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 Abdii 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 Comley 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, Éta 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—DEI Pad and Styli—were finalists in the 2012 InVenture Prize Competition, with Styli 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

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Doug Williams
Professor and Senior Associate Chair
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.

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.
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 photonics. 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.

Costley Chosen for Lindau Meeting of Nobel Laureates

Mitch Costley was selected to attend the Lindau Meeting of Nobel Laureates, which took place July 1-5 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.

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 “OROE: 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.

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 inEta Kappa Nu, and he also co-founded Georgia Tech StartUpU, 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 Leifonda 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.

Dr. Zhang has been a member of the ECE faculty since 2006. He serves as a participant in the Georgia Tech Office of Naval Research Young Investigator Program. Dr. Zhang’s research is funded by NSF, the U.S. Department of Energy, or Mars, Inc., and consists of U.S. doctoral students 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.

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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. Tentesis (left) and his team are using inkjet printers to combine sensors, microprocessors, and communication capabilities on paper or flexible substrates. The resulting self-powered wireless sensors could be used for chemical, biological, heat, and stress sensing.

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.

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 their 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’ vocalization 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 into 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 existing 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.

ECE Teams Advance to 2012 InVenture Prize Finals

Two teams with students from ECE—Styli and DEIT Pad—were among the six finalists in the 2012 InVenture Prize Competition, with Styli eventually taking home the second place prize of a free U.S. patent filing by Georgia Tech; automatic acceptance into Flashpoint, a Georgia Tech student accelerator; and a $5,000 cash prize. The event took place March 13 at the First Center for the Arts on the Georgia Tech campus and was televised live on Georgia Public Broadcasting.

Styli: An extraordinarily precise and pressure-sensitive capacitive stylus, Styli can be used for any touch screen device (like an iPad or an i-cell phone) and would allow a user to trace thin lines on a 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.

DEIT 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 DEIT pad. The team is made up of David Burke, a computer engineering major from Canton, Ga.; Jarred Vallbracht, an electrical engineering major from 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. Lattman.

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


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 Versus Stereo Reconstruction of Ocean Waves.” His advisors are Anthony Zeyti and Francesco Fedele.

More information on these faculty research projects may be found in the media section of www.ece.gatech.edu.
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 Berthélot 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.

Asanka, Axion Biosystems among Class of 2012 ATDC Graduates

Asanka 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.

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

Axion, a cloud services provider, also selected Asanka to help their business. By using Asanka’s RAPID solution, the company has been able to significantly increase the throughput of file transfers and deliver a superior cloud storage environment. Asanka’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 brainwave 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 300 drugs 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

Asanka* | Co-Founder and CTO: Raghupathy Sivakumar
Axion Biosystems | Board of Directors: Mark G. Allen
CardiMEMS | Co-Founder and CTO: Mark G. Allen
EGT | CEO: Nikolaj Jylant
GTronix* | Co-Founder and CTO: Nassim Al-Regib
Innovata* | Chair, CTO, and Co-Founder: Deepak Divan
Lancope | Founder: John A. Copeland
Nexidia | Co-Founder and Board Member: Mark A. Clements
Suriva* | Founder and CTO: Ajeet Rohatgi

ATDC ECE Start-Up Companies

GTronix* | Co-Founder, CSO, and Board Member: Jennifer O. Hasler
Qualbit* | Co-Founder and CTO: Farrokh Ayazi
VOLink* | Co-Founder and Interim CEO: Nikolaj Jylant

* 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.gte.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 DME637 | Ghassan Al-Riqabi
Integrated Grounding System Design and Testing | A.P. Sakis Meliopoulos
Modern Energy Management Systems | A.P. Sakis Meliopoulos
Near-Fiel 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, Jr.
2012 Fault and Disturbance Analysis Conference | A.P. Sakis Meliopoulos
2012 Annual Protective Relaying Conference | A.P. Sakis Meliopoulos

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.

In 2010, Whisper Communications was founded by Steven W. McLaughlin (above left) and alumni of his research group Demijan Klinc and Cenk Argon, this VentureLab has 17 start-up opportunities in various stages of development that are being evaluated by VentureLab, a service of ATDC.

Based on patent pending technology co-developed by

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 encoded 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 hopefully garbled beyond that distance.

Businesses that sell online financial transactions, such as credit card purchases, are highly motivated to protect the data that can be stolen through the merchant terminal—which legally established the Lafayette Institute, a €28 million (approximately $37 million) facility that will facilitate 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.
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 Bohanan, 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.
ECE GRADUATES HONORED AT 2012 COLLEGE OF ENGINEERING ALUMNI AWARDS

Two ECE alumni—Mark A. Randolph (BSEE ’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 Rice 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 CoDean 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 contracting company. He has been involved with the National Electrical Contractors Association, an organization serving over 4,000 members, and has held offices both locally and nationally.

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 under-graduate research model. Funding is used to support both under-graduate 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 Semiconduc tor Research Corporation Education Alliance. To support the Intel initiative, SRC provided funds for two students to attend the 2011 Techcon Conference in Austin, Texas: to present their research. Other industry funding was provided by Cominx, 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, education, 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.

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<td>FOR CURRENT OPERATIONS</td>
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Eaton Charitable Fund
Fidelity Investment Charitable Gift Fund
Harris Corporation Foundation
International Foundation for Telemetering
Jewish Federation of Greater Atlanta
John and Mary Franklin Foundation, Inc.
Lockheed Martin Foundation
Nokia Southern Foundation
Otto & Jenny Krauss Charitable Foundation
SCEEE
Shanghai Jiao Tong University
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

<table>
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<tr>
<th>Gifts and giving</th>
<th>Institutions</th>
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<td>AOC Technologies, Inc.</td>
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<td>Allied Energy Services, LLC</td>
<td>AOC Technologies, Inc.</td>
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<td>Boeing Company</td>
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<td>Cisco Systems, Inc.</td>
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<td>Comin, Inc.</td>
<td>ExxonMobil Corporation</td>
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<td>Ford Motor Company</td>
<td>Future/We Technologies, Inc.</td>
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<td>Gamer Economic Systems</td>
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<td>Integrated Device Technology, Inc.</td>
<td>Interim Corporation</td>
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<td>Intesl Corporation</td>
<td>Linear Technology Corporation</td>
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<td>Lockheed Martin</td>
<td>Lockheed Martin Aeronautics Company</td>
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<td>MacLean Power Systems - Bethel National Instruments</td>
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<td>Northrop Grumman</td>
<td>NVIDIA Corporation</td>
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<td>Oracle America, Inc.</td>
<td>Pinay Bowes, Inc.</td>
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<td>Pixel Sand, Inc.</td>
<td>Procter &amp; Gamble Company</td>
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<td>Raytheon</td>
<td>RF Micro Devices</td>
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<td>Robert Bosch Corporation</td>
<td>Smith Wire Grid, Inc.</td>
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<td>Southern Company Services, Inc.</td>
<td>Taylor Exhibition Services, Inc.</td>
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<td>Texas Instruments, Inc.</td>
<td>Union Pacific Railroad</td>
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<td>Williams Benator &amp; Libby, LLP</td>
<td>ZTE USA, Inc.</td>
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Entrekins’ Estate Gift Embraces a Wide Range of Priorities

Ken R. Entarkin, 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. Entarkin. “Thinking logically was part of the thought process at Georgia Tech, and that has helped tremendously in my career.”

Mr. Entarkin 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 seven years, and currently from Steve McLaughlin,” Mr. Entarkin 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 an ECE alumnus—provides a much-needed update for classroom and office space.

“As for his support for the Scheller College, Mr. Entarkin 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 Entrekins family tradition has continued at Tech with daughter Angela Entarkin Medley, BIEL ’96; son-in-law Brian Medley, IE ’95; and son Cliff Entarkin, MS ECON 2006. The Medleys live in the Atlanta area with their three future Yellow Jacket children: Savannah, Nathan, and Jack. Cliff Entarkin currently lives and works in Hong Kong. Kan Entarkin’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. Entarkin 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 Entarkin Medley. “Tech gave my Dad a 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 retired chairman of ADTRAN Inc. in Huntsville, Ala., Mr. Smith was a strong supporter of higher education and created Georgia Tech with laying the foundation for his career success at ADTRAN, a leading global provider of networking and communications solutions. 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 2009.

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 supporting a world-class research and education program at the intersection 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 the generosity of Linda and Mark 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.”

Entarkin and Smith families have a long history of donating to Georgia Tech. The retired chairman of ADTRAN Inc. in 1962 Reunion Committee. “His 50th reunion is, of course, the perfect time for us to honor 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.”

Campaign Georgia Tech

Geometry on Our page, 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 funding 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 2012.

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 Elita Pittman.

Please direct any inquiries regarding how you can support the School of Georgia Tech to Martina Emmerson Hubbard, director of ECE alumni development, at 404.894.0274 or martina.hubbard@ece.gatech.edu, or to Elita Pittman, director of ECE corporate development at 404.894.6888 or elita.pittman@ece.gatech.edu.
Students 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 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 Alaska Native Native Hawaiian or Other Pacific Islander White Two or More Racial Groups Not Reported Female Male

Graduate 157,310 31% 17% 1% 0% 47% 3% 1% 12%

Ph.D. 570 307 15 24 0 0 189 13 11 87

Ph.D. Robotics* 1 1 0 0 0 3 1 0 0

Ph.D. Bioengineering* 2

Ph.D. 570 307 15 24 0 0 189 13 11 87

Ph.D. Robotics* 1 1 0 0 0 3 1 0 0

M.S./M.S.E.C.E. 559 307 15 24 0 0 189 13 11 87

M.S. 4 0 0 0 0 4 0 0 0 2

M.S. Engineering* 4 2 0 0 0 2 0 1 0 1

Ph.D. Electrical Engineering 570 307 25 21 0 0 197 10 7 10 71

Ph.D. Electrical Engineering 10 2 0 0 0 1 6 1 0 5

Ph.D. Electrical Engineering 10 3 1 0 1 0 5 0 1 0

Total 723 54% 4% 4% 1% 35% 2% 2% 14%

DEGREES AWARDED (Summer 2011-Spring 2012)

Total Asian Black Hispanic American Indian Alaska Native American Indian Alaska Native Female Male

B.S.E.E. 203 59 20 10 5 1 1 6 1 37

B.S.E.E. 65 14 4 6 38 1 0 2 6

Total 268 277 12 9 132 10 1 2 18

M.S./S.E.C.E. 343 177 12 9 132 10 1 2 18

M.S. Engineering* 4 1 0 0 3 0 0 0 2

Ph.D. 105 66 4 2 32 0 0 0 1

Ph.D. Electrical Engineering 1 0 0 0 0 0 0 0 0

Ph.D. Robotics* 1 0 0 0 0 0 0 0 0

Total 455 54% 4% 2% 37% 2% 1% 1% 16%

*with home departments in ECE

723 DEGREES AWARDED (Summer 2011-Spring 2012)

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 key driver 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 mathematics, 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.

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 2,000 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 Elita Pittman, director of ECE corporate development, at 404.894.6888 or etta.pittman@ece.gatech.edu

Hsuhe Eams IEEE Photonics Society Graduate Fellowship

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

Chileh, Banerjee Receive IEEE MTT-S Honors

Outmane Lemtiri Chlieh and Aritra Banerjee received joint 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 Anitra Banerjee received an IEEE MTT-S Graduate Fellowship. A master's degree student in John Papapolymerou's research group, Mr. Chlieh works on CMSOS 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 Chattejee’s research group, Mr. Banerjee works on designing and testing digitally assisted 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 platforms.

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 research study 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. Michael 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.
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.

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.

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 resumes 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/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 1,850 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 as a 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 ages 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.
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 Adolaf Allahmohammadi
MkDr
Compact Variation-Aware Standard Cell Models for Statistical Static Timing Analysis
Component Design Engineer, Intel Custom Foundry, Intel Corp., Portland, Ore.

Amr Hossein Azabali
Adib
Reconfigurable Silicon Photonic Devices for Optical Signal Processing
Technical Staff/Postdoctoral Fellow, Sinorica, Inc., Atlanta, Ga.

Kanily Glatubosun Babatola
Butera
Brain Computer Interfaces for Inducing Brain Plasticity and Motor Learning: Implications for Brain Injury Rehabilitation
DSP Engineer, Zeta Associates, Fairfax, Va.

Muhammad Musagr Bashir
MkDr
Modeling Reliability in Copper/Low-K Interconnects and Variability in CMOS
Yield Research Engineer, Intel Corp., Portland, Ore.

Lukin Armitage Beadles
Brand
Liquid Phase Operation of MEMS Sensors for Biochemical Sensing in Point of Care and Embedded Applications
Medical student, Albany Medical College, Albany, N.Y.

Sunho Beck
Tenters
An Interface-Cancellation Receiver for Multi-Band and Multi-Standard Wireless Communications Systems
Analog design engineer, Texas Instruments, Dallas, Tex.

Douglas Walter Brown
Vochteavansy
A Prognostic Health Management Based Framework for Fault-Tolerant Control
Not known

Matthew Crane
Lu
Automated Quantitative Phenotyping and High-Throughput Screening of C. elegans using Microfluidics and Computer Vision
Research Center for Synthetic and Systems Biology, University of Edinburgh, Edinburgh, Scotland

Achraf Goyal
Swammanthan
Methodologies for Low Cost Testing and Self Healing of RF Systems
SUH Oracle Research, Redwood Shores, Calif.

Stefan Grubic
Habetler
Online Monitoring of Turbomachinery Diagnostics in Mach-5 Induction Machines using Online Surfing Techniques
Owner, Hidden Solutions, LLC, Orlando, Fla.

James Stroman
J. Michaels
Adaptive Dispersion Compensation and Ultra-spectral Imaging for Structural Health Monitoring
Analog Engineer, Intel Corp., Portland, Ore.

Yan-Yu Huang
Kenney
CMOS Bias Control and Phase Control Circuits Designs for Multi-Standard Wireless Communication Systems
Senior Signal Integrity Engineer, NVIDIA, Santa Clara, Calif.

SeungHyun Eddy Haung
Swammanthan
Characterization and Design of Embedded Passive Circuits for Applications up to Millimeter-Wave Frequency
Design Engineer, Texas Instruments, Dallas, Tex.

Hyung Wook Kim
Tenters
CMOS Radio-Frequency Power Amplifiers for Multi-Standard Wireless Communications
Senior Engineer, Qualcomm, Santa Clara, Calif.

Hanjun Kim
Koregay
High Performance Radio-Frequency and Millimeter-Wave Front-End Integrated Circuits Design in Silicon-Based Systems
STMicroelectronics, Hilsboro, Ore.

Se Hun Kook
Chatterjee
Low-Cost Test of High-Precision Analog-to-Digital Converters
Not known

Kun Sook Lee
Kenney
Wideband Phase-Locked Loops with High Spectral Purity for Wireless Communications
Staff RFIC Designer, Marvell Semiconductor, Santa Clara, Calif.

Andrew Geier
Ferguson
Development of Wide Bandgap Solid-State Neutron Detectors
Postdoctoral Fellow, Department of ECE, University of North Carolina at Charlotte, Charlotte, N.C.

Usman Saeed
Paterson
Adaptive Numerical Techniques for the Solution of Electromagnetic Integral Equations
GE, Florence, S.C.

Jyoti Saxty
Dhan
Direct AC Control of Grid-Assets
Power Electronics R&D engineer, ABB, Inc., Raleigh, N.C.

Ehsan Shah Hosseini
Adib
High Quality Integrated Silicon Nitride Nanophotonics Structures for Visible Light Applications
Postdoctoral Fellow, Massachusetts Institute of Technology, Cambridge, Mass.

Zhi Sun
Aklydz
Reliable and Efficient Communication in Wireless Underground Sensor Networks
Department of Electrical Engineering, State University of New York at Buffalo, Buffalo, N.Y.

Nayanaaryan Tendulkar Varadarajan
Swammanthan
Fast Methods for Full-Wave Electromagnetic Simulations of Integrated Circuit Package Modules
Intel Corp., Chandler, Ariz.

Ryan Sian Westlie
Hunt
Investigation of Phonic Crystals for Dispersive Surface Acoustic Wave Oscillator Sensors
Research Engineer II, Advanced Concepts Laboratory, GTRI, Atlanta, Ga.

Stephen Vincent Williams
Howard
Visual Arctis Navigation: Techniques for Autonomous Agents in Geospatial Environments
Postdoctoral Researcher, College of Computing, Georgia Tech, Atlanta, Ga.

**FALL 2011**

Saman Muhammad Adam
Barnes
Target Tracking Using Residual Vector Quantization
Leutenant Colonel, Pakistan Army, Islamabad, Pakistan

Eman Ayad
Fei
Iterative Algorithms for Trust and Reputation Management and Recomender Systems
Postdoctoral Fellow, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland

Tapobrata Banerjee
Tumala
Modeling, Design, and Characterization of Through Vias in Silicon and Glass Interposers
Design Engineer, Texas Instruments, Dallas, Tex.

Charles Henry Camp
Adib
Label Free Flow Cytometry using Multiplexed Anti-Stokes Raman Scattering Spectroscopy
Postdoctoral Fellow, National Institute of Standards and Technology, Bethesda, Md.

David Chung
Pappatou-menou
Development of System Level Integration of Compact RF Components on Multi-layer Liquid Crystal Polymer
RF System Engineer, Space Electronics System Development, Naval Research Laboratory, Washington, D.C.

Rui Dai
Akyldz
Correlation-Based Communication in Wireless Multimedia Sensor Networks
Design Engineer, Adtran, Huntsville, Ala.

Thomas Frederick Detweiler
Ralph
Continuous Phase Modulation for High Speed Fiber-Optic Links
Postdoctoral Scholar, Stanford University, Stanford, Calif.

Ruthika Devaraj
Stevens
The Centimeter-and Millimeter-Wavelength Ammonia Absorption Spectra under Jupiter Conditions
Postdoctoral Scholar, Duke University, Durham, N.C.

Gregory Frederick
Yalamanchi
Harmony: An Evolution Model for Heterogeneous Systems
Research Scientist, NVIDIA Corporation, Santa Clara, Calif.

Salih Dikbas
Altunbasak
A Low-Complexity Approach for Motion-Compensated Video Frame Rate Up-Conversion
Systems Engineer, Texas Instruments, Dallas, Tex.

Ali Raghib
Eltehrar
Nanoscale Light-Matter Interactions in the Near-Field of High-Q Microresonators
Research Engineer, School of ECE, Georgia Tech, Atlanta, Ga.

Shu-Hao Fan
Chang
Convergence of Millimeter-Wave and Photonic Interconnect Systems for Very-High-Throughput Digital Communication Applications
Optical System Engineer, Clarify, Los Altos, Calif.

Jason M. George Anderson
Ladkrabang
Harnessing Resilience: Biased Voltage Overscaling Probabilistic Signal Processing
Partner, Censci, Austin, Tex.

Rutchanee Guayanan
T. Michaelis
A Calibration Methodology for Energy Diapositive X-Ray Fluorescence Measurements Based upon Synthetically Generated Reference Spectra
Lecturer, King Mongkut's Institute of Technology Ladkrabang, Ladkrabang, Bangkok, Thailand

Geekor Gurun
Degebritke
Integrated Electronics Design for High Frequency Intravascular Ultrasound Imaging
IC Design Member of Technical Staff, Maxim Integrated Products, Hillsboro, Ore.

Lie Hou
Huml anch
Reduced-Data Magnetic Resonance Imaging Reconstruction Methods: Constraints and Solutions
Senior Member of Technical Staff, Draper Laboratory, Cambridge, Mass.

Stephen Jonathan Horst
Cresler
Frequency Synthesis of Single-Band CMOS Processes
Research Engineer, NASA Jet Propulsion Laboratory, Pasadena, Calif.

Zaheer Tanvi Khan
Soren
Design of Power Delivery Network for Noise Suppression and Tolerant Control
Partner, Censci, Austin, Tex.

Syed Ali Hassan
Ingram
Stochastic Modeling of Cooperative Wireless Multi-Hop Networks
Not known

Stephen Jonathan Horst
Cresler
Frequency Synthesis of Single-Band CMOS Processes
Research Engineer, NASA Jet Propulsion Laboratory, Pasadena, Calif.

Suzanne Lynn Hul
Ahmed
Design of Power Delivery Network for Noise Suppression and Tolerant Control
Senior Member of Technical Staff, Draper Laboratory, Cambridge, Mass.

Xueliang Huang
Hovanciko
Tongue Drive: A Wireless Tongue-Based Assistive Technology for People with Severe Disabilities
Hardware Engineer, Microsoft Corp., Redmond, Wash.

Yi Yang
Dhan
Power Line Sensor Networks for Enhancing Power Line Reliability and Utilization
Specialist-Engineering, Eaton Corporation Innovation Center, Milwaukee, Wis.

Seungil Yoon
Kim
Cross-Layer Dynamic Spectrum Management Framework for the Coexistence of White Space Applications
Principal engineer, Samsung Electronics Co. Ltd., Suwon, South Korea

Youngchang Yoon
Kenney
Reconfigurable CMOS RF Power Amplifiers for Advanced Mobile Terminals
Senior Engineer, Qualcomm, San Diego, Calif.

Pan Zhou
Copeland
Power Control and Capacity Analysis in Cognitive Radio Networks
Research Engineer, Oracle Corporation, Nashua, N.H.; faculty member, Harvard University of Science and Technology, Wuhan, Hubei Province, People’s Republic of China

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Terence Wu
Tenters
Antenna Integration for Wireless and Sensing Applications
Not known
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tr>
<td>Michael Ross Hutse</td>
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<td>Deryck Yeung</td>
<td>Vernest</td>
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<tr>
<td>Yun Zhang</td>
<td>Shen</td>
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<tr>
<td>Research Engineer II, Advanced Concepts Laboratory, GTR, Atlanta, GA.</td>
<td>Postdoctoral Fellow, School of ECE, Georgia Tech, Atlanta, GA.</td>
</tr>
<tr>
<td>Probiobatic Space Maps for Speech with Applications</td>
<td>Speech Scientist, Microsoft Corp., Redmond, Wash.</td>
</tr>
<tr>
<td>Accuracy-Energy Tradeoffs in Digital Image Processing using Embedded Computing Platform</td>
<td>Samsung, South Korea</td>
</tr>
<tr>
<td>High-Performance Computer System Architectures for Embedded Computing</td>
<td>Qualcomm, San Diego, CA.</td>
</tr>
<tr>
<td>Characterization of the Surface Plasmon Modes in Planar Metal Insulation-Metal Waveguides by an Alternated Total Reflection Approach</td>
<td>Postdoctoral Fellow, School of ECE, Georgia Tech, Atlanta, GA.</td>
</tr>
<tr>
<td>Design and Reliability of High Dynamic Range RF Building Blocks in SOI CMOS SiGe BiCMOS Techniques</td>
<td>Staff Engineer, Skyworks, Woburn, Mass.</td>
</tr>
<tr>
<td>Statistical Pattern Recognition Approaches for Retrieval-Based Machine Translation Systems</td>
<td>Software Engineer, IBM, Research Triangle Park, N.C.</td>
</tr>
<tr>
<td>Chemical Identification under a Poisson Model for Raman Spectroscopy</td>
<td>Systems Engineer, Texas Instruments, Dallas, Tex.</td>
</tr>
<tr>
<td>SiGe HBT BiCMOS RF Front-Ends for Radar Systems</td>
<td>Senior Member of Technical Staff, DSO National Laboratories, Singapore, Singapore</td>
</tr>
<tr>
<td>Direct Dynamic Control of Impedance for VAR and Harmonic Compensation</td>
<td>Principal Engineer, Varentec, Inc., San Jose, Calif.</td>
</tr>
<tr>
<td>Communication with Chaotic Optoelectronic Systems: Cryptography and Multiplexing</td>
<td>Postdoctoral Fellow, Duke University, Durham, N.C.</td>
</tr>
<tr>
<td>Data-Driven Transform Optimization for Next Generation Multimedia Applications</td>
<td>Member of Technical Staff, Texas Instruments Research Lab, Dallas, Texas.</td>
</tr>
<tr>
<td>Throughput Optimization in MIMO Networks</td>
<td>Senior Engineer, Qualcomm, Santa Clara, Calif.</td>
</tr>
<tr>
<td>Coding Techniques for Information-Therapeutic Strong Sacrecy on Wireless Channels</td>
<td>Staff Engineer, Link_A_Media Devices Corporation, Santa Clara, Calif.</td>
</tr>
<tr>
<td>Low Power Discrete Fourier Transform and Soft-Decision Viterbi Decoder for OFDM Receivers</td>
<td>Engineer, Samsung, Seoul, South Korea</td>
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<tr>
<td>Optimal Power Flow via Quadratic Modeling</td>
<td>Senior Application Engineer, ABB, Inc., Santa Clara, Calif.</td>
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<tr>
<td>A Microscopic Chemical Sensor Platform for Environmental Monitoring</td>
<td>Scientific Staff, ETH Zurich, Zurich, Switzerland</td>
</tr>
<tr>
<td>Acoustic Wave Biosensor Arrays for the Simultaneous Detection of Multiple Cancer Biomarkers</td>
<td>Senior Multi-Discipline Systems Engineer, Mitre Corporation, Aberdeen, Md.</td>
</tr>
<tr>
<td>Effects of Image Compression on Data Interpretation for Teleophotography</td>
<td>Consultant, Accenture, Atlanta, GA.</td>
</tr>
<tr>
<td>Development of III-Nitride Bipolar Devices: Avalanche Photodiodes, Laser Diodes, and Double-Heterojunction Bipolar Transistors</td>
<td>Professor, Institute of Semiconductors, Chinese Academy of Sciences, Beijing, China</td>
</tr>
<tr>
<td>Efficient Spectrum Sensing and Utilization for Cognitive Radio</td>
<td>Senior Systems Engineer, Marvell Semiconductor, Santa Clara, Calif.</td>
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<tr>
<td>Multi-Viewplane Lateral Detection with Application in Driver Safety Research</td>
<td>Systems &amp; Software Engineer, Intel Corporation, Santa Clara, Calif.</td>
</tr>
<tr>
<td>Utilizing the Connected Power Electronic Converter for Improved Condition Monitoring of Induction Motors and Claw Pole Generators</td>
<td>Senior R&amp;D engineer, ABB, Inc., Raleigh, N.C.</td>
</tr>
<tr>
<td>Adaptation of Task-Aware, Communicative Variance for Motion Control in Social Humanoid Robotic Applications</td>
<td>Postdoctoral Researcher, Wallace H. Cruapper Department of Biomedical Engineering at Georgia Tech and Emory University, Atlanta, Ga.</td>
</tr>
<tr>
<td>Design of RF and Microwave Amplifiers and Power Upconverters</td>
<td>Senior Applications Engineer, Silicon Creations, San Ramon, Calif.</td>
</tr>
<tr>
<td>Frontiers of Optical Networking Technologies: Millimeter-Wave Radio Over Fiber and 100G Transport System for Next-Generation High Data Rate Applications</td>
<td>Postdoctoral Fellow, Georgia Tech, School of ECE, Atlanta, Ga.</td>
</tr>
<tr>
<td>Highly Efficient Linear CMOS Power Amplifiers for Wireless Communication</td>
<td>Senior Design Engineer, RF Micro Devices, Torrance, Calif.</td>
</tr>
<tr>
<td>A Statistical Framework for the Analysis of the Neurol Control of Movement with Aging and other Clinical Applications</td>
<td>Process Control Systems Engineer, Inc., Conming, Inc., Conming, N.Y.</td>
</tr>
<tr>
<td>Through Silcon Via Aware Prediction and Physical Design for Multi-Granularity 3D Integrated Circuits</td>
<td>Senior Member of Technical Staff, Cadence Design Systems Inc., San Jose, Calif.</td>
</tr>
<tr>
<td>Tensets CMOS RF Transmitter Front-End Module for High-Power Mobile Applications</td>
<td>Senior Engineer, RF Micro Devices, San Jose, Calif.</td>
</tr>
<tr>
<td>Statistical and Geometric Methods for Visual Tracking with Occlusion Handling and Target Reacquisition</td>
<td>Postdoctoral Associate, Boston University, Boston, Mass.</td>
</tr>
<tr>
<td>Wind Energy and Power System Interconnection, Control, and Operation for High Penetration of Wind Power</td>
<td>Scientist, ABB, Inc., Raleigh, N.C.</td>
</tr>
<tr>
<td>Improved Condition Monitoring of Induction Motors and Claw Pole Generators</td>
<td>Computational Photography Systems Engineer, Texas Instruments, Inc., Dallas, Tex.</td>
</tr>
<tr>
<td>Control of Multi-Agent Networks: From Network Design to Decentralized Coordination</td>
<td>Quantitative Analyst, IntercontinentalExchange, Atlanta, Ga.</td>
</tr>
<tr>
<td>Characterization of Selective Epipodal Graphene Growth on Silicon Carbide: Limitations and Opportunities</td>
<td>Senior Graduate Engineer, Meggitt Systems, Rockmart, Ga.</td>
</tr>
<tr>
<td>Prediction and Analysis of the Methylated Status of CpG Islands in the Human Genome</td>
<td>Informatics, Baylor College of Medicine, Houston, Tex.</td>
</tr>
</tbody>
</table>
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, telecommunication systems, 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. ECE also hired 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 tenured-track and tenured faculty members employed during the last fiscal year.

**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
- Microsystems/microsystems; bioengineering

### New Faculty

Abdul Raheem Beyah
Associate Professor
- Ph.D., Stanford University
- Research interests: Network security; wireless networks; traffic characterization; network protocol performance

Wenshan Cai
Associate Professor
- Ph.D., Georgia Institute of Technology
- Research interests: High performance computer architecture; accelerator research; compilers; memory management; storage system design

### Faculty Director, Georgia Tech Office of Graduate Studies

Robert J. Butera, Jr.
- Ph.D., University of California at Berkeley
- Faculty Director, Georgia Tech Office of Graduate Studies
- Bioengineering, computer systems and software

### Distinguished Professor

Ronald G. Harley
- Ph.D., London University
- Electrical energy

### Regents’ Professors

- Ph.D., University of Illinois at Urbana-Champaign
- Microsystems/microsystems; optics and photonics
- 2012 IEEE Fellow “for contributions to integrated nanophotonics, nanophotonic lab-on-chip sensing, and optical interconnects.”

### Regents’ Professor; Director of the Georgia Tech Office of Graduate Studies

Robert J. Butera, Jr.
- Ph.D., University of California at Berkeley
- Faculty Director, Georgia Tech Office of Graduate Studies
- Bioengineering, computer systems and software

### Ph.D., University of California at Berkeley
- Electrical energy

### Co-Director, Center for Experimental Research in Computer Systems

Oliver Brand
- Ph.D., The Johns Hopkins University
- Computer systems and software

### Regents’ Professor

Ronald G. Harley
- Ph.D., London University
- Electrical energy

### Regents’ Professor; Director of the Georgia Tech Office of Graduate Studies

Robert J. Butera, Jr.
- Ph.D., University of California at Berkeley
- Faculty Director, Georgia Tech Office of Graduate Studies
- Bioengineering, computer systems and software

### Professor

Miroslav M. Becov
- Ph.D., Virginia Polytechnic Institute and State University
- Electrical energy

### Professor

Babak Shekarabi
- Ph.D., University of California at Berkeley
- Electrical energy

### Senior Associate Chair

Joseph L.A. Hughes
- Ph.D., Stanford University
- Research interests: Computer architecture; computer optimization

### Regents’ Professor

Ronald G. Harley
- Ph.D., London University
- Electrical energy

### Regents’ Professor

Ronald G. Harley
- Ph.D., London University
- Electrical energy
Once said of him, "I don't know of any other, with appropriate, innovative uses of modern graduate Curriculum Committee and the serving on both the Georgia Tech Under the new computer engineering curriculum students are in university positions and two researchers. One-third of his doctoral areas of embedded surveillance systems, mined by a majority vote of the ECE senior 83 classes. Most recently, in 2009, he was for computing systems, computer architecture, including the introduction to computer engineering, taught in the area of computer engineering, Dr. Wills joined the ECE faculty in 1991. He 51 years old.

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 Technology Education Award, which he received with his wife and collaborators, Linda Wills, and the School of ECE Richard M. Bass/Ella Kapua N Outstanding Teacher Award, which is determined by a majority vote of the ECE senior class.

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

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 committee of Computing College of Georgia Engineering boards 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 was his unselfish efforts with students with appropriate, innovative uses of modern it have been inspirational to students and faculty alike. One of Dr. Wills' former students once said of him, "I don't know of any other person who has been so focused in the field of engineering for the passion for the subject that he or she possesses."
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