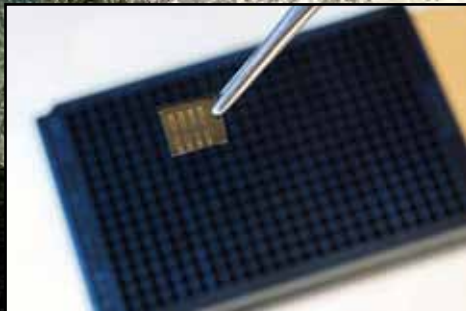
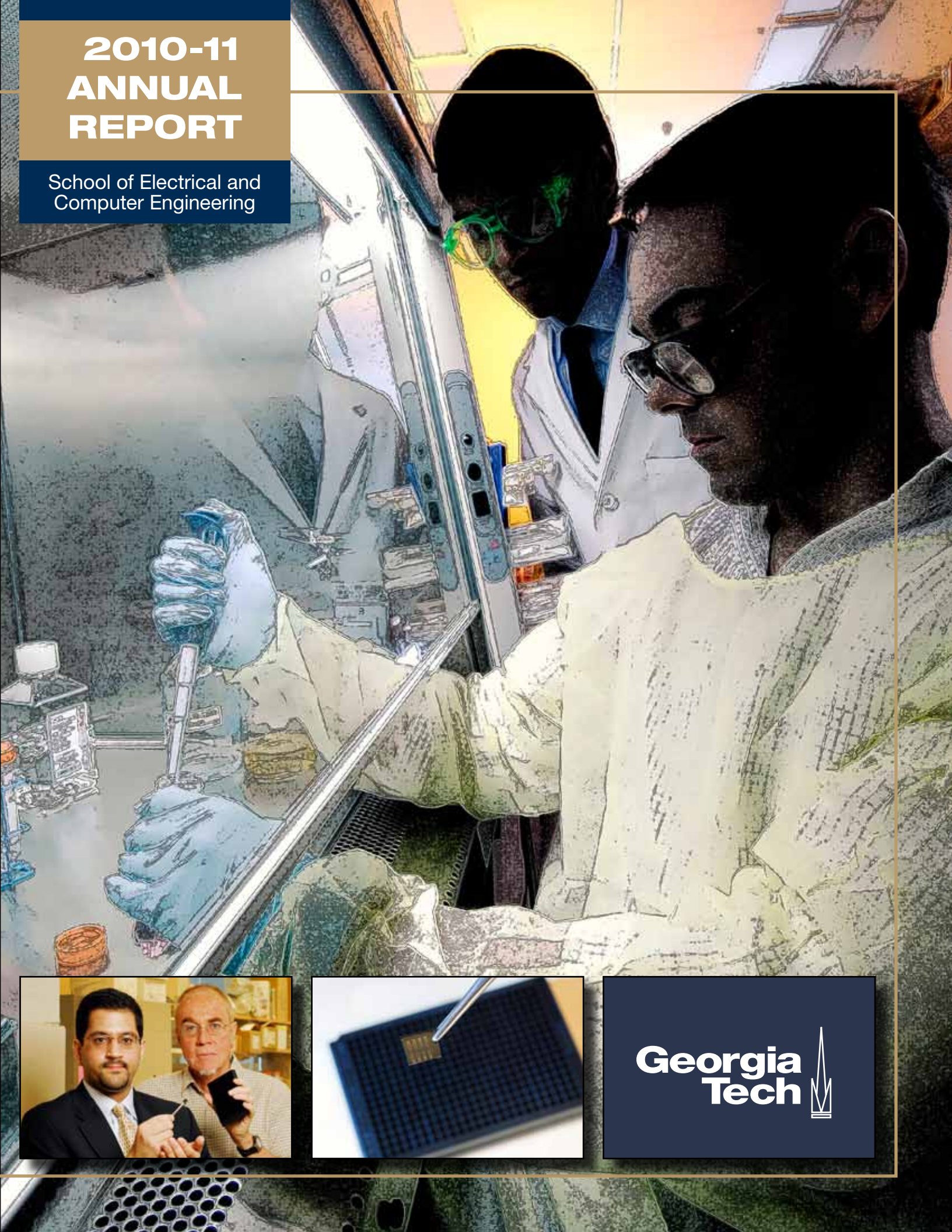


# 2010-11 ANNUAL REPORT

School of Electrical and  
Computer Engineering



Georgia  
Tech 



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## Interim Chair

I am very pleased to share with you the many accomplishments of the faculty, staff, and students in the School of Electrical and Computer Engineering at Georgia Tech. Our people and our programs are a great testament and showcase to all areas of import to our profession with contributions in teaching, research, and service.

Our faculty members earned national and international acclaim during 2010-11 in a number of different ways. ECE Professor John Cressler was honored for his commitment to his students and teaching excellence with the 2011 IEEE Leon K. Kirchmayer Graduate Teaching Award. Six Georgia Tech faculty members, three from ECE, were elected to the rank of IEEE Fellow, while two faculty members were elected as SPIE Fellows. Two junior faculty members won National Science Foundation CAREER awards, and a number of faculty received technical honors for their research in a diverse range of fields.

Our students were recognized with much-deserved accolades. Allie Del Giorno was one of two Georgia Tech students to earn a Goldwater Scholarship, while two of our graduate students—Chris Coen and Jordan Greenlee—won graduate fellowships from the Department of Defense and NASA, respectively, and two ECE students received NSF Graduate Research Fellowships. For the sixth year in a row, Eta Kappa Nu won a national Outstanding Chapter Award.

We granted 669 degrees and had nearly 2,400 students enrolled in our academic programs, all of which remained in the top 10 of their respective rankings in *U.S. News & World Report*. Two teams with ECE undergraduate students—Velociryder and Waste to Watts—were finalists in the 2011 InVenture Prize Competition, and the Vertically Integrated Projects Program continued to thrive, adding new project teams and hosting its first innovation contest during the spring 2011 semester. Five ECE graduate students also earned awards at the second annual Georgia Tech Research and Innovation Conference.

Faculty acquired just over \$56.8 million in research awards during FY 11, and ECE-founded companies developed out of the Advanced Technology Development Center kept flourishing, with ATDC graduate CardioMEMS continuing its success in attracting venture capital and investments. Suniva, another ATDC graduate, was named the fastest growing company in the 2011 *Atlanta Business Chronicle* Pacesetter Awards and ranked second in the list of “Top 10 Venture-Backed, Clean Technology Companies” by the *Wall Street Journal*.

I began my service as interim chair on July 1, 2011, the same date that former ECE School Chair Gary May started his tenure as dean of the College of Engineering. While this next year will be one of transition as the search for a new school chair proceeds, the School remains steadfast to its commitment as a key player and leader in the future success of the Institute. I invite our corporate and government partners, alumni, and friends to join us in our ongoing mission to make Georgia Tech the best technological university in the world.



Douglas B. Williams  
*Interim Chair and Professor*



## Facts at a Glance

**2,377**

### Students

(Fall Semester 2010)

- 1,207 Undergraduate Students
  - 811 Electrical engineering
  - 396 Computer engineering
- 1,170 Graduate Students
  - 637 Doctoral\*
  - 13 Special
  - 520 Master's\*

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

**669**

### Degrees Awarded

(Summer 2010 through Spring 2011)

- 73 B.S.Cmp.E.
- 2 B.S.Cmp.E.-Georgia Tech-Savannah
- 185 B.S.E.E.
- 15 B.S.E.E.-Georgia Tech-Savannah
- 311 M.S./M.S.E.C.E.
- 7 M.S./M.S.E.C.E.-Georgia Tech-Savannah
- 75 Ph.D.
- 1 Ph.D.-Georgia Tech-Savannah

**264**

### Faculty/Staff

- 113 Number of faculty (tenure-track)
- 5 Joint appointments
- 26 Professors Emeriti
- 31 Funded professorships
- 8 Georgia Research Alliance Eminent Scholars
- 5 National Academy of Engineering members
- 40 IEEE Fellows
- 6 Presidential Early Career Award in Science and Engineering recipients
- 3 Academic professionals
- 68 Research faculty
- 80 Administrative staff

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 following statistics 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 ATLANTIS M.S. dual degree program with Politecnico di Torino in Italy and the Technical University of Munich in Germany.

**6**

### Eta Kappa Nu Wins Outstanding Chapter Award

For the sixth 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 2009-10.

HKN is one of the largest honor societies in the country, with nearly 200 university chapters, a variety of committees, many active member volunteers, and thousands of student members. The number of chapters receiving the Outstanding Chapter Award six years in a row is seven, including the Beta Mu chapter of Georgia Tech. (Read more about HKN on page 13)

**\$190,694,032**

### Submitted Proposals

These totals represent the activity of ECE faculty on the Atlanta campus, Georgia Tech-Savannah, and Georgia Tech-Lorraine, as well as in the Nanotechnology Research Center, the Georgia Electronic Design Center, National Electrical Energy Testing, Research, and Applications Center, and the Georgia Tech Broadband Institute. Georgia Tech Foundation grants and gifts designated for research are also counted in the research funded total that is provided.

Our research activities fall into the broad areas of bioengineering, computer systems and software, digital signal processing, electrical energy, electromagnetics, electronic design and applications, microelectronics/microsystems, optics and photonics, systems and controls, telecommunications, and VLSI systems and design.

**\$56,853,439**

### Research Funded

**\$80,484,742.04**

### ECE FY 11 State Budget and Expenditures

State*	\$27,918,978.87	Sponsored**	\$52,050,314.86
Salaries & Fringe	25,043,886.29	Salaries & Fringe	19,404,935.76
Travel	230,943.67	Travel	1,406,780.22
Materials & Supplies	2,231,271.69	Materials & Supplies	13,134,909.72
Equipment	412,877.22	Equipment	2,638,217.89
<b>Research Consortium</b>	<b>\$242,507.64</b>	Other (GTF Direct)	192,288.15
Salaries & Fringe	101,603.03	Indirect (O/H)	11,363,326.69
Travel	5,525.37	Georgia Tech-Savannah	1,067,139.45
Materials & Supplies	135,379.24	Georgia Electronic Design Center	577,490.34
<b>Dept. Sales &amp; Services</b>	<b>\$272,940.67</b>	Microelectronics Research Center/Nanotechnology Research Center	2,265,226.64
Salaries & Fringe	109,684.23		
Travel	30,668.39		
Materials & Supplies	124,893.05		
Equipment	7,695.00		

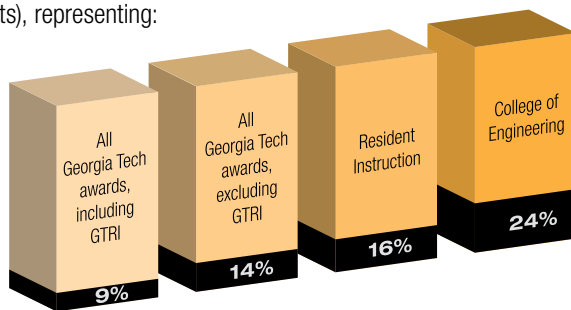
\* Includes Tuition, Initial FY11 Allocation \$19,076,300  
 \*\* Includes Georgia Tech Foundation and Agency funds

## Research Summary

ECE faculty and its associated research centers acquired a total of **\$52,896,845** in FY 11 (excludes Georgia Tech Foundation grants and gifts), representing:

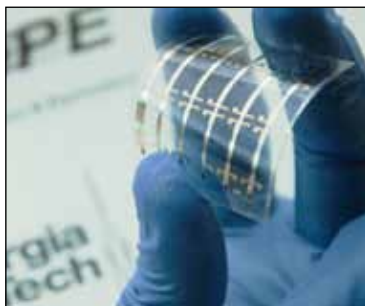
### Intellectual Products

- 30/84 Patents/records of invention
- 5 Advanced Technology Development Center start-up companies
- 7 ATDC graduate companies



## New Transistor for Plastic Electronics Exhibits the Best of Both Worlds

A new method of combining top-gate organic field-effect transistors with a bilayer gate insulator has been developed by ECE Professor Bernard Kippelen and his team from the Center for Organic Photonics and Electronics. This allows a transistor to perform in a stable fashion while exhibiting good current performance. In addition, the transistor can be mass produced in a regular atmosphere and can be created using lower temperatures, making it compatible with the plastic devices that it will power.



## Cover Story...



### New Biosensing Technology Could Facilitate Personalized Medicine

The multi-welled microplate, long a standard tool in biomedical research and diagnostic laboratories, could become a thing of the past, thanks to new electronic biosensing technology developed by a team of microelectronics engineers and biomedical scientists at Georgia Tech. The team is led by ECE Associate Professor Muhannad Bakir and John McDonald, a professor in the School of Biology and chief research scientist at the Ovarian Cancer Institute.

The researchers hope to replace these microplates with modern microelectronics technology, including disposable arrays containing thousands of electronic sensors connected to powerful signal processing circuitry. If successful, this new electronic biosensing platform could help realize the dream of personalized medicine by making possible real-time disease diagnosis—potentially in a physician's office—and by helping select individualized therapeutic approaches.

*Above: Postdoctoral fellow Kenneth Scarberry uses bioconjugate techniques to bind ligands to silicon nanowires, while graduate research assistant Ramasamy Ravindran observes.*

*On lower cover: ECE associate professor Muhannad Bakir (l) holds a prototype electronic microplate while John McDonald (School of Biology) holds an example of the conventional microplate. (center) The new microplate is shown in front of the technology it aims to replace. ▀*

### ECE Teams Advance to InVenture Prize Finals

Two teams with ECE students were among the seven finalists selected to compete for the 2011 InVenture Prize @ Georgia Tech. Students presented their inventions during a live Georgia Public Broadcasting program televised from the Robert Ferst Center for the Arts on March 9.

ECE had students on two of the finalist teams—Velocityder and Waste to Watts. Velocityder built a motorized, self-balancing skateboard that features two wheels instead of four. The team was made up of Aaron Fan and Xo Wang (shown at right), both double majors in EE and computer science, and Jamison Go, an EE and mechanical engineering double major. Waste to Watts had sustainability in mind when they created a low-cost, modular back-up power supply by reusing discarded electronic parts. This system will provide much-needed power in third world countries.

The team was made up of James Molini, a biomedical



engineering student, and Patrick Caputo, an EE and physics double major.

The eventual winner of the 2011 InVenture Prize was the Slide Capo, designed by Industrial Design student Daniel Chaney. Slide Capo is a new twist on a guitar capo that can create unique sounds. As the winner of this year's competition, Mr. Chaney took home \$15,000 in prize money and a free U.S. patent filing by Georgia Tech's Office of Technology Licensing.

The InVenture Prize is an innovation competition for Georgia Tech undergraduate students who work independently or in teams to create inventions that are presented to and then judged by a panel of experts. The judges for the 2011 event were Sara Blakely, founder and owner of SPANX; Deborah Kilpatrick, senior vice president at CardioDx, a privately held genomic medicine company; Greg Foster, founder and CEO of BrightWhistle and entrepreneur-in-residence with Chrysalis Ventures; and David Phelps, president and CEO of CreoSalus, a peptide science company.



## Transitions

### LEADERSHIP



#### **May Named Dean of the College of Engineering**

Following a national search, Gary S. May, alumnus, professor, and the Steve W. Chaddick School Chair for

the School of Electrical and Computer Engineering, became the dean of Georgia Tech's College of Engineering on July 1. He succeeded Don Giddens, who stepped down as the CoE dean and retired from the Institute at the end of June.

As dean, Dr. May is responsible for directing the nation's largest engineering program, one that enrolls nearly 60 percent of the student body and is home to about half of its tenured and tenure-track faculty.

Dr. May is the founder and director of the Summer Undergraduate Research in Engineering/Science program, which is designed to attract talented minority students into graduate school. He also founded and co-directs the Facilitating Academic Careers in Engineering and Science program, which encourages minorities to pursue engineering and science careers in academia. He has been on the ECE faculty since 1991, where he is a member of the microelectronics/microsystems technical interest group.



#### **Williams Tapped as ECE Interim Chair**

Douglas B. Williams became the interim chair for the School of ECE, effective July 1, and will hold this position until a

new, permanent school chair is named. The search for a new school chair began in August 2011.

Dr. Williams joined Georgia Tech in 1989 as an assistant professor in ECE, and for the past eight years, he has served as the School's

associate chair for undergraduate affairs. While associate chair, Dr. Williams represented ECE in many capacities, both on campus and to external audiences. In the past year, he served on Georgia Tech's Executive Board, chaired the International Plan Committee, and been Georgia Tech's advocate to the University System of Georgia's Faculty Council.

A long-time member of the Center for Signal and Image Processing, Dr. Williams is active within the IEEE Signal Processing Society. Within that Society, he has been a member-at-large on the Board of Governors, an area editor for the *IEEE Signal Processing Magazine*, and a member of the technical committees for Signal Processing Theory & Methods and Signal Processing Education. Dr. Williams also represents IEEE as an ABET program evaluator for electrical engineering and computer engineering.



#### **Michaels Named Interim Associate Chair for ECE Undergraduate Affairs**

Jennifer E. Michaels was named interim associate chair for ECE undergraduate affairs, effective July 1.

Dr. Michaels joined Georgia Tech in 2002 as an associate professor in the School of ECE. Prior to that, she worked in industry, first at a government laboratory, then co-founding a startup company, and finally serving as manager of systems development at Panametrics, Inc. in Waltham, Mass. For the past four years, Dr. Michaels has served as the chair of the ECE Undergraduate Committee, which is in the process of implementing curriculum revisions approved by the ECE faculty last year. She was a member of the Institute Student Honor Committee from 2002-09 and served as alternate chair from 2004-09.

As co-director of the Quantitative Ultrasonic Evaluation, Sensing, and Testing Laboratory within ECE, Dr. Michaels is active in the international nondestructive evaluation and structural health monitoring communities. She is affiliated with the systems and controls and digital signal processing technical interest groups within the School. She is a senior member of IEEE, and is an associate editor of the *IEEE Transactions on Instrumentation and Measurement*.

## STRUCTURE

### New Research Institutes

To leverage existing research expertise and resources in support of strategic initiatives at Georgia Tech, Executive Vice President for Research Stephen Cross announced the formation of the Institute for Electronics and Nanotechnology and the Institute for People and Technology. Both of these Institutes will have significant involvement from ECE.

Led by Executive Director and ECE Regents' Professor Mark G. Allen, IEN consolidates 11 electronics and nanotechnology research centers and related programs into an organization designed to enhance support for rapidly growing programs spanning biomedicine, materials, electronics, and nanotechnology.

IPaT is headed by Executive Director Elizabeth Mynatt, a professor in the School of Computer Science. Made up of 10 research centers and organizations, the Institute is a catalyst for transformational research in areas such as health care, education, and consumer media by integrating advances in human-centered computing, architectural and digital design, policy, and system science and engineering.

### Georgia Tech-Savannah Task Force

Georgia Tech President G. P. "Bud" Peterson accepted the task force recommendations regarding future directions for the Georgia Tech-Savannah campus. The report, "Defining a Path Forward for Georgia Tech-Savannah," provided a comprehensive review of the coastal campus and the Georgia Tech Regional Engineering Program.

Highlights from the task force report include recommendations to continue having a strong presence in Southeast Georgia by creating a new academic and operational model for the campus while phasing out current degree programs in four different majors, including electrical engineering and computer engineering.

The proposed organization, designed to be viable and self-sustaining, includes a portfolio of programs ranging from co-curricular undergraduate activities to instruction for the military and executive and other non-credit education programs to professional master's degrees. In addition, the recommendations included the option of developing regional research opportunities. (<http://savannah.gatech.edu/the-path-forward>) ▶

# 2011 Roger P. Webb Awards

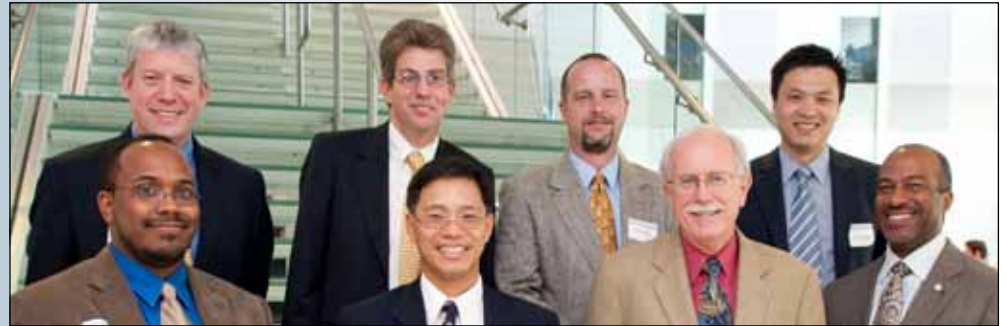
On April 27, the School of ECE held its tenth annual Roger P. Webb Awards Program. Georgia Power Vice President Leslie Sibert (BEE '85) and Kimberly-Clark Vice President Bob Stargel (BEE '83) hosted the event, which honors the students, staff, and faculty who have shown exceptional dedication to their professions and studies. Support for this annual event is provided through an endowment established by the ECE Advisory Board.



(Left) Undergraduate award winners pictured with ECE School Chair Gary May. Bottom row (l-r): Sean McGee, Kenneth Adams, Jenny Liu, Allie Del Giorno, Andrew Perez, Joshua Durham. Top row (l-r): Bradley Keller, Adam Kitain, Jaydeep Srimani, Michael Lu, and Ackshaey Singh.

(Below-Left) Staff award winners pictured with ECE School Chair Gary May (counterclockwise from bottom left): Catherine Gholson, Harry Beck, and David Webb.

(Below-Right) Faculty award winners pictured with ECE School Chair Gary May. Bottom row (l-r): Elliot Moore, Shyh-Chiang Shen, Jim McClellan. Top row (l-r): Mark Clements, Oliver Brand, Alan Doolittle, and Fumin Zhang.



## STUDENT AWARDS

<i>Outstanding ECE Sophomore Award</i>	Adam Kitain
<i>ECE Junior Scholar Award</i>	Sean Austen McGee
<i>ECE Undergraduate Research Award</i>	Brett Ireland
<i>Most Outstanding ECE Senior Co-op Award</i>	Andrew Perez
<i>Outstanding Service to Georgia's Community Award</i>	Jenny Liu
<i>ECE Faculty Award</i>	Sean Austen McGee
<i>Outstanding Electrical Engineering Senior Award</i>	Michael Lu
<i>Outstanding Computer Engineering Senior Award</i>	Jaydeep Srimani
<i>ECE Senior Scholar Award</i>	Kenneth Adams, Joshua Durham, Bradley Keller
<i>Colonel Oscar P. Cleaver Awards</i>	Sen Yang, Mahbub Alam
<i>ECE Graduate Teaching Assistant Excellence Award</i>	Mohammad Omer
<i>ECE Graduate Research Assistant Excellence Award</i>	Erman Ayday, Xueliang Huo

## STAFF AWARDS

<i>Hats Off Performance Award</i>	Harry Beck, Catherine Gholson
<i>Research Spotlight Award</i>	Jae-Hyun Ryou
<i>Academic Spotlight Award</i>	David Webb

## FACULTY AWARDS

<i>Outstanding Junior Faculty Member Award</i>	Shyh-Chiang Shen, Fumin Zhang
<i>ECE Outreach Award</i>	Elliot Moore
<i>Richard M. Bass and W. Marshall Leach/ Eta Kappa Nu Outstanding Teacher Awards</i>	Alan Doolittle, James McClellan
<i>ECE Distinguished Mentor Award</i>	Oliver Brand
<i>Distinguished Faculty Achievement Award</i>	Mark Clements



Graduate award winners: Bottom row (l-r): Mojtaba Hudjat-Shamami, Moazzam Khan, Mohammad Omer. Top row (l-r): Xueliang Huo, Erman Ayday, and Jason Okerman.

## Georgia Tech Awards

- Georgia Tech Faculty/Staff Honors Luncheon, April 15  
*Georgia Tech Outstanding Doctoral Thesis Advisor Award:* Paul Hasler
- Georgia Tech Student Honors Day, April 21  
*Henry Ford II Scholar Award:* Stephen Bracca, Ackshaey Singh
- Georgia Tech Sigma Xi Awards Banquet, April 14  
*Sigma Xi Best Undergraduate Student Thesis Award:* Ashish Katariya
- Eta Kappa Nu/ECE Spring Picnic, April 22  
*Outstanding ECE Graduate Teaching Assistants:*  
Mauricio Pardo Gonzalez      Michael Oakley  
Mojtaba Hudjat-Shamami      Jason Okerman  
Nak-Seung Hyun      Spyridon Pavlidis  
Moazzam Khan      Po-Yen Wu



## Awards / Honors

### Adibi, Gaylord Named SPIE Fellows



Ali Adibi and Thomas K. Gaylord are among 67 professionals who have been promoted to the rank of SPIE Fellow. Both faculty members are part of the optics and photonics group in ECE.

Both faculty members are part of the optics and photonics group in ECE.

A member of the faculty since 2000, Dr. Adibi was recognized “for achievements in integrated nanophotonics and volume holography.” He leads the Photonics Research Group within the School and also heads up a research center funded by the Defense Advanced Research Projects Agency at \$4.3 million as one of DARPA’s Centers in Integrated Photonics Engineering Research. The goal of the Center is to develop a new sensor that can detect multiple biological and chemical threats on a compact integrated platform faster, less expensively, and more sensitively than current state-of-the-art sensors.

Dr. Gaylord, a Regents’ Professor and Julius Brown Chair Professor, was recognized “for achievements in diffractive and polarization optics.” As the leader of the Optics Laboratory, Dr. Gaylord has formulated rigorous coupled-wave analysis, an electromagnetic approach for analyzing wave propagation in periodic

structures. Designs based on RCWA formalism have been used to create diffractive elements, photonic crystals, and even head-up displays.

### Meliopoulos Honored with the 2010 International George Montefiore Award



A.P. Sakis Meliopoulos was honored with the 2010 International George Montefiore Award in September 2011. Dr. Meliopoulos holds the Georgia Power Distinguished Professorship in ECE.

The George Montefiore Award is given every five years, and in 2010, the award recognizes fundamental contributions to smart grids or smart electricity networks. The award will be presented at the Montefiore Award Workshop

– continued on page 8



IEEE is the world’s largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity.



### Six Georgia Tech Faculty Members Elected as IEEE Fellows

Six Georgia Tech faculty members were elevated to the rank of IEEE Fellow, effective January 1, 2011, including three from ECE (above, pictured l-r).

**Mark G. Allen**, ECE Regents’ Professor and Joseph M. Pettit Professor, “for contributions to micro and nanofabrication technologies for microelectromechanical systems.”

**John Papapolymerou**, ECE professor, “for contributions to flexible, microwave and wireless components and systems.”

**Gabriel Rincón-Mora**, ECE associate professor, “for contributions to energy- and power-integrated circuit design.”



### Cressler Honored with IEEE Graduate Teaching Award

John D. Cressler, Ken Byers Professor in ECE, received the 2011 IEEE Leon K. Kirchmayer Graduate Teaching Award on February 21 at the IEEE International Solid-State Circuits Conference in San Francisco, Calif.

The award recognized Dr. Cressler for inspirational teaching and student mentoring in the field of advanced microelectronic devices and circuits. Known for his approachability and his unlimited patience, Dr. Cressler includes unique design experiences within his graduate courses, so that students gain exposure to real-world challenges, learn to communicate with diverse audiences, and work together in a team environment to solve complex problems.



### Akyildiz Chosen for IEEE Computer Society Award

Ian F. Akyildiz, the Byers Professor in Telecommunications, received the 2011 W. Wallace McDowell Award, which is given by the IEEE Computer Society. He received this accolade at an awards dinner held on May 25 in Albuquerque, N.M. during the IEEE Computer Society Board of Governors Meeting.

The McDowell Award is given to individuals for outstanding recent theoretical, design, educational, practical, or other similar innovative contribution that falls within the scope of IEEE Computer Society interest. Dr. Akyildiz



## Two ECE Faculty Members Earn NSF CAREER Awards

ECE Assistant Professors Pamela Bhatti and Saibal Mukhopdhyay were selected for NSF CAREER Awards within the last fiscal year, bringing the total number of ECE faculty with current NSF CAREER Awards to nine. Since the 1980s, 37 ECE faculty members have received funding from this esteemed program.

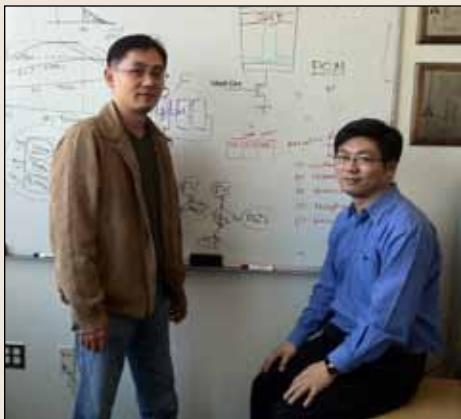


Pamela Bhatti: "An Ultra-Low-Power MEMS-Based Implantable Biosystem for Restoring Vestibular Function-Platform for an Integrated Human-Centered Hybrid Biosystem." The objective of Dr. Bhatti's research is to develop an ultra-low-power implantable biomedical microsystem capable of activating vestibular nerve fibers in the inner ear that convey head rotation cues to the central nervous system. Such a device would assist persons suffering from bilateral vestibular dysfunction who experience postural imbalance, dizziness, and nausea.



Saibal Mukhopadhyay: "3D Heterogeneous Integration for Power Reduction in Embedded Systems: Application to Wireless Image Sensing and Transport." Dr. Mukhopadhyay's research explores principles to minimize power dissipation of embedded systems for real-time imaging, high-volume multimedia processing, and wireless communication in time-varying noisy channel under Quality-of-Service constraints. The principles are applied to design a low-power 3D wireless image sensor node for a high-quality image/video communication network.

was honored by the Society "for pioneering contributions to wireless sensor network architectures and communication protocols."



## ECE Research Team's Paper Tapped for IEEE "Top Picks" Issue

A paper written by ECE Associate Professor Hsien-Hsin Sean Lee and his research team is the first ever from Georgia Tech to be chosen for *IEEE Micro* magazine's "Top Picks" issue. Published annually, this issue selects the most significant papers from computer architecture conferences based on novelty and long-term impact.

Being chosen for this honor is considered the equivalent to receiving a Best Paper Award. In 2011, *IEEE Micro* chose 11 papers to highlight. Dr. Lee co-wrote the paper entitled "Security

Refresh: Protecting Phase-Change Memory against Malicious Wear Out" with his current Ph.D. student Nak Hee Seong (shown on left with Dr. Lee) and his former Ph.D. student Dong Hyuk Woo. This work addressed the technological limitation of an emerging memory technology known as Phase Change Memory. Security refresh can effectively extend PCM's lifetime to approach its theoretical limit, enabling its practical use as an integral part of the system memory for future computing systems.

## Tummala Receives IEEE CPMT Award



Rao Tummala will receive the 2011 IEEE Components, Packaging, and Manufacturing Technology Award "for pioneering and innovative contributions to package integration research, cross-disciplinary education, and globalization of electronic packaging." He is the director of the 3D Systems Packaging Research Center and is the Joseph M. Pettit Chair in Electronics Packaging and Georgia Research Alliance Eminent Scholar.

This award recognizes lifelong contributions to industry, academia, and professional societies in components, packaging, and manufacturing technologies. Dr. Tummala received this honor at the IEEE 61st Electronic Components and

Technology Conference, held May 31-June 3, 2011 in Lake Buena Vista, Fla.

## Roca Earns IEEE MTT-S Scholarship



Rolando Roca received an IEEE Microwave Theory and Techniques Society Undergraduate/Pregraduate Scholarship at the 2011 International Microwave Symposium, held June 5-10 in Baltimore, Md.

An electrical engineering major, Mr. Roca received this award for outstanding work on his project "Smart Passive Wireless Gas Sensor Using Functionalized Carbon Nanotubes with Inkjet Printing Technology." This project is the first real world demonstration of inkjet-printed low-cost wireless sensors on paper and plastics utilizing nanotechnology-based structures, namely carbon nanotubes. His work could potentially set the foundation for the first quality-of-life ubiquitous sensor networks that truly bridge nanotechnology, RF, and "green electronics."

Mr. Roca is an ECE Opportunity Research Scholar program participant, and he is advised by Emmanouil M. (Manos) Tentzeris and ECE Ph.D. student Hoseon Lee.

on “Challenges and Opportunities of Electric Energy Systems of the Future,” which took place in Liege, Belgium on September 16.

The award includes a cash prize of 25,000 euros that Dr. Meliopoulos will share with award co-recipient Goran Andersson of ETH-Zurich. Dr. Meliopoulos will use his monies to finance the Clayton Griffin Student Award, which is presented at the annual Protective Relaying Conference that he coordinates each year, and another student award at the Technical University of Athens, Greece, where he earned his undergraduate degree.



### Del Giorno Wins Goldwater Scholarship

Allison Del Giorno was one of two Georgia Tech students who won a 2011 Goldwater Scholarship. A sophomore majoring in electrical engineering, with a minor in biomedical engineering, Ms. Del Giorno is studying electrical engineering approaches to the nervous system, specifically investigating the spatio-temporal electrical properties of neurons that control

respiration. Once finished with her undergraduate studies, she plans to pursue a doctorate in computational neuroscience to conduct neuroscience research focused on fundamental discoveries for clinical applications.

### Greenlee Wins 2011 National Defense Science and Engineering Graduate Fellowship



Jordan Greenlee won a 2011 National Defense Science and Engineering Graduate Fellowship. Mr. Greenlee is a Ph.D. student in ECE and works in the Advanced Semiconductor Technology Facility.

Advised by W. Alan Doolittle, Mr. Greenlee’s research interests include the fabrication, characterization, and numerical modeling of lithium-based memristors. A memristor is a resistor whose resis-

tance depends on previous input to the device and emulates the synapses in the brain. The development of lithium-based memristors could ulti-

mately usher in a new era of devices that compute similarly to the brain.

Administered by the American Society for Engineering Education, the NDSEG Fellowship is sponsored and funded by the Department of Defense. NDSEG selections are made by the Air Force Research Laboratory/Air Force Office of Scientific Research, the Office of Naval Research, the Army Research Office, and the DoD High Performance Computing Modernization Program Office.

### Coen Chosen for New NASA Research Fellowship



Chris Coen has been chosen for the inaugural NASA Space Technology Research Fellowship Program. Launched this year by NASA’s Office of the Chief Technologist, this new program is aimed at supporting student researchers who show significant potential to contribute to NASA’s strategic goals and missions.

Advised by John D. Cressler, Mr. Coen is a Ph.D. student in the SiGe Devices and Circuits Group.

His proposal was entitled “SiGe Front-end Electronics for Space-based Radar Applications,” which aims to exploit the unique capabilities of SiGe electronics to operate robustly in extreme environments such as space 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.

### Two ECE Students Win NSF Graduate Research Fellowships

Jessica Falcone and Sean Sanders were among 33 Georgia Tech students to receive NSF Graduate Research Fellowships in 2011. Ms. Falcone is an M.S.E.C.E. student who has worked on improving technologies for cochlear implants with ECE Assistant Professor Pamela Bhatti, while Mr. Sanders is a senior computer engineering major who has worked on network security and computer architecture projects with ECE Professor Henry Owen. ▲

### VIP Program Holds Inaugural Innovation Contest

The Vertically Integrated Projects Program held its first ever VIP Innovation Contest on April 27 at various locations on the Georgia Tech campus. Led by ECE Professor Edward J. Coyle, the VIP Program consists of teams of sophomores through seniors who work with graduate students and faculty on multidisciplinary research and development projects.

The contest consisted of four parallel tracks—service projects and three technical areas: embedded systems, wireless systems, and database systems. Each track had first and second place winners, with a grand prize winner selected from the four track winners. The

prize-winning teams and their advisors were:

#### Service Track

*First Place:* The Medical Devices for Diabetes Team, advised by Mechanical Engineering Regents’ Professor David N. Ku. This team also won the overall grand prize.

*Second Place:* The Intelligent Tutoring-Android Team, advised by ECE Professor James H. McClellan.

#### Embedded Systems Track

*First Place:* The Collaborative Workforce Team, advised by Dr. Coyle and ECE Senior Research Engineer Randal Abler.

*Second Place:* The eStadium SuiteTV Team, advised by Drs. Abler and Coyle.

#### Wireless Systems Track

*First Place:* The eStadium Wireless Team, advised by Drs. Coyle and Abler.

*Second Place:* The I-Natural Team, advised by ECE Associate Professor Ayanna Howard.

#### Database Systems Track

*First Place:* The eStadium Web-Apps Team, advised by Drs. Abler and Coyle.

*Second Place:* The eCampus Team, advised by College of Computing Research Scientist Russell Clark.

To learn more about these projects and the VIP Program, visit the VIP web site at <http://vip.gatech.edu/>.



## Student Profile

### Average Entering Freshman Electrical Engineering Student

High school GPA - 3.89

SAT verbal score - 637

SAT math score - 716

### Average Entering Freshman Computer Engineering Student

High school GPA - 3.89

SAT verbal score - 639

SAT math score - 699

### Average Entering ECE Graduate Student

Undergraduate GPA - 3.69

GRE analytical writing score - 4.00

GRE quantitative score - 774

GRE verbal score - 565



Students are ECE's most important products. Almost 2,400 students were enrolled in our graduate and undergraduate programs during FY 11, making the School's programs the largest in the U.S. In the last academic year, 669 degrees were awarded to students at the main campus in Atlanta, Georgia Tech-Savannah, Georgia Tech-Lorraine, Georgia Tech-Shanghai Initiative, 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 2010-11, ECE had two graduates of the international plan, one graduate who completed the research option, and 55 co-op graduates.

## Enrollment Fall 2010

	Total	Asian	Black	Hispanic	American Indian or Alaskan Native	Native Hawaiian or Other Pacific Islander	White	Multi-Racial	Not Reported	Female
B.S.E.E.	777	260	75	61	1	0	352	23	5	93
B.S.Cmp.E.	387	105	43	30	0	0	192	13	4	19
B.S.E.E./GT-Savannah	34	1	10	3	0	0	20	0	0	2
B.S.Cmp.E./GT-Savannah	9	0	2	0	0	0	6	1	0	0
<b>Total</b>	<b>1,207</b>	30%	11%	8%	0%	0%	47%	3%	1%	9%
M.S./M.S.E.C.E.	513	267	18	18	1	0	190	8	11	94
M.S.E.C.E./GT-Savannah	4	0	0	0	0	0	4	0	0	0
M.S. Bioengineering*	3	1	0	0	0	0	2	0	0	1
Special	13	4	0	0	0	0	8	0	1	1
Ph.D.	596	339	24	23	0	0	194	10	6	66
Ph.D./GT-Savannah	14	10	0	1	0	0	2	0	1	4
Ph.D. Bioengineering*	19	7	0	0	0	1	9	2	0	7
Ph.D. Robotics*	8	3	1	0	1	0	3	0	0	0
<b>Total</b>	<b>1,170</b>	54%	4%	4%	0%	0%	36%	2%	0%	15%
<b>Grand Total</b>	<b>2,377</b>									

## Degrees Awarded

### Summer 2010-Spring 2011

	Total	Asian	Black	Hispanic	White	Multi-Racial	American Indian or Alaskan Native	Not Reported	Female
B.S.E.E.	185	61	16	14	86	8	0	0	19
B.S.Cmp.E.	73	15	10	4	37	6	0	1	3
B.S.E.E./GT-Savannah	15	1	2	3	8	1	0	0	1
B.S.Cmp.E./GT-Savannah	2	0	1	0	1	0	0	0	0
<b>Total</b>	<b>275</b>	28%	11%	8%	48%	5%	0%	0%	8%
M.S./M.S.E.C.E.	310	151	11	8	132	6	1	1	43
M.S.E.C.E./GT-Savannah	7	4	0	0	3	0	0	0	2
M.S. Bioengineering*	1	1	0	0	0	0	0	0	0
Ph.D.	75	45	1	1	26	1	0	1	9
Ph.D./GT-Savannah	1	0	0	1	0	0	0	0	0
<b>Total</b>	<b>394</b>	51%	3%	3%	41%	2%	0%	0%	14%
<b>Grand Total</b>	<b>669</b>								

\* With home department in ECE.



## Ph.D. Graduates

Seventy-six students graduated with their doctoral degrees in 2010-11 and have moved on to work at the world's top companies and universities and with start-up companies originating from research at Georgia Tech.

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

### SUMMER 2010

Daniel Dwayne Billingsley	Doolittle	<i>Feasibility Study of III-Nitride-Based Transistors Grown by Ammonia-Based Metal-Organic Molecular Beam Epitaxy</i>	Sensor Electronic Technology, Columbia, S.C.
Hyun Woo Choi	Chatterjee	<i>Jitter Measurement of High-Speed Digital Signals using Low-Cost Signal Acquisition Hardware and Associated Algorithms</i>	Senior engineer, Samsung Corporation, Atlanta, Ga.
Kemal Safak Demirci	Brand	<i>Chemical Microsystems Based on Integration of Resonant Microsensor and CMOS ASIC</i>	Technical staff member, Texas Instruments, Dallas, Tex.
Chi-Ti Hsieh	Citrin	<i>Carrier Transport in Optical-Emitting and Photodetecting Devices Based on Carbon Nanotube Field Effect Transistors</i>	Postdoctoral research fellow, Academia Sinica, Taipei, Taiwan
Aravind Kailas	Ingram	<i>Towards Perpetual Wireless Networks: Opportunistic Large Arrays with Transmission Thresholds and Energy Harvesting</i>	Assistant professor, Department of Electrical and Computer Engineering, University of North Carolina at Charlotte, Charlotte, N.C.
Taimoor Saleem Khawaja	Vachtsevanos	<i>A Bayesian Ls-SVM Based Framework for Fault Diagnosis and Failure Prognosis</i>	Research engineer, Pratt & Whitney, East Hartford, Conn.
Jungbae Kim	Kippelen	<i>Organic-Inorganic Hybrid Thin Film Transistors and Electronic Circuits</i>	Postdoctoral fellow, School of ECE, Georgia Tech, Atlanta, Ga.
Jeannie Su Ann Lee	Jayant	<i>Mixed Initiative Multimedia for Mobile Devices: Design of Semantically Relevant Low Latency System for News Video Recommendations</i>	Engineer, Qualcomm, San Diego, Calif.
Myounghwan Lee	Copeland	<i>Quality of Service DiffServ Architecture in Hybrid Mesh/Relay Networks</i>	Senior engineer, Samsung DMC R&D Center, Suwon, Republic of Korea
Yuan Li	Papapolymerou	<i>Development of Micromachined Millimeter Wave Modules for Wireless Communication Systems</i>	Engineer, Mindspeed Technologies, Irvine, Calif.
Qijia Liu	Zhou	<i>Power Efficiency and Diversity Issues for Peak Power Constrained Wireless Communications</i>	System staff scientist, Broadcom Corporation, San Diego, Calif.
Johnathan Lucas McKay	Ting	<i>Neuromechanical Constraints and Optimality for Balance</i>	Postdoctoral fellow, Emory University, Atlanta, Ga.
Seyed Hossein Miri Lavasani	Ayazi	<i>Design and Phase-Noise Modeling of Temperature-Compensated High Frequency MEMS-CMOS Reference Oscillators</i>	R&D analog IC design engineer 3, Avago Technologies, San Jose, Calif.
Saeed Mohammadi	Adibi	<i>Phononic Band Gap Micro/Nano-mechanical Structures for Wireless Communication and Sensing Applications</i>	Postdoctoral fellow, School of ECE, Georgia Tech, Atlanta, Ga.
Tae Joong Song	Kim	<i>A Fully Integrated SRAM-based CMOS Arbitrary Waveform Generator for Analog Signal Processing</i>	Senior research engineer, Samsung Electronics, Suwon, South Korea
Erich Peter Stuntebeck	Abowd	<i>An Analysis of the Domestic Power Line Infrastructure to Support Indoor Real Time Localization</i>	Head of Research, AirWatch, Atlanta, Ga.
Erick Omar Torres	Rincón-Mora	<i>An Electrostatic CMOS/BI/CMOS Li ION Vibration-Based Harvester-Charger IC</i>	IC design engineer, Texas Instruments, Dallas, Tex.
Juan Felix Torres	Moore	<i>Estimation of Glottal Source Features from the Spectral Envelope of the Acoustic Speech Signal</i>	Faculty member, Polytechnic University of Puerto Rico, San Juan, P.R.
Arif Selcuk Uluagac	Copeland	<i>Secure Communication Framework for Wireless Sensor Networks</i>	Research engineer, Georgia Tech, School of Electrical and Computer Engineering, Atlanta, Ga.
David Alexander Yeh	Laskar	<i>Multi-Gigabyte Low-Power Wireless CMOS Demodulator</i>	Engineer, Hittite Microwave Corporation, Boston, Mass.
Tahir Zaidi	Ferguson	<i>Ferromagnetic and Multiferroic Thin Films Aimed Towards Optoelectronic and Spinatronic Applications</i>	Associate professor, National University of Sciences and Technology, Rawalpindi, Pakistan
Pinjia Zhang	Habetler	<i>Active Thermal Protection for Induction Motors Fed by Motor Control Devices</i>	Senior research engineer, GE Global Research, Schenectady, N.Y.

FALL 2010

Manzar Abbas	Vachtsevanos	<i>System Level Health Assessment of Complex Engineering Processes</i>	Employed with a university in Pakistan.
Francesco Barale	Mukhopadhyay	<i>Design of Integrated Frequency Synthesizers and Clock Data Recovery Circuits for 60 GHz Wireless Communications</i>	Design engineer, Silicon Laboratories, Austin, Tex.
Pierrick Antoine Burgain	Feron	<i>On the Control of Airport Departure Operations</i>	Trader, Capital One, Washington, D.C.
JeongWon Cha	Tentzeris	<i>A CMOS Radio-Frequency Front End for Multi-Standard Wireless Communication</i>	Not Known.
Peng Cheng	Cressler	<i>Reliability of SiGe HBTS for Extreme Environment and RF Circuit Applications</i>	Advisory engineer, IBM, Burlington, Vt.
Jaehyouk Choi	Tentzeris	<i>Fully Integrated DLL/PLL-based CMOS Frequency Synthesizers for Wireless Systems</i>	Not known
Isaac Perry Clements	Bellamkonda	<i>Topographic Guidance Scaffolds for Peripheral Nerve Interfacing</i>	Senior research engineer, Plexon, Inc. Dallas, Tex.
Yao Duan	Harley	<i>Method for Design and Optimization of Surface Mount Permanent Magnet Machines and Induction Machines</i>	Electromagnetic design engineer, Vestas, Marlborough, Mass.
Vincent Alexander Emanuele	Zhou	<i>Advancements in High Throughput Protein Profiling Using Surface Enhanced Laser Desorption and Ionization Time of Flight Mass Spectrometry</i>	Computer scientist, Centers for Disease Control, Atlanta, Ga.
Musad Al Haque	Egerstedt	<i>Biologically Inspired Heterogeneous Multi-Agent Systems</i>	CFO, Greenhill Resource, Singapore
Michael Benjamin Healy	Lim	<i>Physical Design for Performance, Power and Thermal Trade-Offs in Modern 2D and 3D Microarchitectures</i>	Postdoctoral researcher, IBM Research, Yorktown Heights, N.Y.
Yong Huang	Dupuis	<i>InAlGaAs/InP Light Emitting Transistors and Transistor Laser Operating Near 1.55 <math>\mu\text{m}</math></i>	Senior engineer, Kopin Corporation, Tauton, Mass.
Joonhoi Hur	Laskar	<i>A Highly Linear and Efficient Out-Phasing Transmitter for Multi-Band, Multi-Mode Applications</i>	Engineer, Texas Instruments, Dallas, Tex.
Vivek Kaul	Yezzi	<i>Tracking and Detection of Crack Patterns Using Minimal Path Techniques</i>	Software algorithm design engineer, Pay Pal, Inc., San Jose, Calif.
Kil-Hoon Lee	Tentzeris	<i>Design of Signal Integrity Enhancement Circuits</i>	Not known
Sang Min Lee	Laskar	<i>A CMOS Analog Pulse Compressor with a Low-Power Analog-to-Digital Converter for MIMO Radar Applications</i>	Senior engineer, Qualcomm, San Diego, Calif.
Jun Ma	Li	<i>Channel Estimation and Signal Detection for Wireless Relay</i>	Engineer, Marvell, Santa Clara, Calif.
Waqas Majeed	Keilholz	<i>Spatiotemporal Dynamics of Low Frequency Fluctuations in BOLD FMIR</i>	Postdoctoral research fellow, Vanderbilt University, Nashville, Tenn.
Nisarga Niranjana Naik	M. Allen	<i>MEMS-Based Nozzles and Templates for the Fabrication of Engineered Tissue Constructs</i>	Postdoctoral research fellow, Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, Mass.
Vishwanath Natarajan	Chatterjee	<i>Self-Healing RF SoCs: Low Cost Built-in Test and Control Driven Simultaneous Tuning of Multiple Performance Metrics</i>	Test R&D engineer, Intel Corporation, Chandler, Ariz.
Ibrahima Jacques Ndiour	Vela	<i>Dynamic Curve Estimation for Visual Tracking</i>	Systems engineer, Intel Corporation, Chandler, Ariz.
Daniel Thomas Owens	Kippelen	<i>Linear and Non-Linear Optical Properties of Metal-Dielectric Multilayer Structures</i>	Electrical engineer, Army Evaluation Center, Aberdeen Proving Ground, Md.
Zehra Parlak	Degertekin	<i>Quantitative Imaging of Subsurface Mechanical Properties at Nanoscale Using the Atomic Force Microscope</i>	Postdoctoral associate, Duke University, Durham, N.C.
Jeremy Thomas Reed	C.-H. Lee	<i>Acoustic Segment Modeling and Preference Ranking Music Information Retrieval</i>	Research engineer, Sensors and Electromagnetic Applications Laboratory, Georgia Tech Research Institute, Smyrna, Ga.
Romeil Singh Sandhu	Tannenbaum	<i>Statistical Methods for 2D Image Segmentation and 3D Pose Estimation</i>	Postgraduate studies, University of Alabama, Tuscaloosa, Ala.
Tushar Thrivikraman	Cressler	<i>SiGe BiCMOS Phased Array Front-Ends for Extreme Environment Applications</i>	RF microwave engineer, NASA Jet Propulsion Laboratory, Pasadena, Calif.
Fengtao Wang	Adibi	<i>Optical Interconnects on Printed Circuit Boards</i>	Research engineer, School of Electrical and Computer Engineering, Georgia Tech, Atlanta, Ga.
Dong Hyuk Woo	H.-S.S. Lee	<i>Designing Heterogeneous Many-Core Processors to Provide High Performance under Limited Chip Power Budget</i>	Research scientist, Intel Labs, Santa Clara, Calif.

Sang Hyun Woo	Laskar	<i>Low Noise RF CMOS Receiver Integrated Circuits</i>	Senior engineer, Qualcomm, San Diego, Calif.
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## SPRING 2011

Abhiruchi Agarwal	Bellamkonda	<i>Nanocarrier Mediated Therapies for the Gliomas of the Brain</i>	Bioinformatic analyst, Novartis Institute of Biomedical Research, Boston, Mass.
Murtaza Askari	Adibi	<i>High Efficiency Devices Based on Slow Light in Photonic Crystals</i>	Research technician, Georgia Tech, School of Electrical and Computer Engineering, Atlanta, Ga.
Michael Ryan Bales	D.S. Wills	<i>Illumination Compensation in Video Surveillance Analysis</i>	Temporary professional advisor, Sensors and Electromagnetic Applications Laboratory, Georgia Tech Research Institute, Smyrna, Ga.
Kevin Shun Chieh Chuang	G.K. Chang	<i>Multi-Gigabit CMOS Analog-to-Digital Converter and Mixed-Signal Demodulator for Low-Power, Millimeter Wave Communication Systems</i>	Technical staff, MIT Lincoln Laboratory, Lexington/Cambridge, Mass.
Huseyin Dinc	P. Allen	<i>A High-Speed Two-Step Analog-to-Digital with an Open Loop Residue Amplifier</i>	Not known
Marcus Franklin Dutton	Keezer	<i>Flexible Architectures and Methods for Graphics Processing</i>	Manager of Electrical Engineering, L-3 Communications, Alpharetta, Ga.
Supaporn Erjongmanee	Ji	<i>Study of Network-Service Disruption Using Heterogeneous Data and Statistical Learning</i>	Lecturer, Kasetsart University, Ladyaow Chatuchak, Thailand
Guillermo Gallego Bonet	Yezzi	<i>Variational Image Processing Algorithms for the Stereoscopic Space-Time Reconstruction of Water Waves</i>	Postdoctoral researcher, Universidad Politécnica de Madrid, Madrid, Spain
Brian Joseph Gestner	Anderson	<i>Lattice Reduction for MIMO Detection: From Theoretical Analysis to Hardware Realization</i>	Sandia National Labs, Albuquerque, N.M.
Seunghwa Kang	Bader	<i>On the Design of Architecture-aware Algorithms for Emergency Applications</i>	Postdoctoral researcher, Pacific Northwest, Seattle, Wash.
Jonghoek Kim	F. Zhang	<i>Simultaneous Cooperative Exploration and Networking</i>	Senior researcher, Korean Agency for Defense Development, Jinhae, South Korea
Demijan Klinc	McLaughlin	<i>On Applications of Puncturing in Error-Correction Coding</i>	Videoconferencing Engineer, Apple, Inc., Cupertino, Calif.
Michael Scott Kranz	M. Allen	<i>Micromechanical Sensor for the Spectral Decomposition of Acoustic Signals</i>	CEO, Engenius Micro, LLC, Atlanta, Ga.
Elizabeth Anna Whitaker Lynch	Riley	<i>Hardware Acceleration for Conservative Parallel Discrete Event Simulation on Multi-Core Systems</i>	Computer engineer, U.S. Navy, California, Md.
Ashraf Muhammad Majid	Keezer	<i>Methods for Extending High Performance Automated Test Equipment using Multi-Gigahertz FPGA Technologies</i>	Vice president, SunTrust Banks, Inc., Atlanta, Ga.
James Gregory Malcolm	Rathi	<i>Filtered Tractography</i>	Not known
Apurva Mohan	Blough	<i>Design and Implementation of an Attribute Based Authorization Management System</i>	Research scientist, Honeywell Research Labs, Golden Valley, Minn.
Vandana Mohan	Tannenbaum	<i>Computer Vision and Machine Learning Methods for the Analysis of Brain and Cardiac Imagery</i>	Consultant, McKinsey, Atlanta, Ga.
John Kangchun Perng	Murthy	<i>Ultrasound Imaging of Oxidative Stress in vivo with Chemically-generated Gas Microbubbles</i>	Siemens Corporation, Boston, Mass.
William John Potscavage	Kippelen	<i>Physics and Engineering of Organic Solar Cells</i>	Postdoctoral fellow, Chihaya Adachi Group, OPERA, Kyushu University, Fukuoka City, Japan
Amin Hassan Rida	Tentzeris	<i>Integrated RF Modules and Passives on Low-Cost Flexible Materials for Applications up to the MM-Wave Frequency Range</i>	Systems engineer, Northrop-Grumman, Atlanta, Ga.
Ashwin Kumar Samarao	Ayazi	<i>Compensation and Trimming for Silicon Micromechanical Resonators and Resonator Arrays for Timing and Spectral Processing</i>	Research engineer, Bosh, Palo Alto, Calif.
Nithya Sankaran	Tummala	<i>Electromagnetic Coupling in Multilayer Thin-Film Organic Packages with Chip-Last Embedded Actives</i>	Package technical lead, NVIDIA Corporation, Santa Clara, Calif.
Negar Tavassolian	Papapolymerou	<i>Dielectric Charging in Capacitive RF MEMS Switches with Silicon Nitride and Silicon Dioxide</i>	Postdoctoral fellow, School of ECE, Georgia Tech, Atlanta, Ga.
Yasser A. Zaghoul	Adibi	<i>Polarization Based Digital Optical Representation, Gates, and Processor</i>	Not employed



## Student Groups and Organizations

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.

### Eta Kappa Nu

Eta Kappa Nu is the honor society for electrical and computer engineers. Led by Aakash Degwekar, Sean McGee, and Viki Sherman during 2010-11, HKN hosted 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 sixth 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 2009-10 (see related article, page 2).

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 scholarship recipient for 2010-11 was Ackshaey Singh, who was awarded \$1,000, credited to his tuition. Mr. Singh plans to graduate in fall 2012 and then pursue a master's degree in ECE.

The group hosted the annual ECE Spring Picnic, where the 2011 Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award and the 2011 W. Marshall Leach, Jr./Eta Kappa Nu Outstanding Teacher Award were presented to ECE Associate Professor W. Alan Doolittle and ECE Professor James H. McClellan. HKN volunteers tutored high school students who attend GIVE Center West in Gwinnett County, participated in Tech Beautification and Team Buzz community service events, and volunteered at the MedShare Center, where they assembled boxes of medical equipment that was then donated to low income countries.

*Below: HKN members have a "chip party" to package lab supplies to be sold to students at discounted prices.*



*WECE 2010-11 Officers.*

### Women in Electrical and Computer Engineering

Women in Electrical and Computer Engineering aims to increase awareness of opportunities for women in ECE and to help women reach their full potential as engineers and leaders. Jenny Liu served as the organization's president during 2010-11.

In the last year, WECE hosted K-12 outreach activities and also took part in similar activities sponsored by other organizations at Georgia Tech. They hosted lab tours for Norcross, Berkmar, and B.E.S.T. Academy High School students and co-sponsored the State of Georgia FIRST LEGO League Tournament (see related story on page 15). They also participated in the Women in Engineering Career Conference for high school girls and Kids @ Kollege, an annual event for metro area elementary school-aged children. The group gave time to the community by working on service projects through Team Buzz and with MedShare International.

WECE also organized academic development workshops specific to the School, such as the ECE Survival Guide and programs focused on co-op and research opportunities, as well as on the class registration process and study and work abroad options. WECE also hosted networking and information sessions with ConocoPhillips, Alcatel-Lucent, Epic Systems, T-Mobile, Harris Corporation, and Cisco, and they organized professional development workshops focused on the job interview process and stress management.

WECE also made time for fun and socializing. The group held its annual Halloween party, movie and bowling night, a luncheon for transfer students, and pool party—which attract a wide cross-section of faculty, staff, and undergraduate and graduate students—along with a barbeque for freshmen and a luncheon for transfer students.



### IEEE Student Branch

IEEE is the world's leading professional association for the advancement of technology. Chaired by Rob Rhinehart in 2010-11, the Georgia Tech branch of IEEE provides students with ways to enhance their technical skills and professional development, as well as to build a sense of community among its members and all ECE students. The group has over 800 members, making it the largest student branch in the nation. Multiple Outstanding Student Branch of the Year and Exemplary Student Branch awards have also been awarded to this organization.

Throughout the year, IEEE connected students with faculty and industry professionals by coordinating faculty seminars and corporate presentations. The group held its annual Student-Professional Awareness Conference on March 8, and attended the Region 3 IEEE SoutheastCon in Nashville, Tenn.

*Left: 2010-11 IEEE Officers.*

### Georgia Tech Excels in Final Year of EcoCAR Challenge

A Georgia Tech team of students and faculty representing ECE, mechanical engineering, and chemical and biomolecular engineering placed seventh out of the 16 competing universities in the third and final year of the EcoCAR Challenge. Georgia Tech also placed fourth in lifecycle greenhouse gas emission reductions, fifth in lifecycle petroleum use reduction, and won the Best Vehicle Appearance award.

Sixteen universities across North America took part in this competition and were challenged to design, re-engineer, and then test a sports utility vehicle in order to minimize fuel consumption and greenhouse gas emissions while maintaining vehicle performance and consumer appeal. The competition was held June 5-16, 2011 at General Motors' Milford, Mich., proving grounds and at locations throughout Washington, D.C.

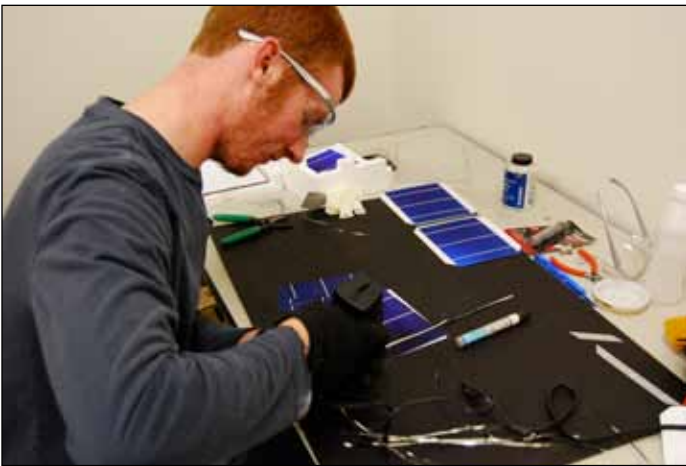
The Georgia Tech team entered a hybrid electric vehicle with a power-split architecture featuring a biofuel powered 1.6L engine, GM's 2-Mode hybrid transmission, and a lithium-ion battery pack provided by A123 Systems. Georgia Tech placed first out of the six universities that chose to use this prototype power split architecture.

Students were given carte blanche to design and build their unique advanced propulsion solutions in order to meet the array of vehicle performance targets set by the competition. Teams explored a wide variety of technologies and strategies that helped their vehicles achieve these goals, such as hybrid electric, plug-in electric, range-extended electric and fuel cell electric architectures, along with a combination of gasoline, ethanol, biodiesel, electricity, and hydrogen fuels and energy carriers. They were also directed to follow the real-world approach modeled after GM's global vehicle development process, providing students with hands-on engineering experience.

The Georgia Tech team included over 60 students with team leaders Carlos A. Cubero-Ponce and Ryan Melsert, both of ECE, and faculty advisors including Tom Fuller (Chemical and Biomolecular Engineering), Michael Leamy (Mechanical Engineering), and David Taylor (ECE).







### Solar Jackets Promote Green Energy While Stressing Teamwork and Leadership

Composed of undergraduate and graduate students mostly from the College of Engineering, the Solar Jackets build solar and electric vehicles for competitions. The group has 40 active members representing 10 majors, including five senior design teams from different schools and nine distinct design teams that tackle an individual component or system of the car while collaborating with the other sub-teams.

The Solar Jackets continue to work on the Audi TT Solar-Assisted Electric Vehicle, which runs on a unique blend of solar and stored-electric power. A conventional 120V outlet charges the SAEV's primary battery pack, while thin film solar cells on the car's roof and hood charge the batteries for the 12-volt auxiliary system, which includes electric power brakes and steering, headlights, and radio. They are also working on the Solar Racer, a sleek, lightweight endurance vehicle that is powered only by the sun. The car will accommodate high-efficiency solar cell technology, high-voltage power electronics, telemetric systems, composites fabrication, efficient power management, sound mechanical construction, and streamlined aerodynamics. The Solar Racer will compete in the 2012 Formula Sun Grand Prix and American Solar Challenge, which will take place next July. This 1,000+ mile cross-country race attracts many international organizations and serves as proving grounds for showcasing the world's premiere solar-electric vehicle technology.

During the last year, the Solar Jackets participated in the Georgia Tech Auto Show 2011 and also took part in several metro Atlanta events that promote sustainable lifestyles, environmental protection, and alternative-fuel transportation. They also attended the EV Rally in Jackson County, Ga. where middle and high school students have built and raced electric go-karts for over a decade. The Solar Jackets currently have over 30 sponsors and welcome contributions to its Adopt-A-Cell Program. For more information, visit <http://solarjackets.gatech.edu>.



**SJ-1 Endeavour**  
Georgia Tech's First Solar Racer



### Georgia Tech Hosts FIRST LEGO League State Tournament

On January 29, 2011, 50 student teams gathered at the Georgia Tech Student Center to compete in the State of Georgia FIRST LEGO League Tournament. The event was coordinated by the ECE Student-Faculty Committee and the Center for Education Integrating Science, Mathematics, and Computing and was staffed by student, faculty, and staff volunteers from Georgia Tech and the community as a whole.

This year's Challenge theme was "Body Forward," which gave students aged 9 to 14, a chance to explore the cutting-edge world of biomedical engineering to discover innovative ways to repair injuries, overcome genetic predispositions, and maximize the bodies' potential, with the purpose of leading happier, healthier lives.

In this year's tournament, 337 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 50 teams, involving 480 students that advanced to the January 29 tournament at Georgia Tech. This year's winning team (pictured above) was GENIUS—Girls Exploring New Ideas Using Science, which was sponsored by the Girl Scouts of Greater Atlanta.

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

Five ECE graduate students earned awards at the 2011 Georgia Tech Research and Innovation Conference, held at the Georgia Tech Student Center on February 8. 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 done in ECE.

**Greg Drayer:** GTRIC 2011 Fellowship Award, "Design and Simulation of a Reconfigurable Aquatic Habitat for Experiments in Life Support Control." (Ph.D. advisor: Ayanna Howard)

**Jayant Ratti:** GTRIC 2011 Best Designed Poster Award, "Morphing Micro Aerial Robot with Quad Hybrid Energy-Efficient Mechatronics." (Ph.D. advisor: George Vachtsevanos)

GTRIC 2011 Travel Awards: **Maysamreza Chamanzar,** "Ultra-compact On-chip Hybrid Plasmonic-photonics Sensors" (Ph.D. advisor Ali Adibi); **Kiruthika Devaraj,** "The Centimeter- and Millimeter-wavelength Ammonia Absorption Spectra under Jovian Conditions" (Ph.D. advisor Paul Steffes); and **Aakash Sahai,** "Chaos in Laser Diodes" (Ph.D. advisor: David Citrin). ▀



## Faculty Profile

### 113 Faculty\*

- 5 Regents' Professors
- 65 Professors
- 28 Associate Professors
- 15 Assistant Professors

### Tenured

- 5 Regents' Professors
- 65 Professors
- 25 Associate Professors

### Diversity

- 13 Female
- 4 African-American
- 27 Asian
- 3 Hispanic
- 1 Multi-racial

\* Includes all faculty members employed during FY 11, including those permanently based at Georgia Tech-Savannah and Georgia Tech-Lorraine.

## New Faculty



**Muhannad Bakir**  
Associate Professor  
BEE '99, Auburn University  
MSECE '00, Georgia Tech  
PhD ECE '03, Georgia Tech

Research interests:  
Three-dimensional  
(3D) electronic

system integration; advanced cooling and power delivery for 3D systems; biosensor technologies and their integration with signal processing circuitry; carbon-based nanoelectronics; nanofabrication technology; novel interconnect systems. He is the editor of a book entitled *Integrated Interconnect Technologies for 3D Nanoelectronic Systems* and is the author/coauthor of more than 60 journal publications and conference proceedings, five book chapters, and 10 U.S. patents.

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. Effective July 1, 2010, the computer engineering technical interest group split into two different groups—computer systems and software and VLSI systems and digital design.

One hundred thirteen faculty members were employed during 2010-11, with 84 percent holding tenure and all holding doctorates. In the last year, ECE added one new faculty member to its ranks, and seven faculty members were promoted and/or tenured. Statistics detailing academic rank and diversity are provided, in addition to a list of 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; Acting Director, Georgia Electronic Design Center*  
Ph.D., Massachusetts Institute of Technology  
Microelectronics/microsystems; bioengineering  
2011 IEEE Fellow “for contributions to micro and nanofabrication technologies for microelectromechanical systems.”

#### Thomas K. Gaylord

*Julius Brown Chair Professor*  
Ph.D., Rice University  
Optics and photonics; electromagnetics; microelectronics/microsystems  
2011 SPIE Fellow “for achievements in diffractive and polarization optics.”

#### 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

#### Glenn S. Smith

*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  
2011 SPIE Fellow “for achievements in integrated nanophotonics and volume holography.”

#### Ian F. Akyildiz

*Byers Professor in Telecommunications*  
Ph.D., University of Erlangen  
Telecommunications  
2011 W. Wallace McDowell Award, given by the IEEE Computer Society “for pioneering contributions to wireless sensor network architectures and communication protocols.”

#### Yucel Altunbasak

Ph.D., University of Rochester  
Digital signal processing

#### 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

#### Douglas M. Blough

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

#### Oliver Brand

*Co-Director, Center for MEMS and Microsystems Technologies*  
Ph.D., ETH-Zurich  
Bioengineering; microelectronics/microsystems  
2011 ECE Distinguished Mentor 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

**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  
[2011 ECE Distinguished Faculty Achievement Award](#)

**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  
[2011 IEEE Leon K. Kirchmayer Graduate Teaching Award](#).

**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

**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

**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

**Joseph L.A. Hughes**

*Senior Associate Chair*

Ph.D., Stanford University  
VLSI systems and digital design; microelectronics/microsystems; telecommunications; computer systems and software

**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

**Bing-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

**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

**W. Marshall Leach, Jr.** (died November 20, 2010)

Ph.D., Georgia Institute of Technology

Electromagnetics; electronic design and applications; microsystems

**Chin-Hui Lee**

Ph.D., University of Washington  
Digital signal processing

**Ye (Geoffrey) Li**

Ph.D., Auburn University  
Telecommunications

**Vijay K. Madiseti**

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

**Gary S. May** (appointed as Dean of the Georgia Tech College of Engineering, effective July 1, 2011)

*Steve W. Chaddick School Chair*

Ph.D., University of California at Berkeley  
Microelectronics/microsystems; systems and controls  
[2011 Father of the Year Award, given by the Father's Day Council of Atlanta and the American Diabetes Association.](#)

**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  
[2011 W. Marshall Leach/Eta Kappa Nu Outstanding Teacher Award](#)

**Steven W. McLaughlin**

*Vice Provost for International Initiatives;*

*Byers Professor*

Ph.D., University of Michigan at Ann Arbor  
Telecommunications

[Co-recipient with Matthieu Bloch of the IEEE Communications and Information Theory Society Joint Paper Award for "Wireless Information-Theoretic Security," published in the June 2008 issue of the IEEE Transactions on Information Theory; named "Chevalier dans l'Ordre Nationale de Merite"—the grade of Knight in the French National Order of Merit—by the French government.](#)

**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  
[2010 International George Montefiore Award "for fundamental contributions to smart grids or smart electricity networks."](#)

**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  
2011 IEEE Fellow “for contributions to flexible, microwave, and wireless components and systems.”

**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

**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

**Allen Tannenbaum** (resigned July 1, 2011)

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

**Emmanouil M. Tentzeris**

Ph.D., University of Michigan at Ann Arbor  
Electromagnetics; electronic design and applications  
[IEEE Electronic Components and Technology Conference Best of Session Award for his paper, “Inkjet-Printed System-on-Paper/Polymer ‘Green’ RFID and Wireless Sensors.”](#)

**David G. Taylor**

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

**Rao R. Tummala**

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

Microelectronics/microsystems

2011 IEEE Components, Packaging, and Manufacturing Technology Award “for pioneering and innovative contributions to package integration research, cross-disciplinary education, and globalization of electronic packaging;” 2011 TechnoVisionary Award, given by the India Semiconductor Association.

**Erik I. Verriest**

Ph.D., Stanford University  
Systems and controls; bioengineering

**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)

*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 Willis**

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. Yezi, 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

**ASSOCIATE PROFESSORS**

**David V. Anderson**

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

**Muhannad Bakir**

*Associate Director, Interconnect and Packaging Center*  
Ph.D., Georgia Institute of Technology  
Microelectronics/microsystems

2011 IEEE Components, Packaging, and Manufacturing Technology Society Outstanding Young Engineer Award.

**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  
2011 Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award

**Gregory D. Durgin**

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

**Santiago Grijalva**

Ph.D., University of Illinois at Urbana-Champaign  
Electrical energy; computer systems and software

**Paul E. Hasler**

Ph.D., California Institute of Technology  
Electronic design and applications; bioengineering  
2011 Georgia Tech Outstanding Doctoral Thesis Advisor Award.

**Ayanna Howard**

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

**Chuanyi Ji**

Ph.D., California Institute of Technology  
Telecommunications

**J. Stevenson Kenney**

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

**Arthur Koblasz**

Ph.D., California Institute of Technology  
Bioengineering

**Kevin T. Kornegay**

Motorola Foundation Professor  
Ph.D., University of California at Berkeley  
Electronic design and applications; 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  
[IEEE Micro magazine “Top Pick” for his paper, “Security Refresh: Protecting Phase-Change Memory against Malicious Wear Out.”](#)

**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

**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

**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

**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  
**2011 IEEE Fellow** "for contributions to energy and power integrated circuit design."

**David E. Schimmel**

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

**Linda M. Wills**

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

**ASSISTANT PROFESSORS****Pamela T. Bhatti**

Ph.D., University of Michigan at Ann Arbor  
Bioengineering; microelectronics/microsystems  
**NSF CAREER Award** for her project, "An Ultra-Low-Power MEMS-Based Implantable Biosystem for Restoring Vestibular Function—Platform for an Integrated Human-Centered Hybrid Biosystem;" **2011 Atlanta Clinical & Translational Science Institute KL2 Mentored Clinical and Translational Research Scholar.**

**Maysam Ghovanloo**

*ON Semiconductor Junior Professor*  
Ph.D., University of Michigan at Ann Arbor  
Bioengineering; electronic design and applications  
**"Leo" People's Choice Award, given at the 2010 da Vinci Awards, for his team's development of the Tongue Drive System.**

**Saibal Mukhopadhyay**

Ph.D., Purdue University

VLSI systems and digital design; microelectronics/microsystems; electronic design and applications  
**NSF CAREER Award** for his project, "3D Heterogeneous Integration for Power Reduction in Embedded Systems: Application to Wireless Image Sensing and Transport." **2010 IBM Faculty Award** for his project, "Thermal and Power Analysis and On-line Management in 3D Systems."

**Azad Naeemi**

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

**Justin K. Romberg**

Ph.D., Rice University  
Digital signal processing

**Christopher J. Rozell**

Ph.D., Rice University  
Bioengineering; digital signal processing  
**2011 Class of 1969 Teaching Fellows Program, coordinated by the Georgia Tech Center for the Enhancement of Teaching and Learning.**

**Shyh-Chiang Shen**

Ph.D., University of Illinois at Urbana-Champaign  
Microelectronics/microsystems  
**2011 ECE Outstanding Junior Faculty Member Award**

**Patricio Vela**

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

**PROFESSOR OF THE PRACTICE****Thomas E. Michaels**

Ph.D., Washington State University  
Electromagnetics; systems and controls

**GEORGIA TECH SAVANNAH FACULTY****PROFESSOR**

**Monson H. Hayes, III** (retired February 28, 2011)  
*Associate Chair for ECE Programs at Georgia Tech-Savannah*

Sc.D., Massachusetts Institute of Technology  
Digital signal processing

**ASSOCIATE PROFESSORS****Ghassan Al-Regib**

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

**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  
**2011 ECE Outreach Award**

**P. Douglas Yoder**

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

**ASSISTANT PROFESSORS****Bo Hong**

Ph.D., University of Southern California  
Computer systems and software

**Jongman Kim**

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

**Hongwei Wu**

Ph.D., University of Southern California  
Bioengineering; digital signal processing

**Fumin Zhang**

Ph.D., University of Maryland at College Park  
Systems and controls  
**2011 ECE Outstanding Junior Faculty Member Award; 2011 Martin Klein MATE Award, given at the 10th MATE International Remotely Operated Vehicle Competition.**

**Ying Zhang**

Ph.D., University of California at Berkeley  
Digital signal processing; systems and controls; microelectronics/microsystems

**GEORGIA TECH LORRAINE FACULTY****PROFESSOR****Abdallah Ougazzaden**

*Director, International Research Unit on Telecommunications and Innovative Materials Research*  
Ph.D., University of Paris VII  
Microelectronics/microsystems; optics and photonics

**ASSISTANT PROFESSORS****Matthieu Bloch**

Ph.D., Georgia Institute of Technology  
Telecommunications  
**Co-recipient with Steven W. McLaughlin of the IEEE Communications and Information Theory Society Joint Paper Award for "Wireless Information-Theoretic Security," published in the June 2008 issue of the IEEE Transactions on Information Theory.**

**Paul L. Voss**

*Demetrius T. Paris Professor*  
Ph.D., Northwestern University  
Optics and photonics

## In Memoriam: **W. Marshall Leach, Jr.**

Georgia Tech and ECE lost a very dear friend and colleague when Professor W. Marshall Leach, Jr. died on November 20, 2010 after suffering from a heart attack. He was 70 years old.

Dr. Leach first arrived at Georgia Tech in 1968 when he enrolled as a Ph.D. student in the School of Electrical Engineering, after serving for three years in the Air Force. After graduation, he joined the School's faculty in 1972, beginning a 38-year-long career as a beloved and respected teacher of electromagnetics, microsystems, and electronic design and applications.

A four-time recipient of the Richard M. Bass/Eta Kappa Nu Outstanding Teacher Award—an honor determined by a majority vote of the ECE senior class, Dr. Leach was chosen for this award in 1975, 1982, 2002, and 2007. No other faculty member has matched or surpassed that feat.

Dr. Leach's popularity as a teacher, his open door policy with students, and his years as faculty advisor for IEEE, WREK-FM, and the Institute Radio Communication Board have left indelible impressions on thousands of students. Alumni and audiophiles from around the world have shared stories about his classes, his influence and friendship, and his web pages for construction plans for "Leach amplifiers and loudspeakers," that are still being used 20 to 30 years after they were built.

Through his untiring efforts both inside and outside of the classroom, Dr. Leach has influenced several generations of Georgia Tech electrical engineers and computer engineers, in addition to untold others from around the world. His legacy will live on through his work, his students, and everyone that he touched.



## FACULTY WITH JOINT APPOINTMENTS IN ECE

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

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

**James Foley**, Professor and Stephen Fleming Chair in Telecommunications, 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

## PROFESSORS EMERITI/ RETIRED FACULTY

Cecil O. Alford 1968-98  
Phillip E. Allen 1984-2005  
Thomas P. Barnwell 1971-2006  
Henry C. Bourne 1982-92

Aubrey Bush 1965-92  
(employed with the Georgia Centers for Advanced Telecommunications Technology)  
W. Russell Callen, Jr. 1970-2005  
(part-time employment with ECE)  
J. Alvin Connelly 1968-2001  
John F. Dorsey 1980-2010  
Robert K. Feeney 1970-2004  
Joseph L. Hammond 1955-84  
David R. Hertling 1978-2004  
(part-time employment with ECE)  
Richard J. Higgins 1987-99  
John W. Hooper 1957-88  
Edward B. Joy 1970-98  
Edward W. Kamen 1971-80, 1991-2002  
Russell M. Mersereau 1975-2008  
Mohamed F. Moad 1963-2001  
(part-time employment with ECE)  
John B. Peatman 1964-2008  
(part-time employment with ECE)  
Hans B. Püttgen 1981-2006  
(employed with EPFL, Swiss Federal Institute of Technology)  
Dale C. Ray 1966-99

William T. Rhodes 1971-2005  
(employed with Florida Atlantic University)  
George P. Rodrigue 1968-96  
Ronald W. Schafer 1974-2004  
(employed with HP)  
Jay H. Schlag 1967-2004  
Kendall L. Su 1954-94  
Roger P. Webb 1963-2004  
(part-time employment with the Georgia Tech Office of the Provost and Vice President for Academic Affairs)

**Promotion/Tenure**  
Effective July 1, 2010

### *Promotions to Professor*

**Robert J. Butera, Jr.**  
**Magnus Egerstedt**  
**Famarz Fekri**  
**Raghupathy Sivakumar**

### *Promotions to Associate Professor with Tenure*

**Benjamin D.B. Klein**  
**Xiaoli Ma**  
**Elliot Moore**



## ECE Professional Education

During 2010-11, both active and retired ECE faculty members offered 31 professional education courses and two conferences through the Georgia Tech Professional Education Office. Below is a listing of dates, titles, and ECE-based instructors. Two ECE-sponsored conferences and seven online courses are included in this list.

### 2010

June 14-17, 2010	Christopher F. Barnes	Synthetic Aperture Radar Image Formation Processing
June 14-18, 2010	Edward B. Joy	Near-Field Antenna Measurement Techniques
June 21-24, 2010	Mark A. Richards	Fundamentals of Radar Signal Processing
July 19-22, 2010	Mark A. Richards	Fundamentals of Radar Signal Processing
August 2-September 17, 2010	Ghassan AlRegib	Image Processing Using TI DM6437 (Online)
August 17-November 15, 2010	W. Russell Callen, Jr.	Electrical Engineering: Preparation for the PE Exam, Power Option
August 18-November 13, 2010	W. Russell Callen, Jr.	Fundamentals of Engineering (Online)
September 1-October 20, 2010	W. Russell Callen, Jr.	Fundamentals of Engineering
September 20-24, 2010	Edward B. Joy	Antenna Engineering
September 22-24, 2010	A.P. Sakis Meliopoulos	Power Distribution System Grounding and Transients
October 4-8, 2010	Mark A. Richards	Fundamentals of Radar Signal Processing
October 4-November 19, 2010	Ghassan AlRegib	Video Processing Using TI DM6437 (Online)
October 11, 2010-January 25, 2011	Douglas B. Williams	DSP for Practicing Engineers Using the TI C6713 DSP Starter Kit (Online)
October 19-22, 2010	A.P. Sakis Meliopoulos	Power Systems Relaying: Theory and Application
October 25-29, 2010	Mark A. Richards	Fundamentals of Synthetic Aperture Radar
November 8-10, 2010	Mark A. Richards	Signal Processing Refresher
November 15-19, 2010	Edward B. Joy	Far-Field, Anechoic Chamber, Compact, and Near-Field Antenna Measurement Techniques
November 17-19, 2010	A.P. Sakis Meliopoulos	Modern Energy Management Systems

### 2011

January 21-April 30, 2011	W. Russell Callen, Jr.	Electrical Engineering: Preparation for the PE Exam, Power Option (Online)
January 21-April 30, 2011	W. Russell Callen, Jr.	Fundamentals of Engineering (Online)
February 2-March 23, 2011	W. Russell Callen, Jr.	Fundamentals of Engineering
February 5-March 19, 2011	W. Russell Callen, Jr.	Electrical Engineering: Preparation for the PE Exam, Power Option
February 7-11, 2011	Mark A. Richards	Fundamentals of Radar Signal Processing
March 7-May 28, 2011	Douglas B. Williams	DSP for Practicing Engineers Using the TI C6713 DSP Starter Kit (Online)
March 28-31, 2011	A.P. Sakis Meliopoulos	Integrated Grounding System Design and Testing
April 4-7, 2011	Mark A. Richards	Fundamentals of Radar Signal Processing
April 18-20, 2011	Mark A. Richards	Signal Processing Refresher
May 2-6, 2011	Edward B. Joy	Antenna Engineering
May 9-11, 2011	A.P. Sakis Meliopoulos	2011 Fault and Disturbance Analysis Conference
May 11-13, 2011	A.P. Sakis Meliopoulos	2011 Annual Protective Relaying Conference
May 23-25, 2011	A.P. Sakis Meliopoulos	Grounding, EMI, and Power Quality
June 13-16, 2011	Mark A. Richards	Fundamentals of Radar Signal Processing
June 13-17, 2011	Edward B. Joy	Near-Field Antenna Measurement Techniques



## Company News

ECE has a long and successful history of start-up company activity through the Advanced Technology Development Center, a nationally recognized science and technology incubator that helps Georgia entrepreneurs launch and build successful businesses. Seven ATDC “graduate companies” have originated out of ECE, while five 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.

### ATDC ECE Graduate Companies

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

### CardioMEMS

Co-Founder and CTO: Mark G. Allen

### EGT

CSO: Nikil Jayant

### Innovolt\*

Chair, CTO, and Co-Founder: Deepak Divan

### Lancope

Founder: John A. Copeland

### Nexidia

Co-Founder and Board Member: Mark A. Clements

### Suniva\*

Founder and CTO: Ajeet Rohatgi

### ATDC ECE Start-Up Companies

### Asankya Networks\*

Co-Founder and CTO: Raghupathy Sivakumar

### Axion Biosystems\*

Board of Directors: Mark G. Allen

### GTronix\*

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

## CardioMEMS Leads the Way in Biomedical Innovations, Venture Capital Financing



CardioMEMS, Inc., an Atlanta-based medical technology company that has developed and is commercializing proprietary wireless sensing and communication technology for the human body, announced that its first quarter venture financing ranked first in Georgia by dollar amount raised in 2010. The Georgia Top 25 Venture Capital Deals listing was compiled by PricewaterhouseCoopers, LLP and published recently in the *Atlanta Business Chronicle*.

The \$37.9 million venture capital transaction, with lead investor Arcapita Ventures and eight co-investors provided CardioMEMS with additional funding to complete its CHAMPION clinical trial. The 550-patient trial, conducted in 64 prominent U.S. heart centers, evaluated the safety and effectiveness of the CardioMEMS heart failure pressure measurement system. The positive results of the CHAMPION trial were published in the February 2011 issue of *The Lancet*, one of the world’s leading medical journals.

In addition, CardioMEMS was named a top 10 Innovative Technology Company by the Technology Association of Georgia. The company also earned a Georgia Bio Deal of the Year Award for the \$60 million equity investment that it secured from St. Jude Medical in September 2010, shortly after the successful completion of the CHAMPION trial. CardioMEMS was co-founded by ECE Regents’ Professor **Mark G. Allen**, who also serves as the company’s CTO.

## Axion Biosystems’ Multi-electrode Arrays Have a Myriad of Uses

Axion Biosystems has developed the next generation of microelectrode array technology that can simultaneously stimulate and record responses from living cells. This capability has applications in the research, clinical, and drug discovery markets. Based on technology developed at Georgia Tech, Axion has received more than \$6 million in funding from the Georgia Research Alliance, VentureLab, the federal government, and private investors. While the company’s initial focus is on pharmaceutical drug screening, ongoing development will result in devices in the medical diagnostic and medical device arenas.



In June 2011, Axion announced a Cooperative Research and Development Agreement with the National Health and Environmental Effects Research Laboratory of the Environmental Protection Agency’s Office of Research and Development. This agreement was established to evaluate the neurotoxic effects of chemicals using Axion’s microelectrode array system. Between 30-50 chemicals will be evaluated, including pesticides and other compounds known to be neurotoxic, as well as some non-toxic compounds, and compounds for which less information regarding their neurotoxicity is available. The results will help to establish the capabilities of MEA systems for neurotoxicity screening. **Mark G. Allen** serves on the company’s board of directors

## Suniva Shines Brightly in Local Economy

Suniva, a U.S. manufacturer of high-efficiency monocrystalline silicon solar cells and modules, that was founded by ECE Regents’ Professor Ajeet Rohatgi, was named as the fastest growing company at the 2011 *Atlanta Business Chronicle* Pacesetter Awards. To qualify for the Pacesetter Awards, companies must be privately owned, based in the metro Atlanta area, have experienced a two-year growth in sales of more than 50 percent, and have garnered revenue between \$1 million and \$300 million in 2010. Between 2009 and 2010 alone, Suniva’s revenue increased 400 percent.



Earlier this year, *The Wall Street Journal* ranked Suniva second in its list of the “Top 10 Venture-Backed, Clean Technology Companies” for the second consecutive year. During the past year, the company has also been named “Exporter of the Year” by the Export-Import Bank of the United States, “Commercial Technology of the Year” by Platts Global Energy, and an “American Success Story” by U.S. Department of Energy Secretary Steven Chu in a White House blog post. With its expanding, diverse, and skilled workforce, Suniva is producing world-class technology and generating record-setting screen printed solar cell efficiencies both in the lab and in manufacturing. ▀





## Development

The 2010-11 advisory board members and their affiliations are listed below.

**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  
Lawrenceville, Ga.

**Mat Hans**

DTS  
Calabasas, Calif.

**Holmes J. Hawkins, III**

King & Spalding  
Atlanta, Ga.

**Kelvin C. Hawkins, Sr.**

IBM  
Research Triangle Park,  
N.C.

**Sherra E. Kerns**

Olin College  
Needham, Mass.

**W. Wayt King, Jr.**

FSB Legal  
Atlanta, Ga.

**Fred Kitson**

Motorola, Inc.  
Schaumburg, Ill.

**Michael R. McQuade**

DuPont Company  
Wilmington, Del.

**Joseph Parks**

Intel Corporation  
Beaverton, Ore.

**Randall E. Poliner**

Antares Capital  
Corporation  
Melbourne, Fla.

**Sheryl S. Prucka**

Prucka Engineering  
(sold to General Electric  
Medical Systems)  
Park City, Utah

**Thomas J. Quigley**

Broadcom Corporation  
Franklin, N.C.

**T.E. (Ed) Schlesinger**

Department of ECE,  
Carnegie-Mellon Univ.  
Pittsburgh, Pa.

**Leslie Sibert**

Georgia Power  
Atlanta, Ga.

**Ronald S. Slaymaker**

Texas Instruments, Inc.  
Dallas, Tex.

**Alek Szlam**

Szlam Enterprises, Inc.  
Alpharetta, Ga.

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.

Pictured at left are ECE's newest Advisory Board members, Sheryl (Sheri) S. Prucka and T.E. (Ed) Schlesinger.

### ECE Advisory Board Adds Two Members

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 22 representatives, provides feedback in these areas during its formal, semiannual meetings and throughout the year. During FY 11, the ECE Advisory Board welcomed two new members, **Sheryl S. (Sheri) Prucka** and **T.E. (Ed) Schlesinger**.

After completing her education at Georgia Tech, Ms. Prucka (BEE '82, MSEE '84) worked at IBM in Boca Raton, Fla. and Schlumberger in Houston, Tex, before starting her business, Prucka Engineering, Inc. with her husband, Matthew. The company built computerized diagnostic equipment for cardiology, and its products included CardioMapp®, a 256-channel open heart mapping system, and CardioLab®, an advanced computerized diagnostic recording device, which is used in electrophysiology and catheterization labs to diagnose and treat arrhythmias and hemodynamic problems using cardiac catheters. The assets of Prucka Engineering, Inc. were sold to General Electric Medical Systems, Inc. in 1999.

Ms. Prucka is the past chair of the external advisory board for the Wallace H. Coulter Department of Biomedical Engineering at

Georgia Tech and Emory University and has been a trustee for both the Georgia Tech Alumni Association and the Georgia Tech Foundation. She is also a board member of Computing in Cardiology, an international annual scientific conference.

Dr. Schlesinger is the David Edward Schramm Professor and head of the Department of ECE at Carnegie Mellon University. He is also the director of the DARPA Memory Intensive Self-Configuring Integrated Circuits Center. He previously served as director of the Data Storage Systems Center, associate department head in ECE, and founding co-director of the General Motors Collaborative Research Laboratory at CMU.

After receiving his B.Sc. degree in physics from the University of Toronto in 1980, Dr. Schlesinger earned his M.S. and Ph.D. degrees in applied physics from the California Institute of Technology in 1982 and 1985, respectively. His research interests are in the areas of solid-state electronic and optical devices, nanotechnology, and information storage systems. A Fellow of IEEE and SPIE, Dr. Schlesinger is the president of the ECE Department Heads Association and a member of the International Advisory Panel for the A\*STAR Graduate Academy in Singapore.

### 2011 James R. Carreker Distinguished Lecture

**Amir Aghdaei**, president of Tektronix, delivered the tenth annual James R. Carreker Distinguished Lecture on April 7 in the Van Leer Building Auditorium.

Mr. Aghdaei spoke on "The Future of Engineering and Why Innovation Matters." With the year 2011 marking the 65th anniversary of Tektronix, he discussed how the engineer's job is impacted by the technology trends driving today's electronics industry. He also shared his view about the importance of technology and innovation to address the acceleration of those trends in the future.

To view the video of Mr. Aghdaei's talk, visit <http://www.ece.gatech.edu/media/archive/carreker2011/index.html>



## ECE Graduates Honored at 2011 College of Engineering Alumni Awards



The 2011 College of Engineering Alumni Awards Ceremony was held on March 11 at the Georgia Tech Hotel and Conference Center. At this event, CoE Dean Don Giddens inducted new members into the Engineering Hall of Fame, the Academy of Distinguished Engineering Alumni, and the Council of Outstanding Young Engineering Alumni. Four alumni were honored by the School of ECE.

**ENGINEERING HALL OF FAME** This award recognizes alumni for meritorious engineering and/or managerial contributions during their careers.

**H.M. Jack Reynolds**, BEE '50 | Entrepreneur | Dunlap, Tenn.



**ACADEMY OF DISTINGUISHED ENGINEERING ALUMNI** This 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.

**Jose C. Barrios**, MSEE '71 | Deputy Administrator | Panama Canal Authority | Panama City, Panama

**Michael K. Moore**, BEE '79 | President | C.H. Guernsey & Company | Oklahoma City, Okla.

**COUNCIL OF YOUNG ENGINEERING ALUMNI** This award recognizes alumni who have distinguished themselves through professional practice and/or service to the Institute, profession, or society at-large. They are on the "fast track" and have made rapid advancement within their organizations and have been recognized for early professional achievements by others within their profession, field, or organization. These recipients are considered future leaders in their profession.

**Guy Primus**, BIE '92, MSIE '95 | Chief Operating Officer | Overbrook Entertainment | Beverly Hills, Calif.

Co-nominated by ECE and the H. Milton Stewart School of Industrial and Systems Engineering



*Former Georgia Tech College of Engineering Dean Don P. Giddens (l) and COE Advisory Board member Jad Batteh (r) congratulate award winners (top-bottom) H.M. Jack Reynolds, Jose C. Barrios, and Guy Primus.*

### Georgia Tech, ECE Receives \$1 Million Gift for TI DSP Leadership University Program

For the fifth consecutive funding period, Texas Instruments has chosen Georgia Tech and its Center for Signal and Image Processing as one of its primary academic partners for digital signal processing research in its TI Leadership University Program. Since 1999, the TILU program has supported research at Georgia Tech in DSP and its applications with three-year unrestricted gifts of \$1 million. Since 2005, the awards have been made to James H. McClellan, the current CSIP Director and the John and Marilu McCarty Chair Professor of Electrical Engineering, who administers a research program that involves seven projects each centered around a Ph.D. thesis topic.

At present, the research projects are in the areas of cognitive radio networks, performance of power-loaded OFDM systems, sparse wavelet transforms for video coding, automatic image annotation, blind source separation and speech enhancement, audio-video based recognition of handwritten mathematical content, and parameterized adaptable filter structures.

During the lifetime of the TILU program, 12 professors and 29 thesis students have conducted their research with TILU support, with 17 receiving Ph.D.s. More than half of the Ph.D.s have been employed at TI's Research Laboratory in Dallas, where they have made notable contributions in areas such as wireless base stations, digital camera products, and biomedical devices. Numerous other Ph.D. students from CSIP,

telecommunications, and analog electronics within ECE are presently employed by TI Research, as well as many more Georgia Tech ECE graduates from all degree levels.

The selection of Georgia Tech for this prestigious honor continues a long-standing relationship between the Institute and the global, Dallas-based company, one of the first and largest semiconductor makers and the global market leader in digital signal processors. The award is also a tribute to Georgia Tech's internationally recognized DSP research and education program and its faculty. In addition to Georgia Tech, Rice and MIT have been TILU recipients since 1999. Tsinghua University (China), Shanghai Jiaotong University (China), the University of Electronic Science and Technology (China), and the Indian Institute of Science were also named as TI Leadership Universities for 2011.

*"TI's support for our research program extends back to the 1980s paralleling the growth of DSP. The TILU program is a beautiful model for industry-academia relations because it affords us the opportunity to explore new research areas with the only constraint being that we demonstrate leadership in producing new ideas. Our students benefit from the interest that TI researchers have in their thesis projects, as well as from learning how researchers work in the commercial sector. Many of these students go on to successful careers at TI and related companies."*

— James H. McClellan



Van Leer 2012



Proposed Van Leer Renewal



### Van Leer Building Renewal Update

Now approaching its 50th year, the Van Leer Building must be improved and expanded in order to meet the needs of the School and to provide the quality spaces and state-of-the-art facilities that will keep ECE at the forefront in engineering and technology. Through private support, our alumni, friends, and corporate partners can play a vital role in the expansion and renovation of the Van Leer Building.

The School is grateful to the following individuals, companies, and organizations for donating \$4 million toward the \$15 million needed for the Van Leer Renewal Project to commence. To learn how to direct your gift in support of the Van Leer Renewal, contact Martina Hubbarth, ECE director of development for alumni relations.

#### INDIVIDUALS

Geneva N. Akridge  
C. Neal Alexander, Jr.  
Deborah D. Ballard  
Paul H. Barton  
Joan M. Baucom  
Jackie Beck  
Shem K. Blackley, Jr.  
Jean Boiter  
Ralph Bostian  
Anne K. Brinkley  
Scott W. Brown  
Charles V. Burleson  
Jack C. Causey  
Steve W. Chaddick  
Brenda S. Clark  
Christopher R. Clark  
William A. Coley  
Patricia L. Copper  
James C. Cox  
Julian D'Amico, Jr.  
Ann W. Davant  
Martin L. Davis  
James C. Deddens  
Robert L. Dixon, Jr.  
H. Allen Ecker  
Linda D. Edwards  
Robert B. Fallin

Harriet J. Flack  
Elmer J. Flexer  
Forest La Verne Fowler, Jr.  
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Barrow W. Godbee, Jr.  
James S. Gray  
George W. Grier, III  
B. Susan Haire  
Molly G. Hampton  
John A. Hannah  
John W. Hardison  
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Emilie Hartz  
M. Thomas Hatley, Jr.  
Jeffrey A. Hawthorne  
Julia M. Hite  
Mark Hoffman  
Jane B. Hollar  
Sarah S. Hughes  
Margaret N. Humphrey  
Henry R. Jackson  
Jonathan C. James  
Becky R. Jenkins  
Wyatt S. Jones, Jr.  
Sonya B. Kennedy  
Mary L. Kitchen  
Ernestine M. Kuhr  
James C. Leathers

Diane K. Lemaster  
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Anthony D. Matthews  
Mildred B. Mayfield  
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Janie G. McGregor  
Zona B. McGuirt  
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Bradley B. McQueen  
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Randall E. Poliner  
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Tim Preister  
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William F. Reinke  
Bobby J. Rhyne  
William T. Robertson, Jr.  
Marcelle E. Rogers  
Jordan Rosenthal  
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Gene Sapp, Jr.  
Carole C. Scofield  
Frank W. Seymore  
Allan Smith  
Anne F. Smith  
Anne T. Smith  
Dorothy T. Smith  
Elizabeth S. Smith  
Gary W. Smith  
Sandra F. Smith  
William B. Stalvey  
Lee H. Strange  
Terence J. Sullivan  
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Pamela R. Todd  
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Hal B. Tucker  
Warren H. Tucker, Jr.  
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Bessie J. Windham  
Julia T. Windham

#### COMPANIES

Harris Corporation  
Joe Whitwell & Assoc., Inc.  
Laser Products, LLC  
Travelport GDS-Worldspan  
Tucker, Stone & Plymel, P.C.

#### FOUNDATIONS/ NON-PROFIT ORGANIZATIONS

First United Methodist  
Church (Lawrenceville, Ga.)  
Foundation For The Carolinas  
Harris Foundation  
Jewish Federation of Greater  
Atlanta  
Memorial United Methodist  
Church

#### PROFESSIONAL, RESEARCH, & ACADEMIC ORGANIZATIONS

Institute of Nuclear Power  
Operations  
Nuclear Energy Institute

## Campaign Georgia Tech

**Our time. Our legacy.**

Georgia Tech is now in the public phase of a comprehensive fundraising campaign, known as Campaign Georgia Tech, 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 \$129 million as of the end of FY 11.

New extended campaign goals are pending for the Institute and all units, including the School of ECE. Please direct any inquiries regarding how you can support the School and Georgia Tech to Martina Hubbarth, director of ECE development for alumni relations, at 404.894.0274 or [martina.hubbarth@ece.gatech.edu](mailto:martina.hubbarth@ece.gatech.edu), or to Etta Pittman, director of ECE corporate development at 404.894.6888 or [etta.pittman@ece.gatech.edu](mailto:etta.pittman@ece.gatech.edu).

## Grants and Gifts

Corporations, non-profit organizations, and individual donors enthusiastically and generously supported ECE and its research, educational, and service missions by contributing \$11,328,940 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 11.

Some corporate donors represented in this 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, visit the Alumni and External Relations section of the ECE web site ([www.ece.gatech.edu](http://www.ece.gatech.edu)).

<b>For Endowment</b>	<b>\$755,771</b>
Student Support	\$528,161
Faculty Support	\$4,000
Program Enrichment	\$223,610
<b>For Facilities and Equipment</b>	<b>\$1,087,109</b>
Facilities	\$278,466
Equipment	\$808,643
<b>For Current Operations</b>	<b>\$9,486,060</b>
Student Support	\$166,465
Faculty Support	\$2,743,328
Program Enrichment	\$6,576,267
<b>Total</b>	<b>\$11,328,940</b>

### COMPANIES

ADVA Optical Networking  
 Agilent Technologies, Inc.  
 Alpha & Omega Semiconductor, Inc.  
 AOC Technologies Inc.  
 AREVA NP, Inc.  
 Atotech USA, Inc.  
 Beena Vision Systems, Inc.  
 BP America  
 Caterpillar Foundation  
 Chevron  
 Cisco Foundation  
 Cisco Systems, Inc.  
 ClassOne Equipment, Inc.  
 Cox Communications, Inc.  
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 Eaton Corporation  
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 FutureWei Technologies, Inc.  
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 National Semiconductor Corporation  
 NEC Laboratories America, Inc.  
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 Southern Company Services, Inc.  
 Sprint Nextel Corporation  
 Tektronix, Inc.

Texas Instruments, Inc.  
 Textron, Inc.  
 Union Pacific Railroad  
 ZTE USA, Inc.

### FOUNDATIONS/ NON-PROFIT ORGANIZATIONS

Community Foundation for Greater Atlanta  
 Eaton Charitable Fund  
 General Motors Foundation  
 Georgia Cancer Coalition  
 Jewish Federation of Greater Atlanta  
 John and Mary Franklin Foundation, Inc.  
 JustGive.org  
 Otto & Jenny Krauss Charitable Foundation Trust  
 PepsiCo Foundation  
 The Quigley Family Foundation  
 SCEEE  
 Silicon Valley Community Foundation  
 SRC Educational Alliance  
 Texas Instruments Foundation  
 Vanguard Charitable Endowment  
 Wallace H. Coulter Foundation

### PROFESSIONAL, RESEARCH, AND ACADEMIC ORGANIZATIONS

Electric Power Research Institute  
 Eta Kappa Nu Society  
 King Abdulaziz University  
 King Abdullah University of Science & Technology  
 Ulsan National Institute of Science & Technology

### INDIVIDUALS

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 Mark G. Allen  
 Antonio R. Alvarez  
 Anonymous 128  
 Gabriel Azar  
 Steve A. Barton  
 Harry L. Beck

Teresa Beck  
 Sue Ann Bidstrup Allen  
 Roger C. Bisher  
 Aaron F. Bourgeois  
 Christina Bourgeois  
 Kevin Brennan (posthumous)  
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 Hal B. Tucker  
 Rao R. Tummala  
 Kristin Ann Turgeon  
 Valerie E. Uyemura  
 Judith Vanderboom  
 Patrick W. Wathen  
 Sabine E. Wathen  
 Anita Wathen-Brownlee  
 Patricia T. Webb  
 Roger P. Webb  
 Charles Whitaker  
 Mr. and Mrs. Douglas B. Williams  
 G. Tong Zhou

## EE Alumnus Contributes to Georgia Tech Roll Call over 70 Years



At the Statesboro, Ga. President's Undergraduate Honors Luncheon, G. P. "Bud" Peterson, right, met with Albert Roesel, BEE '38, second from right, who has contributed to Roll Call for 74 consecutive years. Joining them were Mr. Roesel's son, Christopher, and granddaughter Renee, BSChBE '11, who was an honoree at the event.

Albert Roesel (BEE '38) has demonstrated unquestionable loyalty to his alma mater. A faithful donor to Georgia Tech Roll Call for the last 74 years, Mr. Roesel keeps up to date by reading the Institute's publications and attends Georgia Tech alumni events held in southeast Georgia. His association with Georgia Tech began in 1935 when he graduated from Augusta Junior College and was introduced to Georgia Tech Dean of Students George C. Griffin by a man who was a boarder at Mr. Roesel's childhood home.

After graduating from Tech, Mr. Roesel fought in World War II and worked in the electrical motor repair industry in both Augusta and Savannah. After the death of his brother-in-law and fellow Tech alumnus Harry Sack, Mr. Roesel and his business partner purchased H.A. Sack Company, Inc. in Statesboro, Ga. As the community and the trade area grew, so did The Sack Company. In time, the company began to take on larger com-



mercial, educational, military, and industrial jobs. Mr. Roesel ran the business until retiring at 90 years old and then transferred control and ownership to his sons Paul and Philip.

The Georgia Tech tradition has continued in the Roesel family with his youngest son, Greg (BEE '81, MSEE '82), who is a neuroradiologist, and his granddaughter Renee (BSChBE '11), who is now a graduate student at MIT.

### Endowment of Presidential Scholarship Honors Husband's Memory

In honor of her husband, Mary Hollingsworth has endowed the John R. Hollingsworth Presidential Scholarship with preference to a student studying in the School of ECE. Mr. Hollingsworth (BEE '28) initially worked for a subsidiary of GE as a salesperson and eventually built his own business as a sales representative. John and Mary lived in Atlanta and were married for almost 60 years until his death in 1999.

Originally from Athens, Ga, Mary graduated from the University of Georgia with a degree in history, studied library science at Louisiana State University, and worked in the State of Georgia Library System. While an avid UGA fan, she is a Tech fan too and strongly believes in supporting engineering education. Just short of her 96th birthday, Mary still lives in Atlanta and stays connected with family, friends, and her church.

The President's Scholarship is Georgia Tech's most prestigious merit scholarship and is offered annually to about 110 outstanding high school seniors who have demonstrated superb leadership skills, are among the top few in their class in academic performance, and show promise of continuing such performance in college and beyond. For more information visit [www.psp.gatech.edu](http://www.psp.gatech.edu).



### ECE Professional Communication Studio Celebrates Milestone

In 2007, ECE School Chair Gary S. May led the development of a five-year strategic plan for the School. Part of its mission statement reads: *To provide degree and professional education programs that produce graduates who are well prepared to enter and assume leadership roles in the (electrical and computer engineering) profession.*

In Fall 2010, ECE faculty, students, and alumni gathered to celebrate the five-year anniversary of the Coleman Family Professional Communication Studio, which provides space for over 1,200 undergraduates each semester to practice oral and written communication skills to be effective in the business environment.

In honor of the anniversary, the Coleman family generously created an endowment to support the Coleman Family Professional Communication Studio in perpetuity. "Supporting Georgia Tech's ECE Professional Communication Studio was an obvious investment for us," said Michael and Jennifer Coleman. "Our family has three generations of engineers, and we appreciate the value of engineers that are able to explain their ideas with precision and efficiency. The Professional Communication Studio prepares students with a highly qualified staff in a state of the art, beautiful environment. This was a perfect fit for our philanthropy."

While ECE prepares for its annual career fair this spring, we are reminded daily of the impact the Coleman Family has on empowering our students to be successful throughout the interview process and in the workforce.

"I am extremely grateful to have the Coleman Family Professional Communication Studio at my disposal," said EE senior Matthew Jacobson. "Already, having this resource has helped me prepare my resume, hone my cover letters, and provided guidance for presentations that will help me in the workforce."

"I think it is important to support the Georgia Tech Electrical and Computer Engineering Department," says Harriett Coleman. "By doing this, my son, Michael and his wife, Jennifer, decided to help start the Coleman Family Communication Studio Endowment. It is a great pleasure and a feeling of accomplishment to contribute to this worthwhile program and help the students at Georgia Tech be prepared for their future. My husband, Jeff Coleman and son, Michael, graduated from Georgia Tech with an electrical engineering degree. My grandson, Kevin, attends Georgia Tech and will be graduating this year."

ECE thanks the Coleman Family for playing an important part in achieving its mission.



## The Short Answer is...

This list defines acronyms and abbreviations found throughout the 2010-11 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  
CSIP – Center for Signal and Image Processing  
ECE – Electrical and Computer Engineering  
GT – Georgia Tech  
GTF – Georgia Tech Foundation  
GTRI – Georgia Tech Research Institute  
GTRIC – Georgia Tech Research and Innovation Conference  
IEN – Institute for Electronics and Nanotechnology  
IPaT – Institute for People and Technology  
UPCP – Undergraduate Professional Communication Program  
VIP – Vertically Integrated Projects (Program)

### COMPANIES AND ORGANIZATIONS

FIRST – For Inspiration and Recognition of Science and Technology  
GRA – Georgia Research Alliance  
HKN – Eta Kappa Nu  
MTT-S – Microwave Theory and Techniques Society (a technical society of IEEE)  
TI – Texas Instruments  
TILU – Texas Instrument Leadership University (Program)  
WECE – Women in Electrical and Computer Engineering

### GOVERNMENTAL AGENCIES AND UNIVERSITIES

CMU – Carnegie Mellon University  
DARPA – Defense Advanced Research Projects Agency  
DoD – Department of Defense  
NASA – National Aeronautics and Space Administration  
NDSEG – National Defense Science and Engineering Graduate (Fellowship)  
NSF – National Science Foundation

### TECHNICAL OR GENERAL ABBREVIATIONS

2D – Two-Dimensional  
3D – Three-Dimensional  
ASIC – Application Specific Integrated Circuit  
BOLD – Blood Oxygenation Level Dependent  
CEO – Chief Executive Officer  
CFO – Chief Financial Officer  
CHAMPION - CardioMEMS Heart Sensor Allows Monitoring of Pressure to Improve Outcomes in NYHA Class III Patients  
CMOS – Complementary Metal Oxide Semiconductor  
CmpE – Computer Engineering  
CSO – Chief Science Officer  
CTO – Chief Technical Officer  
DLL – Delayed-Lock Loop  
DSP – Digital Signal Processing  
EE – Electrical Engineering  
EMI – Electromagnetic Interference  
FMIR – Functional Magnetic Resonance Imaging

FPGA – Field Programmable Gate Array  
FY – Fiscal Year  
G – Gigabit  
GaAs – Gallium Arsenide  
GHz - Gigahertz  
GPA – Grade Point Average  
GRE – Graduate Record Exam  
HBT – Heterojunction Bipolar Transistor  
IC – Integrated Circuit  
InP – Indium Phosphate  
MEA – Multi-electrode Array  
MEMS – Microelectromechanical Systems  
MM – Millimeter  
PCM – Phase-Change Memory  
PLL – Phased-Lock Loop  
R&D – Research and Development  
RCWA – Rigorous Coupled-Wave Analysis  
RF – Radio Frequency  
SAEV – Solar-Assisted Electric Vehicle  
SAT – Scholastic Aptitude Test  
SiGe – Silicon Germanium  
SoC – System-on-Chip  
SRAM – Static Random-Access Memory  
SVM – Support Vector Machine



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