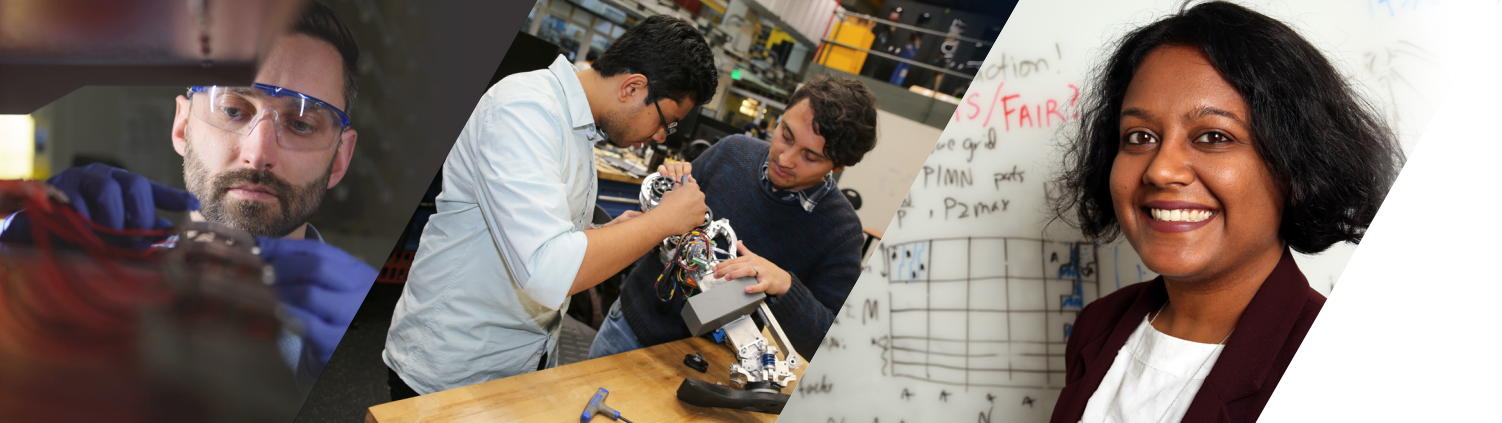





DEFINING OUR **FUTURE**



Georgia Tech  **College of Engineering**

2018-2019 YEAR IN REVIEW

Dear Friends of the College,

Serving as Dean of the College of Engineering at Georgia Tech is a fantastic job. I walk around our campus in awe of the incredible students, faculty and staff who make up our community. The evolution of the College from good to great has been fueled by exceptional students, world-renowned faculty, generous alumni and groundbreaking research and innovation.

With the depth and breadth of the College, finding things to brag about is easy. If we published all our points of pride in the annual report, it would be like reading *War and Peace*. With that in mind, we have narrowed our accomplishments to a few key highlights from this past fiscal year.

But these accomplishments don't happen in a vacuum. The culture and environment of the College is what allows such great things to happen here. I truly believe that in the College we have an environment and culture that allows faculty, staff and students to reach beyond their limits; to be able to fail in a safe environment; and to take risks, or, as I like to say, be fearless.

We empower our faculty and students with the resources they need to succeed. And I marvel as they go after bold and innovative solutions to societal problems, knowing that we offer the tools possible to find answers. Providing a safe environment to take risks is extremely important so that being afraid of failure does not get in the way of action or thought. We also seek a fearless vision of imparting knowledge and impacting technology across the globe.

These philosophies allow us to put a satellite into space, develop low cost hearing aids and blood tests for anemia, put gene therapy to work against cancer, and even revolutionize the way engineering is taught.

I invite you to learn more about our people, research and innovation as we advance our vision for engineering the future.



Steve McLaughlin
Dean and Southern Company Chair
Georgia Tech College of Engineering

#4

undergraduate engineering program
U.S. News and World Report, Sept. 2019

#7

graduate engineering program
U.S. News and World Report, March 2019

100%

of our undergrad degree programs rank in the Top 4
U.S. News and World Report, Sept. 2019

505

engineering academic faculty members

30

National Academy of Engineering members

2M

square feet of research/instructional space

1,249

awards granted, FY19; \$2.7M in new research awards

14,142

students enrolled in the College — 30% women

54%

of students travel abroad

61%

of undergraduate students receive an engineering degree from Georgia Tech

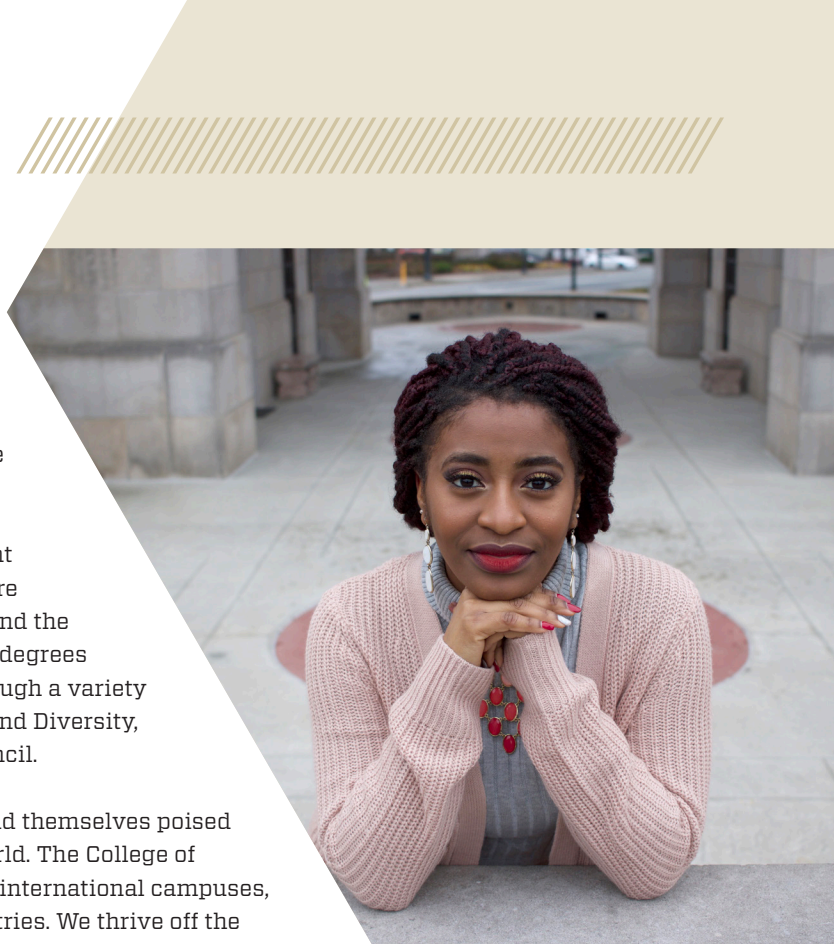


COMMUNITY

Georgia Tech's College of Engineering draws the best minds from all over the world. While at Tech, each student discovers their niche on campus — whether it's spending late nights in the Invention Studio or joining a club that lets them build planes, cars, bridges or boats. Our students come together to create a vibrant and inclusive community of engineers.

The College cultivates a diverse and welcoming environment where any student can succeed. Georgia Tech graduates more female engineers than any other institution in the country, and the College ranks first in the country for number of engineering degrees awarded to minorities. Our successes are accomplished through a variety of programs, such as the Center for Engineering Education and Diversity, Women in Engineering and the Diversity and Inclusion Council.

Positioned in the heart of Midtown Atlanta, our engineers find themselves poised to interact with the city and, by extension, the rest of the world. The College of Engineering community extends into partner research labs, international campuses, corporate offices and struggling regions in developing countries. We thrive off the support of the community and work to pay that support forward.



MAKING AN IMPACT

Engineers are called to a higher purpose: to better the world around them through innovating and solving problems previously thought impossible. Student and faculty researchers alike strive to take on challenges that impact safety, health, education and exploration.

One organization that helps engineers do this is Engineering for Social Innovation (ESI). Led by Dr. **Joyelle Harris** in the School of Electrical and Computer Engineering, ESI provides support to students who want to help those in need. With the help of ESI, industrial and systems engineering graduate **Segolene Muderhwa** (B.S., M.S. in Analytics) launched a startup to help disadvantaged girls pursue and persist in their education in the Democratic Republic of Congo. **Angad Daryani**, an Electrical and Computer Engineering undergraduate, has always been motivated to study air purification, and through ESI, he is working with a team of 20 engineers and designers to create a 20-foot tower that will purify air. Through this invention, Daryani helps people with severe respiratory illnesses in his hometown of Mumbai.

A pilot program from civil engineering Professor **Yongsheng Chen** aims to create and operate a hydroponic growing system using domestic wastewater from Georgia Tech's sewer system. The project is funded by the U.S. Department of Agriculture through a grant of \$5 million over five years. Chen seeks to prove that the process of taking the nutrients from domestic wastewater saves energy and helps control urban environment agriculture systems.

PARTNERING FOR OUR FUTURE

The College could not be what it is today without the dedicated support of partners in industry, governmental programs, peer research institutions, alumni and philanthropic foundations. These partners help the College continue to grow in size and drive our ability to enact positive change.

The Clark Scholars Program accepted its first cohort of students in fall 2018. The program, created through a partnership with the Clark Foundation and their \$15 million gift, allows 10 students per year to be admitted based on their financial need, academic accomplishments, engagement in engineering and leadership skills. The students receive a unique education that combines engineering, business, leadership and community service. By the fall of 2021, Georgia Tech will have more than 40 Clark Scholars enrolled each year thereafter.

Georgia Tech partners with Children's Healthcare of Atlanta, creating the Pediatric Technology Center. Clinical experts and cutting-edge engineering combine to create a formidable opponent to pediatric diseases and health challenges. The Pediatric Technology Center focuses on areas such as medical devices, nanotechnology and regenerative medicine — all to improve the wellness of Atlanta's children. The Center regularly provides grants that fund joint projects between researchers and clinicians.



LEARNING

For many people around the world, our faculty and alumni are the first people that come to mind in response to the question: “What does Georgia Tech think?” Georgia Tech students have top experts in the field at their disposal, and faculty at the College are regularly consulted on all manner of subjects, such as cybersecurity, infrastructure and space exploration, to name a few. With such faculty, students transform from novices to experts.

TEACHING THROUGH INNOVATION

Engineering students are challenged daily in classes, prompting them to develop the skills to think critically and tackle big problems, even as undergraduates. Some courses approach engineering concepts from a novel angle, such as a new origami-themed course. **Glaucio Paulino** (CEE) piloted the Origami Engineering class last fall, which teaches students how the principles of origami, such as structural integrity and math, apply to science, technology and design.

Senior engineering students are required to take a Capstone course to develop a solution to a challenge in a particular field. Projects are sponsored by corporate or government organizations that want to implement the changes that students produce. The solutions can be life-changing — **James Rains** (BME) challenges his Capstone students to work with hospitals and technology companies to develop new medical devices and procedures, helping developing countries bring their healthcare regimens into the 21st century.

ACHIEVING GREATNESS

Every year, the National Academy of Engineering (NAE) elects new members, and our faculty are often among their ranks. In April 2019, **Krish Ahuja** (AE) and **John Koon** (CEE) were elected to the NAE. “Their induction is a testament to the quality of our faculty members and their contributions to the engineering profession,” said Steve McLaughlin, dean of the College of Engineering.

One of the most rigorous characteristics of the College is its effort to infuse technical engineering knowledge with problem-solving techniques. In May, NAE awarded biomedical engineering faculty members **Wendy Newstetter**, **Joseph Le Doux** and **Paul Benkeser** the 2019 Bernard M. Gordon Prize in honor of their pioneering engineering education principles.

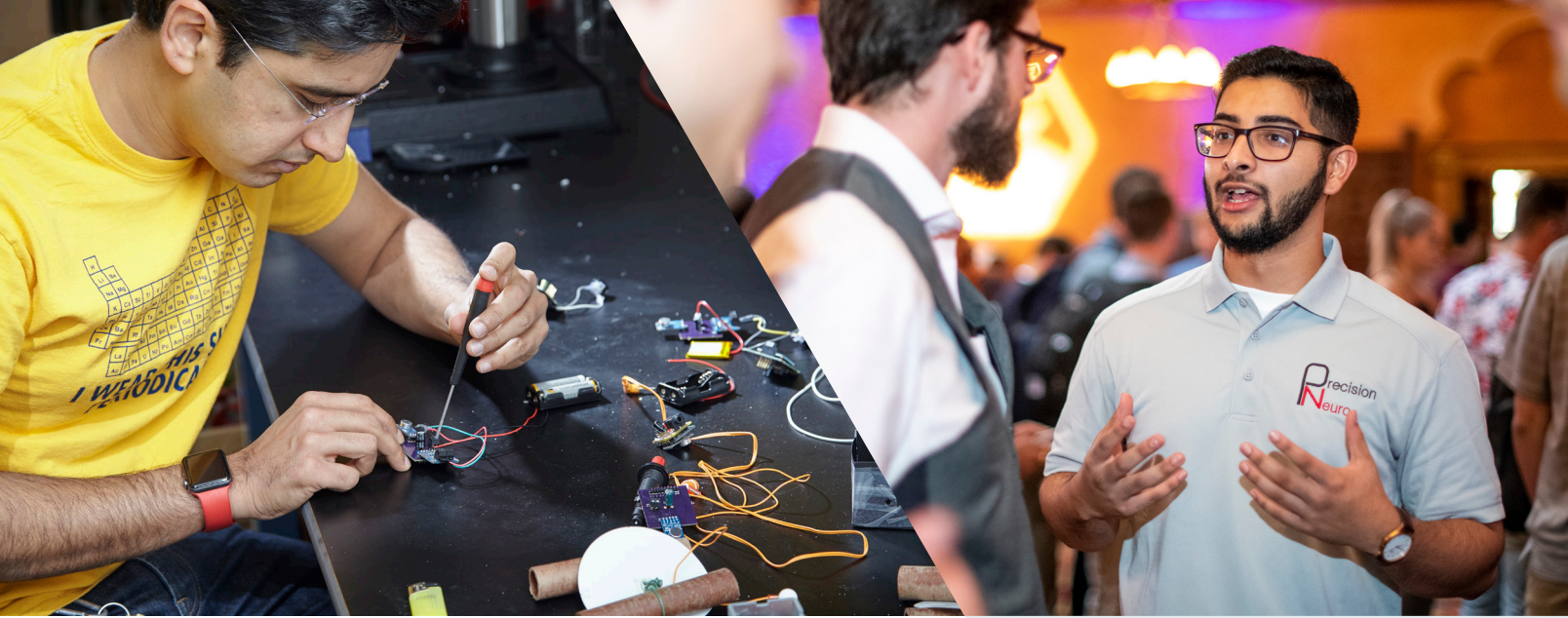
Assistant Professors **Katherine Fu** (ME) and **Marta Hatzell** (ME) received the prestigious Faculty Early CAREER Development award from the National Science Foundation (NSF) in March 2019. This honor supports junior faculty who exemplify the role of teacher-scholars through outstanding research, education and the integration of the two — within the context of their organizations’ missions.

Mark Davenport (ECE) and **Matthew McDowell** (ME, MSE) were recipients of the Presidential Early Career Award for Scientists and Engineers (PECASE), the highest honor bestowed by the U.S. government to outstanding scientists and engineers who are beginning their independent research careers.

NOTABLE GRANTS

- National Institutes of Health: \$3 million to Associate Professors **Wilbur Lam** and **Melissa Kemp** (BME) for new technologies that aim to improve the effectiveness of blood transfusions in patients with sickle cell disease
- U.S. Food and Drug Administration: \$1.8 million to Marcus Center for Therapeutic Cell Characterization and Manufacturing to enable a scalable manufacturing system for cord-tissue derived cells (ISyE)
- U.S. Department of Energy: \$1.6 million to **Preet M. Singh** (MSE) and **Farzad Rahnema** (NRE) for advancements in nuclear energy





DISCOVERY

Engineering discoveries take place almost daily on campus in the form of an algorithm, a method of construction, a pattern in microscopic particles or an innovative device. And no discovery happens in a vacuum; that's why research and entrepreneurship at the College are supported with the full resources and attention of the community. At Tech, our engineers are not only solving the world's toughest problems; they are creating solutions to problems that haven't even arisen.

DRIVING BEST-IN-CLASS RESEARCH

In buildings across campus, you'll find students peering into microscopes, researchers letting sparks fly as they manufacture a prototype, and innovators finding ways to make the impossible possible. **Woon-Hong Yeo** (BME and ME) creates a nanostructured sensor system that could provide a less-invasive treatment and active monitoring for patients at risk of a brain aneurism.

J. Carson Meredith (ChBE) leads a research team that received national media attention for the discovery of a material made from crab shells and trees that could replace flexible plastic packaging. The material has potential to keep food fresher longer and reduce the amount of harmful plastics that are put into the environment.

Technology can be costly, especially to the average person who depends on devices such as hearing aids to help them navigate the world easily. **Saad Bhamla** (ChBE) works to use the principles of frugal science to make scientific tools and healthcare devices accessible to those who need them.

ENGAGING IN ENTREPRENEURSHIP

Some discoveries are too impactful to keep to yourself. Many student and faculty researchers alike choose to transform their ideas into startups. The CREATE-X program is a Georgia Tech initiative to instill entrepreneurial knowledge and confidence in students and empower them to launch real startups. During CREATE-X Startup Launch this summer, students **Mark Connolly** (BME) and **Sang-Eon Park** (ChBE) launched a startup called Precision Neuro, a deep brain stimulation to help patients with Parkinson's disease. And two mechanical engineering students, **Tyler Boone** and **Jayce Delker** founded Aerodyme, a company that provides the technology to make tractor trailers more aerodynamic. More than 40 student startups went through the program, many founded by engineers.

Faculty who make groundbreaking advances through their research can also create startups through programs such as the Georgia Tech VentureLab. **Santiago Grijalva** (ECE) founded ProsumerGrid, which uses a software platform to help electrical utility companies simulate and plan power distribution. When **Gleb Yushin** (MSE) isn't teaching, he serves as co-founder and CTO for Sila Nanotechnologies, which aims to redesign the batteries used inside electric cars, consumer electronics and other devices.

This year's winner of the Georgia Tech InVenture Prize competition was Ethos Medical, made up of recent graduates **Dev Mandavia** (BME), **Cassidy Wang** (BME) and **Lucas Muller** (ME). Ethos Medical won for their medical guidance system that enables physicians to guide spinal tap needles safely and accurately into a patient's spine. The next step for Ethos Medical is to secure FDA approval.



OUR PATH FORWARD

Over the past year, we have grown as a College through meaningful technological contributions from students and faculty, but also through a culture of inclusivity where everyone is welcome. The engineers that come through our doors are fearless, ingenious and creative. As we move forward into a brand new decade, the College will continue empowering faculty, students and staff with the resources to both thrive as individuals and make a difference in our world.

ADMINISTRATION

Steven W. McLaughlin
Dean & Southern Company Chair

Laurence Jacobs
Associate Dean for Academic Affairs

Kimberly Kurtis
Associate Dean for Faculty
Development and Scholarship

Krista Walton
Associate Dean for Research and Innovation

Douglas Williams
Associate Dean for
Administration and Finance

OUR SCHOOLS

The Daniel Guggenheim School of Aerospace Engineering

**The Wallace H. Coulter Department of Biomedical Engineering
at Georgia Tech and Emory University**

School of Chemical & Biomolecular Engineering

School of Civil and Environmental Engineering

School of Electrical and Computer Engineering

The H. Milton Stewart School of Industrial & Systems Engineering

School of Materials Science and Engineering

The George W. Woodruff School of Mechanical Engineering