunications
Ph.D., University of Erlangen
Telecommunications
2011 TUBITAK Exclusive Award, the top academic award given by the Republic of Turkey, "for outstanding contributions to the advancement of scholarship/research of a scholar with Turkish origin at an international level."

Yucel Altunbasak
(resigned August 17, 2011)
Ph.D., University of Rochester
Digital signal processing
2012 IEEE Fellow "for contributions to super-resolution imaging, color filter array interpolation, and error-resilient video communications."

Farrokh Ayazi
Co-Director, Center for MEMS and Microsystems Technologies; Director, Georgia Tech Analog Consortium
Ph.D., University of Michigan at Ann Arbor
Electronic design and applications; microelectronics/microsystems

John R. Barry
Ph.D., University of California at Berkeley
Telecommunications

Miroslav M. Begovic
Ph.D., Virginia Polytechnic Institute and State University
Electrical energy
Elected president of the IEEE Power and Energy Society.

Douglas M. Blough
Co-Director, Center for Experimental Research in Computer Systems
Ph.D., The Johns Hopkins University
Computer systems and software



Prof. Oliver Brand and Dr. Allen Robinson received HKN Outstanding Teacher Awards at the ECE Spring Picnic.

Oliver Brand
Co-Director, Center for MEMS and Microsystems Technologies
Ph.D., ETH-Zurich
Bioengineering; microelectronics/microsystems
Appointed associate director for the Institute for Electronics and Nanotechnology; 2012 Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award.

John A. Buck
Ph.D., University of California at Berkeley
Electromagnetics; optics and photonics

Robert J. Butera, Jr.
Faculty Director, Georgia Tech Office of Graduate Studies
Ph.D., Rice University

Bioengineering; computer systems and software
2012 AAAS Fellow "for advances in computational neuroscience and neurotechnology, promoting engineering through society, editorial, and university leadership, and contributing to STEM policy and educational initiatives."

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
VLSI systems and digital design; computer systems and software

David S. Citrin
Ph.D., University of Illinois at Urbana-Champaign
Optics and photonics

Mark A. Clements
Joseph M. Pettit Professor in Digital Signal Processing; 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; computer systems and software

Edward J. Coyle
Arbutus Chair for the Integration of Research and Education; GRA Eminent Scholar; and Director, Arbutus Center for the Integration

of Research and Education
Ph.D., University of Delaware
Digital signal processing

John D. Cressler
Byers Professor
Ph.D., Columbia University
Electronic design and applications; microelectronics/microsystems
Appointed editor-in-chief of *IEEE Transactions on Electron Devices*.

Deepak Divan
Director, Intelligent Power Infrastructure Consortium
Ph.D., University of Calgary
Electrical energy

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
Microelectronics/microsystems; optics and photonics

Magnus Egerstedt
Ph.D., Royal Institute of Technology, Stockholm, Sweden
Systems and controls; computer systems and software
2012 IEEE Fellow "for contributions to hybrid and networked control, with applications in robotics."

Faramarz Fekri
Ph.D., Georgia Institute of Technology
Digital signal processing; telecommunications

Bonnie Heck Ferri
Associate Chair for ECE Graduate Affairs; Director, Teaching Enhancement via Small-Scale Affordable Labs Center
Ph.D., Georgia Institute of Technology
Systems and controls; computer systems and software
Georgia Tech Class of 1934 Outstanding Use of Innovative Education Technology Award; 2012 Faculty Award for Excellence in Teaching, given by the Women in Engineering Program.

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

Thomas G. Habetler
Ph.D., University of Wisconsin at Madison
Electrical energy

James O. Hamblen
Ph.D., Georgia Institute of Technology
Computer systems and software

Jennifer O. Hasler
Ph.D., California Institute of Technology
Electronic design and applications; bioengineering

Joseph L.A. Hughes
Senior Associate Chair
Ph.D., Stanford University
VLSI systems and digital design; microelectronics/microsystems; telecommunications; computer systems and software
Appointment to IEEE Educational Activities Board for 2012.

William D. Hunt
Ph.D., University of Illinois at Urbana-Champaign
Bioengineering; microelectronics/microsystems; electromagnetics

Mary Ann Ingram
ADVANCE Professor of Engineering
Ph.D., Georgia Institute of Technology
Telecommunications

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
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
VLSI systems and digital design; microelectronics/microsystems

J. Stevenson Kenney
Ph.D., Georgia Institute of Technology
Electronic design and applications; telecommunications; electromagnetics

Bernard Kippelen
Director, Center for Organic Photonics and Electronics; Associate Director, Materials and Devices for the Information Technology Research Center
Ph.D., Université Louis Pasteur
Microelectronics/microsystems; optics and photonics

Chin-Hui Lee
Ph.D., University of Washington
Digital signal processing
2012 ISCA Medal "for pioneering and seminal contributions to automatic speech and speaker recognition, including innovations in adaptive learning, discriminative training, and utterance verification."

Ye (Geoffrey) Li
Ph.D., Auburn University
Telecommunications

Vijay K. Madiseti
Ph.D., University of California at Berkeley
Digital signal processing

New Faculty



Abdul Raheem Beyah
Associate Professor
Research interests: Network security; wireless networks; network traffic characterization; network protocol performance

Wenshan Cai
Associate Professor
Research interests: Micro- and nanophotonic structures and devices; plasmonics and metamaterials; nonlinear optics and ultrafast phenomena; optoelectronics and integrated photonics; fiber optics and optical communications; photovoltaics



Thomas M. Conte
Professor (Joint Appointment with the School of Computer Science)
Research interests: Computer architecture; computer optimization

Moinuddin K. Qureshi
Associate Professor
Research interests: High performance computer architecture; scalable memory/storage system design; architecting systems with emerging technology; fault tolerant computing; analytical modeling of computer systems; hybrid and adaptive architectures



Hua Wang
Assistant Professor
Research interests: Broadband and energy-efficient RF/mm-wave integrated circuits and systems; self-healing integrated systems for communication, radar, and biosensing; sub-THz system integration for spectroscopy and imaging; hand-held point-of-care sensing platforms for biomedical and environmental applications; fundamental noise modeling in high-precision measurements





In Memoriam: D. Scott Wills

Georgia Tech and ECE lost a very dear friend and dedicated colleague when D. Scott Wills died on December 2, 2011 after a long, brave battle with melanoma. He was 51 years old.

Known for his great enthusiasm and passion for his students and love of learning, Dr. Wills joined the ECE faculty in 1991. He taught in the area of computer engineering, including the introduction to computer engineering course and courses in mechanisms for computing systems, computer architecture, and embedded video surveillance.

A very popular, award-winning teacher, Dr. Wills taught almost 2,900 students in 83 classes. Most recently, in 2009, he was honored with the Georgia Tech Outstanding Innovative Use of Education Technology Award, which he received with his wife and collaborator, Linda Wills, and the School of ECE Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award, which is determined by a majority vote of the ECE senior class.

Dr. Wills' research interests were in the areas of embedded surveillance systems, portable image processing architectures, and supercomputer interconnection networks. During his career, he graduated 23 Ph.D. students and seven master's students and supervised over 24 undergraduate researchers. One-third of his doctoral students are in university positions and two-thirds have joined leading electronics companies, including Intel, Motorola, Qualcomm, Samsung, and Sarnoff Corporation.

A passionate advocate for engineering education, Dr. Wills was a leader in defining the new computer engineering curriculum within the School of ECE and served on joint College of Computing/College of Engineering committees that formed new educational programs. He also led on the Institute level, serving on both the Georgia Tech Undergraduate Curriculum Committee and the Graduate Curriculum Committee.

Dr. Wills' personal concern for students and his unselfish efforts to creating classes with appropriate, innovative uses of modern IT have been inspirational to students and faculty alike. One of Dr. Wills' students once said of him, "I don't know of any other person who has better infused in students the passion for the subject that he or she possesses."

Gary S. May (appointed as Dean of the Georgia Tech College of Engineering, effective July 1, 2011)
Ph.D., University of California at Berkeley
Microelectronics/microsystems; systems and controls

James H. McClellan
John and Marilu McCarty Chair of Electrical Engineering; Director, Center for Signal and Image Processing
Ph.D., Rice University
Digital signal processing
2012 D. Scott Wills ECE Distinguished Mentor Award.

Steven W. McLaughlin (appointed Steve W. Chaddick School Chair, effective September 1, 2012)
Vice Provost for International Initiatives; Byers Professor
Ph.D., University of Michigan at Ann Arbor
Telecommunications

James D. Meindl
Joseph M. Pettit Chair in Microelectronics; Director, Microelectronics Research Center; and Founding Director, Nanotechnology Research Center
Ph.D., Carnegie-Mellon University
Microelectronics/microsystems

A.P. Sakis Meliopoulos
Georgia Power Distinguished Professor
Ph.D., Georgia Institute of Technology
Electrical energy; systems and controls

Jennifer E. Michaels (appointed Interim Associate Chair for ECE Undergraduate Affairs, effective July 1, 2011)
Co-Director, Teaching Enhancement via Small-Scale Affordable Labs Center
Ph.D., Cornell University
Digital signal processing; systems and controls

Henry L. Owen
Ph.D., Georgia Institute of Technology
Computer systems and software; telecommunications

Ioannis (John) Papapolymerou
Associate Director, Georgia Electronic Design Center
Ph.D., University of Michigan at Ann Arbor
Electromagnetics; electronic design and applications
Appointed as member of the IEEE TAB Periodicals Review and Advisory Committee; 2012 H.A. Wheeler Prize Paper Award of the IEEE Antennas and Propagation Society; appointed editor-in-chief of *IEEE Microwave and Wireless Components Letters*.

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

Stephen E. Ralph
Director, Georgia Electronic Design Center
Ph.D., Cornell University
Electromagnetics; microelectronics/microsystems; optics and photonics

Waymond R. Scott, Jr.
Ph.D., Georgia Institute of Technology
Electromagnetics

Jeff S. Shamma
Julian T. Hightower Chair in Systems and Controls
Ph.D., Massachusetts Institute of Technology
Systems and controls

Raghupathy Sivakumar
Ph.D., University of Illinois at Urbana-Champaign
Telecommunications; computer systems and software

Paul G. Steffes
Associate Chair for ECE Research
Ph.D., Stanford University
Electromagnetics; telecommunications
2012 AAAS Fellow "for contributions to the understanding of planetary atmospheres through innovative microwave measurements."

Gordon L. Stüber
Joseph M. Pettit Professor in Communications
Ph.D., University of Waterloo
Telecommunications

Madhavan Swaminathan
Joseph M. Pettit Professor in Electronics; Director, Interconnect and Packaging Center
Ph.D., Syracuse University
Electromagnetics
Guest professorship at Zhejiang University, Department of Information Science and Electronics Engineering; Distinguished Lecturer for the IEEE Electromagnetic Compatibility Society.

Allen Tannenbaum (resigned July 1, 2011)
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

Emmanouil M. Tentzeris
Ph.D., University of Michigan at Ann Arbor
Electromagnetics; electronic design and applications

Rao R. Tummala
Director, 3D Systems Packaging Research Center; Joseph M. Pettit Chair in Electronics Packaging; GRA Eminent Scholar
Ph.D., University of Illinois at Urbana-Champaign
Microelectronics/microsystems

Erik I. Verriest
Ph.D., Stanford University
Systems and controls; bioengineering
2012 IEEE Fellow "for contributions to delay systems and modeling time varying and nonlinear systems."

Yorai Y. Wardi
Ph.D., University of California at Berkeley
Systems and controls; telecommunications

Douglas B. Williams (appointed Interim Chair for the School of Electrical and Computer Engineering, effective July 1, 2011; appointed Senior Associate Chair, effective October 1, 2012)
Associate Chair for ECE Undergraduate Affairs; Co-Director, Teaching Enhancement via Small-Scale Affordable Labs Center
Ph.D., Rice University
Digital signal processing

D. Scott Wills (died December 2, 2011)
Sc.D., Massachusetts Institute of Technology
Computer systems and software; VLSI systems and digital design

Marilyn C. Wolf
Rhesa "Ray" S. Farmer, Jr. Distinguished Chair in Embedded Computing Systems and GRA Eminent Scholar
Ph.D., Stanford University
VLSI systems and digital design; digital signal processing

Sudhakar Yalamanchili
Co-Director, Center for Experimental Research in Computer Systems
Ph.D., University of Texas at Austin
Computer systems and software; VLSI systems and digital design

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

G. Tong Zhou
Director, Georgia Tech Shanghai Initiative
Ph.D., University of Virginia
Bioengineering; digital signal processing
2012 IEEE Fellow "for contributions to the analysis of nonlinear signals and systems;" 2012 Steven A. Denning Award for Global Engagement.

ASSOCIATE PROFESSORS

David V. Anderson
Ph.D., Georgia Institute of Technology
Computer systems and software; digital signal processing; electronic design and applications

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

Muhannad Bakir
Associate Director, Interconnect and Packaging Center
Ph.D., Georgia Institute of Technology
Microelectronics/microsystems
2012 DARPA Young Faculty Award for "Radical Silicon Interconnection Platform for Ultimate Performance Electronics;" 2012 participant in the NAE 18th annual Frontiers of Engineering Symposium.

Abdul R. (Raheem) Beyah
Ph.D., Georgia Institute of Technology
Computer systems and software

Wenshan Cai
Ph.D., Purdue University
Optics and photonics

Jeffrey A. Davis
Ph.D., Georgia Institute of Technology
VLSI systems and digital design; microelectronics/microsystems

W. Alan Doolittle
Ph.D., Georgia Institute of Technology
Microelectronics/microsystems

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

Maysam Ghovanloo
ON Semiconductor Junior Professor
Ph.D., University of Michigan at Ann Arbor
Bioengineering; electronic design and applications

Santiago Grijalva
Ph.D., University of Illinois at Urbana-Champaign
Electrical energy; computer systems and software
Appointed associate director for electrical energy systems with the Georgia Tech Strategic Energy Institute.

Ayanna Howard
Ph.D., University of Southern California
Systems and controls

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

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

Kevin T. Kornegay (resigned May 16, 2012)
Motorola Foundation Professor
Ph.D., University of California at Berkeley
Electronic design and applications; microelectronics/microsystems

Aaron D. Lanterman
Ph.D., Washington University in St. Louis
Digital signal processing; computer systems and software

Hsien-Hsin Sean Lee
Ph.D., University of Michigan at Ann Arbor
Computer systems and software
2011 IBM Faculty Award for his project, "Architectural Exploration for Emerging Memory Technologies;" ACM/IEEE Symposium on Architectures for Networking

and Communications Systems Best Paper Award for "Ally: OS-Transparent Packet Inspection Using Sequestered Cores."

Sung Kyu Lim
Ph.D., University of California at Los Angeles
VLSI systems and digital design

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

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

Vincent J. Mooney, III
Ph.D., Stanford University
VLSI systems and digital design

Moinuddin K. Qureshi
Ph.D., University of Texas at Austin
Computer systems and software

George F. Riley
Ph.D., Georgia Institute of Technology
Computer systems and software

Gabriel Rincón-Mora
Ph.D., Georgia Institute of Technology
Electrical energy; electronic design and applications

Justin K. Romberg
Ph.D., Rice University
Digital signal processing
2012 ECE Outstanding Junior Faculty Member Award.

David E. Schimmel
Ph.D., Cornell University
VLSI systems and digital design; computer systems and software

Shyh-Chiang Shen
Ph.D., University of Illinois at Urbana-Champaign
Microelectronics/microsystems
Georgia Tech Senior Faculty Outstanding Undergraduate Research Mentor Award.

Patricio Vela
Goizueta Foundation Junior Faculty Rotating Professorship
Ph.D., California Institute of Technology
Systems and controls

Linda M. Wills
Ph.D., Massachusetts Institute of Technology
Computer systems and software; VLSI systems and digital design

P. Douglas Yoder
Ph.D., University of Illinois at Urbana-Champaign
Microelectronics/microsystems

ASSISTANT PROFESSORS

Pamela T. Bhatti
Ph.D., University of Michigan at Ann Arbor
Bioengineering; microelectronics/microsystems

Jongman Kim
Ph.D., Pennsylvania State University
Computer systems and software

IEEE 13th International Conference on High Performance Computing and Communications Best Paper Award for "A High-Performance and Energy-Efficient Virtually Tagged Stack Cache Architecture for Multi-Core Environments."

Saibal Mukhopadhyay
Ph.D., Purdue University
VLSI systems and digital design; microelectronics/microsystems; electronic design and applications
2012 Office of Naval Research Young Investigator Award for "OROE: On-Line Real-Time Optimal Energy Balancing for Self-Powered Environment Adaptive Sensor Node;" 2012 ECE Outstanding Junior Faculty Member Award.

Azad Naeemi
Ph.D., Georgia Institute of Technology
Microelectronics/microsystems

Christopher J. Rozell
Ph.D., Rice University
Bioengineering; digital signal processing

Hua Wang
Ph.D., California Institute of Technology
Bioengineering; electronic design and applications

Fumin Zhang
Ph.D., University of Maryland at College Park
Systems and controls
2012 Class of 1969 CETL Teaching Scholars Program.

PROFESSOR OF THE PRACTICE

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

FACULTY WITH JOINT APPOINTMENTS IN ECE

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

Thomas M. Conte, Professor, School of Computer Science, College of Computing

Stephen P. DeWeerth, Professor, Wallace H. Coulter Department of Biomedical Engineering

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

Levent Degertekin, Professor and George W. Woodruff Chair in Mechanical Systems, George W. Woodruff School of Mechanical Engineering

Yogendra Joshi, Professor and John M. McKenney and Warren D. Shiver Distinguished Chair in Building Mechanical Systems, George W. Woodruff School of Mechanical Engineering

Georgia Tech-Savannah Faculty

ASSOCIATE PROFESSORS

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

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

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

ASSISTANT PROFESSORS

Bo Hong
Ph.D., University of Southern California
Computer systems and software
2012 Class of 1969 CETL Teaching Fellows Program.

Hongwei Wu (resigned May 17, 2012)
Ph.D., University of Southern California
Bioengineering; digital signal processing

Ying Zhang
Ph.D., University of California at Berkeley
Microsystems
University of Illinois at Urbana-Champaign
Digital signal processing; systems and controls; microelectronics/microsystems
2012 Lockheed Dean's Excellence in Teaching Award.

Georgia Tech-Lorraine Faculty

PROFESSOR

Abdallah Ougazzaden
Director, International Research Unit on Telecommunications and Innovative Materials Research, and GT-L Director
Ph.D., University of Paris VII
Microelectronics/microsystems; optics and photonics

ASSISTANT PROFESSORS

Matthieu Bloch
Ph.D., Georgia Institute of Technology
Telecommunications
2012 Class of 1969 Teaching Fellows Program.

Paul L. Voss
Demetrius T. Paris Professor
Ph.D., Northwestern University
Optics and photonics

This list defines acronyms and abbreviations found throughout the 2011-12 Annual Report for the School of Electrical and Computer Engineering.

GEORGIA TECH/ECE

- ATDC – Advanced Technology Development Center
- CAP – Corporate Affiliates Program
- CoE/COE – College of Engineering
- ECE – Electrical and Computer Engineering
- GT – Georgia Tech
- GTF – Georgia Tech Foundation
- GT-L – Georgia Tech-Lorraine
- GTRI – Georgia Tech Research Institute
- GTRIC – Georgia Tech Research and Innovation Conference
- ORS – Opportunity Research Scholars Program

COMPANIES AND ORGANIZATIONS

- AAAS – American Association for the Advancement of Science
- ASNT – American Society of Nondestructive Testing
- FIRST – For Inspiration and Recognition of Science and Technology
- GRA – Georgia Research Alliance
- HKN – Eta Kappa Nu
- ISCA – International Speech Communication Association
- MTT-S – Microwave Theory and Techniques Society (a technical society of IEEE)
- NSTRF – NASA Space Technology Research Fellows
- OSA – Optical Society of America
- SRC – Semiconductor Research Corporation
- WECE – Women in Electrical and Computer Engineering

GOVERNMENTAL AGENCIES AND UNIVERSITIES

- DARPA – Defense Advanced Research Projects Agency
- DoD – Department of Defense
- EPA – Environmental Protection Agency
- NASA – National Aeronautics and Space Administration
- NSF – National Science Foundation
- ONR – Office of Naval Research

TECHNICAL OR GENERAL ABBREVIATIONS

- 3D – Three-Dimensional

- BiCMOS – Bipolar Junction Transistor Complementary Metal Oxide Semiconductor
- CEO – Chief Executive Officer
- CFO – Chief Financial Officer
- CMOS – Complementary Metal Oxide Semiconductor
- CmpE – Computer Engineering
- CSO – Chief Science Officer
- CTO – Chief Technical Officer
- DSP – Digital Signal Processing
- EE – Electrical Engineering
- EM - Electromagnetics
- EMI – Electromagnetic Interference
- FDTD – Finite-Difference Time-Domain
- FY – Fiscal Year
- G – Gigabit
- GPA – Grade Point Average
- GRE – Graduate Record Exam
- HBT – Heterojunction Bipolar Transistor
- IC – Integrated Circuit
- MEA – Multi-electrode Array
- MEMS – Microelectromechanical Systems
- MIMO – Multiple-Input Multiple-Output
- MM – Millimeter
- OFDM – Orthogonal Frequency Division Multiplexing
- R&D – Research and Development
- RF – Radio Frequency
- RFIC – Radio Frequency Integrated Circuit
- SAT – Scholastic Aptitude Test
- SiGe – Silicon Germanium
- SoI – Silicon on Insulator
- THz – Terahertz
- VAR – Volt-Ampere Reactive

School of Electrical and Computer Engineering
 Georgia Institute of Technology
 777 Atlantic Drive, N.W.
 Atlanta, GA 30332-0250 USA

- 404.894.2901 ECE Main Office
- 404.894.4641 ECE Main Office Fax

SCHOOL CHAIR'S OFFICE

- 404.894.2902 Steve W. Chaddick School Chair, Steven W. McLaughlin
- 404.894.4468 Assistant to the Chair, Teresa Dodd

ASSOCIATE CHAIRS

- 404.894.9832 Senior Associate Chair, Douglas B. Williams
- 404.894.2975 Joseph L.A. Hughes
- 404.894.4697 ECE Faculty Development, Andrew F. Peterson
- 404.894.4767 ECE Graduate Affairs, George F. Riley
- 404.894.3145 ECE Undergraduate Affairs, Bonnie Ferri
- 404.894.3128 ECE Research, Paul G. Steffes

OFFICES

- 404.894.2946 Undergraduate Affairs
- 404.894.2983 Graduate Affairs
- 404.894.4733 Business Operations and Facilities
- 404.894.7337 Accounting
- 404.894.7574 Human Resources
- 404.894.0274 Development-Alumni Relations
- 404.894.6888 Development-Corporate Relations
- 404.894.2906 Communications

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The 2011-12 Annual Report of the School of Electrical and Computer Engineering is produced by Jackie Nemeth, Manager-Communications; Diana Fouts, Graphics Specialist of the ECE Communications Office; and Sarah Collins, Graphics Specialist of the CoE Communications Office.

Additional ECE credits: Christopher Malbrue, ECE Academic Affairs Office; Harry Beck, Linda Dillon, and Siri Melkote, ECE Business Office; Martina Emmerson Hubbarth, ECE Development Office; Mark A. Richards, ECE Research Office; Prabha Viswanathan, WECE; Layla Marshall, IEEE Student Branch.

Additional contributors: Abby Vogel Robinson, Rick Robinson, and John Toon, Georgia Tech Research News and Publications Office; Rob Felt, Lisa Grovenstein, Liz Klipp, Jason Maderer, Matt Nagel, Amelia Pavlik, and Dan Treadaway, Georgia Tech Communications and Marketing; Chris Walker and Patrice Miles, Georgia Tech Professional Education; Sandra Song, Georgia Tech-Lorraine; Douglas Cox, Solar Jackets; Gary Meek Photography.



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