SCHOOL OF

ELECTRICAL [+] COMPUTER

ENGINEERING

**Georgia | School of Electrical and
Tech | Computer Engineering**

[2017-2018 Annual Report]

[+] From the Chair

I am proud to share with you the 2017-2018 annual report for the Georgia Tech School of Electrical and Computer Engineering (ECE). Our commitment to excellence in research, teaching, and service is on full display through the talents and accomplishments of our faculty, staff, and students.

In today's rapidly evolving innovation landscape, ECE finds itself at the forefront of societal-level challenges that can only be met through multidisciplinary collaboration. Our combination of size, diversity, and quality uniquely positions us to address these issues and lead the charge in defining what a modern ECE program could look like. Our rankings continue to climb and we are certainly not done yet!

In this report, you will see how we are taking on challenges in areas like artificial intelligence, cybersecurity, imaging techniques, and electronics technologies. Our students continue to do well and are making their marks on campus, inside as well as outside of the classrooms. These experiences will make them invaluable as employees, academicians, and entrepreneurs, not only for their technical skills, but for their communications, leadership, and teamwork abilities.

On a personal note, I am honored and excited to have been selected to lead this marvelous school. I would like to thank Raheem Beyah for his inspirational and effective service as interim school chair during this past year. I look forward to continuing to build on our world-class program and helping to write the next chapter in this amazing School's story with our outstanding faculty, students, staff, alumni, corporate and government partners, and friends.

Sincerely,

Magnus Egerstedt
Professor and Steve W. Chaddick School Chair

[+] Leadership Transition

Magnus Egerstedt Named as ECE's Steve W. Chaddick School Chair

Magnus Egerstedt became the new Steve W. Chaddick School Chair of the Georgia Tech School of Electrical and Computer Engineering on August 1, 2018. He previously served as executive director for the Institute for Robotics and Intelligent Machines and was the Julian T. Hightower Chair in Systems and Controls in ECE. He holds courtesy appointments in the School of Interactive Computing, Woodruff School of Mechanical Engineering, and Guggenheim School of Aerospace Engineering.

Egerstedt succeeds Steven W. McLaughlin, who became dean of the College of Engineering and Southern Company Chair at Georgia Tech in September 2017. Raheem A. Beyah served as

ECE's Interim Steve W. Chaddick School Chair for a year.

As the new chair, Egerstedt oversees a school that is consistently ranked as one of the nation's most prominent programs of its kind in both graduate and undergraduate education. The School is one of the largest producers of electrical and computer engineers in the United States, with more than 2,500 undergraduate and graduate students and over 110 faculty members.

Egerstedt joined ECE in 2001 after completing a postdoctoral appointment at Harvard University. He is a Fellow of the IEEE, and he received the John R. Ragazzini Education Award from the American Automatic Control Council; the Alumnus of the Year Award from the KTH Royal Institute of Technology; and several educational and research honors from Georgia Tech and ECE.

Cover photo: ECE students are pictured at the Albert Einstein Monument, which is located across the street from the Van Leer ECE Building. The statue is only one of three in the world.

[+] ECE Overview

[RANKINGS]

National Rankings
U.S. News & World Report

Electrical engineering and computer engineering undergraduate programs held steady at fourth and sixth respectively, while electrical engineering and computer engineering graduate programs moved up to fifth and fourth, the best overall showing in the history of the ECE graduate program.

#4
E.E. undergraduate program

#6
Cmp.E. undergraduate program

#5
E.E. graduate program

#4
Cmp.E. graduate program

[ENROLLMENT]

2,554
overall total

1,418
total undergraduate enrollment, FY 18

792 B.S.E.E.
626 B.S.Cmp.E.

17% females
20% underrepresented minorities

1,136
total graduate enrollment, FY 18

553 M.S./M.S.E.C.E.
3 M.S. Bioengineering
540 Ph.D.
10 Ph.D. Bioengineering
27 Ph.D. Robotics
3 Non-degree seeking

18% females
8% underrepresented minorities

[DEGREES]

801
overall total

355
total undergraduate degrees awarded, FY 18

202 B.S.E.E.
153 B.S.Cmp.E.

15% females
17% underrepresented minorities

446
total graduate degrees awarded, FY 18

354 M.S.E.C.E.
91 Ph.D.
1 M.S. Bioengineering

21% females
7% underrepresented minorities

[+] Faculty & Staff

[FY2018 Stats]

111
academic faculty

85
research faculty

8
academic professionals

86
administrative staff

36
faculty members holding chairs or professorships

40
IEEE Fellows

5
NAE members

[New Faculty]

Azadeh Ansari
Assistant Professor
Electronic Design and Applications; Nanotechnology

Sam Coogan
Assistant Professor
Systems and Controls

Felix Herrmann
Professor and Georgia Research Alliance Professor in Energy
Digital Signal Processing
Joint appointment with the School of Earth and Atmospheric Sciences and the School of Computational Science and Engineering

Brendan Saltaformaggio
Assistant Professor
Computer Systems and Software

[Faculty & Staff Awards]

ECE faculty and staff members were honored by Georgia Tech and external groups for their excellence in teaching, advising and mentoring, research, professional service, and commercialization.

External Awards

Ian F. Akyildiz | IEEE ComSoc Technical Committee on Cognitive Networks Recognition Award

Muhannad S. Bakir | IEEE Electronics Packaging Society Exceptional Technical Achievement Award

Sam Coogan, **Omer Inan**, **Fatih Sarioglu** | NSF CAREER Awards

Joyelle Harris | *Atlanta Business Chronicle* 40 under 40 Award

Raymond Hill | IEEE Power and Energy Society Protective Devices Committee Awards

Ayanna Howard | Walker's Legacy Power25 Atlanta Award

Joseph L.A. Hughes | IEEE William E. Sayle Award for Achievement in Education

Omer Inan | ONR Young Investigator Award

Tushar Krishna, **Brendan Saltaformaggio** | NSF CISE Research Initiation Initiative Awards

Geoffrey Ye Li | IEEE Donald G. Fink Overview Paper Award

Saibal Mukhopadhyay, **Justin Romberg** | IEEE Fellows

Abdallah Ougazzaden | National Academy of Metz Corresponding Member

Gabriel A. Rincón-Mora | National Academy of Inventors Fellow

Brendan Saltaformaggio | ACM SIGSAC Doctoral Dissertation Award

Gordon Stüber | IEEE Communications Society Radio Communications Committee Technical Recognition Award

Patricio Vela | ASCE John O. Bickel Award

Hua Wang | DARPA Young Faculty Award

Mary Ann Weitnauer | Vivian A. Carr Award (Radio Club of America)

Georgia Tech Awards

Manos Antonakakis, Dave Dagon | Outstanding Achievement in Research Program Development Award (honored with GTRI's Michael Farrell)

Farrokh Ayazi | Outstanding Achievement in Research Innovation Award

Farrokh Ayazi, Gisele Bennett, Magnus Egerstedt, William Hunt | 80 Years of the Georgia Tech Research Corporation Celebration Honors

Morris Cohen | Center for Teaching and Learning/BP Junior Faculty Teaching Excellence Award

Joseph L.A. Hughes | Outstanding Service Award

Aaron Lanterman | Class of 1940 W. Howard Ector Outstanding Teacher Award

Jacqueline Trappier | Outstanding Graduate Academic Advising Staff Award

Patricio Vela | Outstanding Undergraduate Research Mentor Award

Linda Wills | Women in Engineering Teaching Excellence Award

[+] Students & Student Groups

ECE student groups provide outlets for community building, K-12 outreach and service, and professional development. Our students also participate in interdisciplinary clubs and many social, professional, and cultural organizations at Georgia Tech.

[Student Groups]

ECE Ambassadors • Eta Kappa Nu • IEEE • The Hive • Women in Electrical and Computer Engineering

[Award Winners]

Our students were honored at ECE's annual Roger P. Webb Awards Program and at campus award ceremonies. This past spring, the largest number of ECE graduate students ever were honored at the Sigma Xi Awards Banquet, and two graduating seniors won Institute-level awards in teaching and entrepreneurship.

Georgia Tech Awards

Taiyun Chi, **Sourav Dutta**, **Matthew Hale**, **Shoufeng Lan**, **Deepa Phanish** | Sigma Xi Best Ph.D. Thesis Awards

Shruthi Kumara Vadivel | Sigma Xi Best M.S. Thesis Award

Olatide Omojaro | Center for Teaching and Learning Undergraduate Teaching Assistant Award

Jake Smith | Alvin M. Ferst Leadership and Entrepreneur Scholarship Award

Austin Keener, **Jered Tupik** | College of Engineering Honors Day Awards

Roger P. Webb Awards

Jake Smith | Outstanding Electrical Engineering Senior Award

Darshan Patel | Outstanding Computer Engineering Senior Award

Richard Connor Lawson, **Chunmeng Xu** | ECE Graduate Teaching Assistant Excellence Awards

Sean Rodrigues, **Saeed Zeinolabedinzadeh** | ECE Graduate Research Assistant Excellence Awards

Top: ECE undergraduate student award winners. Bottom: ECE graduate student award winners. Both groups of ECE students are pictured with Interim School Chair Raheem Beyah (bottom rows and center) at the 2018 Roger P. Webb Awards Program.

Yao Wins First Place at Georgia Tech 3MT Competition

ECE Ph.D. student Jingting Yao won first place at the Georgia Tech Three Minute Thesis (3MT) Competition, held on November 13, 2017. Yao's presentation addressed the detection of heart disease, the leading cause of death globally.

She works to improve the quality of diagnostic information while reducing patients' exposure to radiation during computed tomography angiography (CTA). In pursuing this goal, Yao uses novel hardware and signal processing methods to fuse electrocardiogram and seismocardiogram features to achieve cardiac CTA imaging using patient-specific information.

Yao is co-advised by ECE Associate Professor Pamela Bhatti and Emory University Radiology and Imaging Sciences Professor Srini Tridandapani.

[+] Students & Student Groups

Haiti Solar Team Plans Repeat Trip with GTSF Funding

In May 2016, an Opportunity Research Scholars (ORS) student group traveled to the remote village of Thoman, Haiti, to install a solar-powered system that provides LED light and phone charging to a single family home. The system was a success and has been a game changer for two families who had no access to reliable, inexpensive electricity.

With an award from the Georgia Tech Student Foundation (GTSF), a new group of students from the Haiti Solar Team returned in May 2018 to implement more solar-powered systems with a plan for sustainability. The team — consisting of Adam Kinsel, Jake Smith, Bria Matthews, and Ph.D. mentor Jingfan Sun — requested funding for parts and materials to build 25 systems and was presented with a check by GTSF at the Georgia Tech men's basketball game on March 1, 2018 at McCamish Pavilion.

Georgia Tech Takes Top Honors at Formula Hybrid Competition

Georgia Tech's HyTech Racing team won first place at Formula Hybrid, held April 30 - May 3, 2018, at the New Hampshire Motor Speedway in Loudon, NH. Formula Hybrid is a rigorous international student engineering competition where students design, manufacture, and test a formula-style, single-seater racing vehicle.

On top of winning the endurance event at Formula Hybrid, HyTech placed first in the design presentation and project management events. The team was also presented with the "Best Engineered Propulsion System Award" from General Motors for their compact pouch cell battery pack design.

HyTech Racing accepts undergraduate and graduate students from all majors, and ten from ECE participated. Many of these students choose to augment their class experience by working on HyTech's electrical subteam.

Georgia Tech EcoCAR Team Collects Top Prizes in Diverse Categories

The Georgia Tech EcoCAR 3 team placed fifth overall and won top prizes in the final year of EcoCAR 3, a four-year student competition sponsored by the U.S. Department of Energy and General Motors.

Georgia Tech also won third place in the technical categories and earned eight more awards. ECE master's student Jessica Britt was presented with two honors–the Excellence in Leadership Award and the General Motors Women in Engineering Award. The team won two systems awards, two project status and management awards, and awards made by ETAS and dSpace.

Part of the Vertically Integrated Projects Program, the Georgia Tech EcoCAR 3 team consists of undergraduate and graduate students and faculty advisors from the Schools of ECE, Mechanical Engineering, Chemical and Biomolecular Engineering, and Computer Science.

[+] Research & Education Highlights

Brain-Mimicking Nanomaterials for A.I. Retina Receive $7 Million Research Grant

Neuristors are multi-circuit components that emulate the firings of human neurons and exist in labs in small quantities. To fuel the quest to boost neuristors' power and numbers for practical use in brain-like computing, the U.S. Department of Defense awarded a $7.1 million grant to a team led by ECE Professor Alan Doolittle. The researchers will work on new metal oxide materials that buzz electronically at the nanoscale to emulate how human neural networks buzz with electric potential on a cellular level.

The team has developed neuristor materials to build an intelligent light sensor, and not an artificial version of the human brain, which would require hundreds of trillions of circuits. An artificial retina that can learn autonomously appears well within the team's reach. This particular "retina" is not intended as a medical implant, but it could be used in advanced image recognition cameras for national defense and police work. It also significantly advances brain-mimicking, or neuromorphic, computing.

Print No Evil: Three-Layer Technique Helps Secure Additive Manufacturing

Additive manufacturing, also known as 3-D printing, is replacing conventional fabrication processes in areas ranging from aerospace components to medical implants. But because the process relies on software to control the 3-D printer, additive manufacturing could be a target for malicious attacks and unscrupulous operators who may cut corners.

A team led by Motorola Foundation Professor Raheem A. Beyah has developed a three-layer system to verify that components produced using additive manufacturing have not been compromised. The system uses acoustic and other physical techniques to confirm that the printer is operating as expected, and nondestructive inspection techniques to verify the correct location of tiny gold nanorods buried in the parts. Beyond detecting malicious activity or quality problems, the system could stop inadvertent production problems and reduce materials waste.


Searching for Science in the Solar Darkness

ECE Associate Professor Morris B. Cohen and his team used the rare total solar eclipse last August to study how radio communications are impacted by the uppermost part of the atmosphere, known as the ionosphere. To monitor the sun's impact on the ionosphere, Cohen's team examined how radio waves are affected by the rapid shifts between light and dark that an eclipse enables.

The ionosphere matters for long-range communications and satellite-ground communications; its properties dominate GPS reliability and accuracy and some aviation communication. Understanding how the ionosphere responds to solar and space weather changes is critical for a host of engineered systems. To prepare for this event, Cohen and his team deployed radio receivers across the United States on either side of the path of totality. These receivers detect the Very Low Frequency range (VLF), which is dominated by emissions from lightning and by U.S. Navy submarine communications beacons. As the eclipse progressed, a patch of nighttime (shadow) surrounded by daytime moved cross-country. Since VLF waves rely on the ionosphere to propagate thousands of miles, and the sun dominates the electrical properties of the ionosphere, this moving patch affected VLF radio communications. The receivers also picked up scattered signals from lightning and VLF radio transmitters to characterize the ionosphere.

[+] Research & Education Highlights
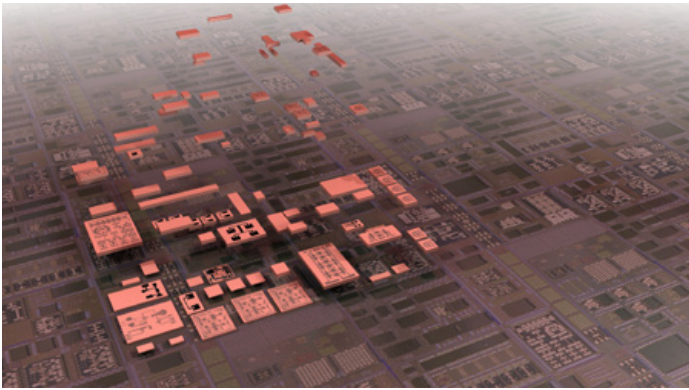
Georgia Tech Researchers Support DARPA's New CHIPS Initiative

A Georgia Tech research team brings its electronic design software and communications expertise to DARPA's new CHIPS initiative, which will enable future generations of integrated circuits (ICs) to be assembled from plug-and-play modules known as "chiplets." Reusing blocks of existing microelectronics technology could reduce the need to design complex monolithic chips from scratch for new applications.

By allowing components like memory modules or signal processors to be easily fitted together like parts of a jigsaw puzzle, the initiative could help reduce the cost of new ICs for Department of Defense (DoD) agencies and accelerate the application of new technology. While driven by DoD-specific needs, innovations from the program could also reduce the cost of developing low-volume specialized devices for commercial uses. Sung Kyu Lim, the Dan Fielder Professor in ECE, leads Georgia Tech's part of this initiative.

Faster Detection, Cleanup of Network Infections are Goals of $12.8 Million Project

Georgia Tech cybersecurity researchers have been awarded a $12.8 million DARPA contract to develop new ways to accelerate the detection and remediation of infections in local and remote networks. Using novel machine learning techniques that take advantage of large data sets, the team will develop tactics for detecting network infections within 24 hours–before invaders can do serious damage.

The technical goal for the new system is to detect changes in individual computer systems by analyzing suspicious network traffic that appears weeks or months before any evidence of malicious software–or malware–can be identified. Beyond rapid detection of infections, the project will accelerate the cleanup after infections are found. The team is led by ECE Assistant Professor Manos Antonakakis.

New Ph.D. Program Highlights Growing Importance of Machine Learning

Georgia Tech now offers a doctoral degree program in machine learning–an interdisciplinary area that impacts everything from robotics and cybersecurity to data analytics. The machine learning (ML) Ph.D. program is a collaborative venture between the colleges of Computing, Engineering, and Sciences.

Qualified students can apply through one of the eight participating schools that are homed in the three colleges. ML Ph.D. students learn to integrate and apply principles from computing, statistics, optimization, engineering, mathematics, and science to innovate and create machine learning models and then apply them to answer important, real-world, data-intensive questions.

ECE Schlumberger Professor Justin Romberg serves as the ML Ph.D. program curriculum coordinator and as an associate director of the Center for Machine Learning.
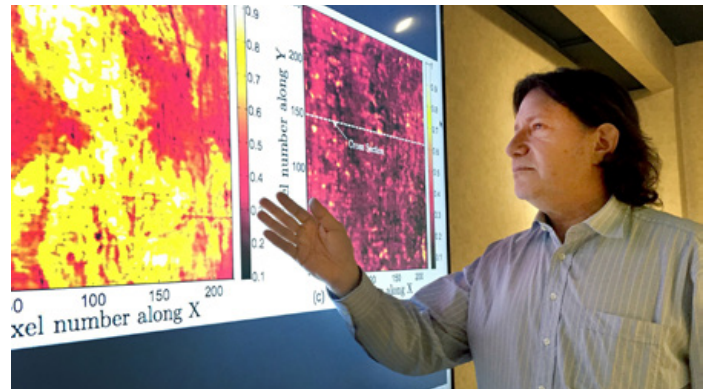
Imaging Technique Unlocks the Secrets of 17th Century Artists

The secrets of 17th century artists can now be revealed, thanks to 21st century technology. Using modern high-speed scanners and advanced signal processing techniques, Georgia Tech researchers can peer through layers of pigment to see how painters prepared their canvasses, applied undercoats, and built up coats of paint to produce their masterpieces.

The images provide an unprecedented look at how artists did their work three centuries ago. The level of detail produced by this technique could help art conservators spot previous restorations of paintings, highlight potential damage, and assist in authenticating old works. This technique could potentially be used for detecting skin cancer, ensuring proper adhesion of turbine blade coatings, and measuring the thickness of automotive paints. The project is led by ECE Professor David Citrin and Alexandre Locquet, a researcher at the Georgia Tech-CNRS international laboratory in Metz, France.
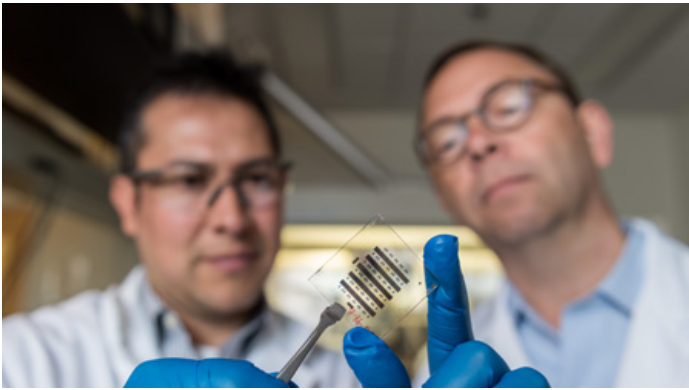
Nanostructured Gate Dielectric Boosts Stability of Organic Thin-Film Transistors

A nanostructured gate dielectric may have addressed the most significant obstacle to expanding the use of organic semiconductors for thin-film transistors. The structure serves as a gate dielectric and simultaneously protects the organic semiconductor–which had previously been vulnerable to damage from the ambient environment–and enables the transistors to operate with unprecedented stability.

The new structure gives thin-film transistors stability comparable to those made with inorganic materials, allowing them to operate in ambient conditions. Organic thin-film transistors can be made inexpensively at low temperatures on different flexible substrates using techniques such as inkjet printing, potentially opening new applications that take advantage of simple, additive fabrication processes. The leader of this research team is Bernard Kippelen, Joseph M. Pettit Professor in ECE and director of the Center for Organic Photonics and Electronics.

New Robotics Lab Allows Anyone to Control the Machines

Building and maintaining robots–or an entire robotics lab–is unaffordable or impractical for many researchers. That's why Georgia Tech opened a new lab on August 22, 2017 that allows greater access to individuals interested in running robotics experiments. No other university has such a facility.

The Robotarium, a $2.5 million lab funded by NSF and the Office of Naval Research, contains nearly 100 rolling and flying swarm robots. Researchers from around the globe can write their own computer programs, upload them, and get the results as the Georgia Tech machines carry out the commands. They also receive video evidence and data of the experiment.

The project is the vision of Magnus Egerstedt, who now serves as the Steve W. Chaddick School Chair in ECE, that came to fruition at its dedication last summer. From August 22, 2017 - June 10, 2018, the Robotarium team ran 322 experiments submitted by 75 different users from every continent except Antarctica.


Transfer Technique Produces Wearable Gallium Nitride Gas Sensors

A transfer technique based on thin sacrificial layers of boron nitride could allow high-performance gallium nitride gas sensors to be grown on sapphire substrates and then transferred to metallic or flexible polymer support materials. The procedure could facilitate production of low-cost wearable, mobile, and disposable sensing devices for a variety of environmental applications.

Sensors produced with this process can detect ammonia at parts-per-billion levels and differentiate between nitrogen-containing gases. The sensors could have a wide range of applications from industry to vehicle engines–and for wearable sensing devices. The devices are attractive because of their advantageous materials properties, including high thermal and chemical stability. This research team is based at Georgia Tech-Lorraine (GT-L) and led by ECE Professor and GT-L Director Abdallah Ougazzaden. It also involves collaborators from Institut Lafayette and the Centre de Nanosciences et de Nanotechnologies.

[+] Research & Education Highlights

Level-shifter Board | Motor control, peripherals and battery | Ultrasonic Sensors | Testchip
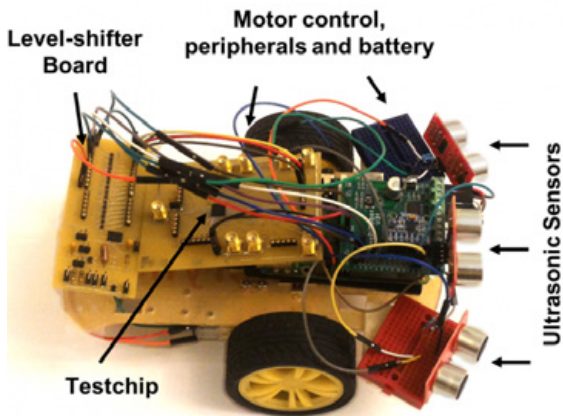
Mixed-signal Processing Powers Bio-mimetic CMOS Chip for Neural Learning in Autonomous Micro-Robots

A team of researchers led by ON Semiconductor Junior Professor Arijit Raychowdhury has used analog processing to squeeze an artificial intelligence processor onto a CMOS chip, consuming less than a milli-watt of power. This technology is aimed at self-teaching micro-robots that need to learn their immediate environments. The processor implements 'reinforcement learning'—a behaviorist psychology-inspired learning algorithm that mimics how dopamine encourages reward-motivated behavior in human social interactions.

A micro-robot used to demonstrate the processing algorithm was designed to measure distance using ultra-sonic sensors and to use the test chip to control its direction of motion. The measured peak energy efficiency of the developed demonstrator is less than one volt.

[+] Commercialization

For over 30 years, ECE faculty members and students have founded successful startup companies through the Advanced Technology Development Center (ATDC). They can also work on commercializing their technologies through VentureLab. Students may also take part in the InVenturePrize at Georgia Tech, a student-led competition for undergraduate students and recent bachelor's degree graduates.

21
patents issued, FY 18

81
invention disclosures, FY 18

195
patents issued in last five years

FireHUD Receives NSF Small Business Grant

Recent Georgia Tech graduates received an NSF Small Business Innovation Research grant to continue work on FireHUD, a device for improving the safety of firefighters.

Zack Braun, a December 2017 graduate in computer engineering, and Tyler Sisk, a fellow December graduate in electrical engineering, invented FireHUD. The real-time wearable system and heads up display provides biometric and environmental data to firefighters on the job and officials on site. The device measures heart rate, body temperature, and external temperatures that can help predict fatigue and prevent injuries.

FireHUD won the 2016 InVenture Prize, and Braun and Sisk also participated in CREATE-X (see related story in this report). Another recent Tech graduate, Joseph Boettcher, has joined the company. All three are working on the device full-time.

Cognosos Graduates from ATDC

Cognosos graduated from ATDC at the 2018 Startup Showcase, held on May 10 at The Renaissance Hotel-Midtown Atlanta. A company can graduate from ATDC if it has achieved one or more of these milestones: producing a recurring annual revenue run rate of $1 million or more; demonstrating significant customer traction; or being acquired in the past year.

While investigating techniques in radio astronomy to combine signals from multiple dishes, the founders of Cognosos saw a way to use software-defined radio and cloud-based signal processing to lower the cost and power required for wireless sensor transmitters. The result is RadioCloud, the world's most advanced, low-power, wide area network for the internet of things. Cognosos was co-founded by Jim Stratigos (BEE '74 and MSEE '80).
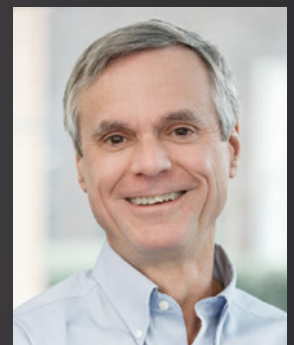
[+] Development

The ECE Development Office cultivates and coordinates the School's fundraising efforts with industry, alumni, and other interested people and organizations. This group manages the ECE Access Program, the ECE Career Fair, and other networking and social activities to promote alumni and corporate involvement.

For more information, contact Etta Pittman, director of ECE Corporate Development, at 404.894.6888, or Anna Walker, assistant director of ECE Development, at 404.894.2273.

The Care and the Feeding of Student Startups

When a budding entrepreneur demonstrates "proof of concept" for a product or service, more investors decide to participate. A similar cause and effect is playing out with Georgia Tech's Initiative to Enhance Entrepreneurial Confidence, started in 2015.

Leveraging years of entrepreneurial expertise at Georgia Tech and branded CREATE-X, this initiative was developed to bring more students into the culture, with structured classes and support for the three basic elements of the startup process: Learn-Make-Launch. These efforts, enhanced through the gifts of earlier donors and starting to yield success, attracted another generous philanthropist to the cause.

An anonymous donor pledged a $30 million gift designated for student entrepreneurship at Georgia Tech. The endowment comes with but one stipulation – that it be used for programs, activities, and initiatives designed to advance entrepreneurship in the student body at Georgia Tech.

[FY 18 Donors]

We would like to thank the following corporations, organizations, and individuals for contributing $8,705,579 to the School and its affiliates during FY 18.

INDIVIDUALS | Behrooz L. Abdi • Anonymous 160 • Steve A. Barton • Irene M. Barton • Warren L. Batts • Harry L. Beck • Teresa Beck • Kevin Brennan (posthumous) • Suzy Briggs • William R. Brody, MD • H. Austin Brown • John H. Brownlee • Robert John Butera, Jr. • Kyoung Ho Choi • James W. Cofer, Jr. • Mary M. Coker, PE • Harriett C. Coleman • Thomas J. Coleman • Thomas R. Collins • Todd G. Cutler • Mayor Hardie Davis, Jr. • James A. DeBardelaben • Boyce R. Dooley • Gail Dooley • Donald Duda • R. Thomas Dyal • Aldo A. Ferri • Bonnie H. Ferri • Richard K. Foster • Janice L. Gaylord • Thomas K. Gaylord • Holmes J. Hawkins, III Esq. • Larry Heck • Martina E. Hubbarth • E. Calvin Johnson • Amol M. Joshi • H. Wade Little, Jr. • Kenneth E. MacKenzie • Nicole R. MacKenzie • Norma J. McLees • Margie T. Maddox • William C. Maddox • Theresa A. Maldonado, PE • Michael J. Molinari • Ragnar-Miguel Myhrer • Chad E. Patterson • John B. Peatman • Claude A. Petty, Jr. • Etta Pittman • Darrell W. Preble • Cindy J. Schwefel • James E. Shea • Teresa H. Shea • Paul G. Steffes • James A. Stratigos, Jr. • Rajagopal Subramanian • Madhavan Swaminathan • Kristin Ann Turgeon • Judith Vanderboom • Anna Walker • Anita Wathen-Brownlee • Sabine Wathen • Patricia T. Webb • Roger P. Webb • Michael J. Whalin • Douglas B. Williams • Kay Williams

FOUNDATIONS/NON-PROFIT ORGANIZATIONS | Boyce and Gail Dooley Family Foundation • Breast Cancer Research Foundation • Corning Glass Works Foundation • Eaton Charitable Fund • Harris Foundation • Norfolk Southern Foundation • Procter & Gamble Fund • Silicon Valley Community Foundation • The Greater Cincinnati Foundation • Vanguard Charitable Endowment • Wells Fargo Community Support Campaign

PROFESSIONAL, RESEARCH, & ACADEMIC ORGANIZATIONS | Electric Power Research Institute • Northwestern University • Radio Club of America, Inc. • Rutgers University • SRC Education Alliance
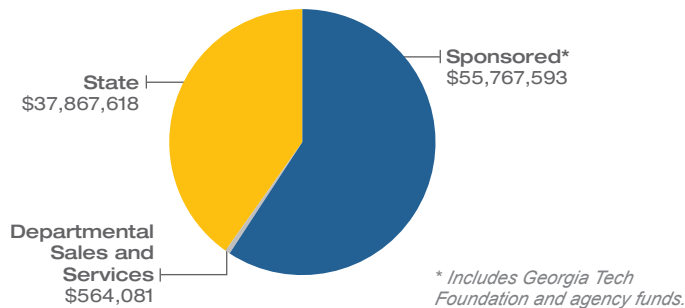
COMPANIES | Advanced Semiconductor Engineering, Inc. • Advancing Technologies • Ajinomoto Company, Inc. • Alibaba (China) Co., Ltd. • Amazon.com, Inc. • Analog Devices, Inc. • Applied Materials, Inc. • Asahi Glass Company, Ltd. • AT&T, Inc. • AVX Corporation • Benevity Community Impact Fund of AEF • BMW Manufacturing • Boeing Company • Comcast Corporation • ConocoPhillips Corporation • Corning, Inc. • Cox Communications, Inc. • Disco Hi-Tec America, Inc. • Eversource • ExxonMobil Corporation • FirstEnergy Corporation • First Look MRI and Imaging, LLC • Google, Inc. • Honeywell Home and Business Control • Honeywell International, Inc. • Intel Corporation • Jiangsu Changjiang Electronics Technology Company • John Deere World Headquarters • Johnson Battery Technologies • Keysight Technologies • Kulicke & Soffa Industries, Inc. • Linear Technology Corporation • Lockheed Martin • Lockheed Martin Advanced Technologies Lab • LyondellBasell Industries • Microsoft Corporation • Milwaukee Tool • Mitsubishi Electric Information Technology Center • MKS Instruments • Murata Manufacturing Company, Ltd. • NAGASE & CO., LTD. • Namics Corporation • National Corporate College Consultants, Inc. • Nitto Denko Technical Corporation • Nokia Solutions and Networks Oy • Northrop Grumman • NOVA-Borealis Compounds, LLC • OPE, LLC • Orbital ATK, Inc. • Pendar Technologies, LLC • Phillips 66 • PPL Corporation • Procter & Gamble Company • Public Service Electric & Gas Corporation • Qorvo • Qualcomm, Inc. • Raytheon Company • Rohm & Haas Electronic Materials, LLC • Samtec, Inc. • San Diego Gas & Electric Company • SavanSys Solutions, LLC • Schott North America, Inc. • Shinko Electric Industries Company, Ltd. • Silicon Labs • Southwire Company • Tango Systems, Inc. • Texas Instruments, Inc. • The Aerospace Corporation • The Chamberlain Group, Inc. • Tokyo Tekko Company, Ltd. • Unimicron Technology Corporation • Union Pacific Railroad Company • Verisolutions, LLC • ViaSat, Inc. • VMWare, Inc. • We Energies
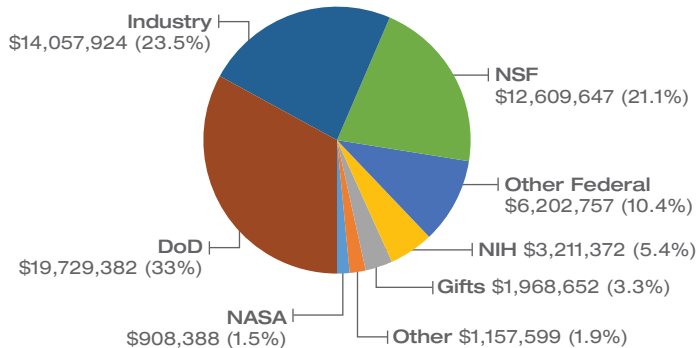
[+] Finances

The School spent $94,199,292 from state, sponsored research, and departmental sales and services sources. This money mostly pays for faculty, staff, and researcher salaries, and the rest is used for materials and supplies, travel, and equipment in support of our research and educational missions.

Research funding for FY 18 totaled $59,845,719 from grants and contracts, an increase of almost 12% over last year, and includes support received through the Georgia Tech Foundation. Of that total, 24% came from industry, 71% came from federal government sources, 3% came from Georgia Tech Foundation gifts, and 2% came from other sources. Sponsored funding acquired by ECE and its affiliated research centers made up 17% of Georgia Tech's research funding portfolio (excluding GTRI) and 26% of the research funding in the College of Engineering, the largest share of any CoE unit.

FY 18 Expenditures

State
$37,867,618

Sponsored*
$55,767,593

Departmental
Sales and
Services
$564,081

Includes Georgia Tech Foundation and agency funds.

FY 18 Research Funding

Industry
$14,057,924 (23.5%)

NSF
$12,609,647 (21.1%)

Other Federal
$6,202,757 (10.4%)

NIH $3,211,372 (5.4%)

Gifts $1,968,652 (3.3%)

DoD
$19,729,382 (33%)

NASA
$908,388 (1.5%)

Other $1,157,599 (1.9%)

[+] Alumni

ECE Graduates Honored at College of Engineering Alumni Awards

Four ECE alumni were honored at the 2018 Georgia Tech College of Engineering Alumni Awards Induction Ceremony, held April 21 at the Four Seasons Hotel in Atlanta.

ACADEMY OF DISTINGUISHED ENGINEERING ALUMNI

David E. Clapham
BSEE '74
Vice President and
Chief Scientific Officer
Howard Hughes Medical Institute
Chevy Chase, Maryland

Keith Ogboenyiya
BSEE '02
Vice President and
General Manager
Texas Instruments, Inc.
Dallas, Texas

James Salter
BSEE '81
Chairman and CEO
Atlantic Engineering Group
Braselton, Georgia

COUNCIL OF OUTSTANDING YOUNG ENGINEERING ALUMNI

Yony Feng
BSCmpE '06, MSECE '07
Co-Founder and CTO
Peloton Interactive
New York City, New York

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