



» BIOMEDICAL ENGINEERING **DOCTORAL PROGRAM**



**Wallace H. Coulter Department of
Biomedical Engineering**



**EMORY
UNIVERSITY**

» Offering the best of both internationally renowned institutions, we are united by our dedication to improving the health and well-being of all by fostering the next generation of leaders in biomedical engineering.





THE WALLACE H. COULTER DEPARTMENT OF BIOMEDICAL ENGINEERING is a single department that combines the world-class resources of the Georgia Tech College of Engineering and the Emory University School of Medicine.

Our faculty are committed to innovative graduate training that prepares a student for any career path. Students are fully supported by a range of funding sources, including pre-doctoral fellowships from the National Science Foundation and the National Institutes of Health, federal and private agencies, and federally funded training grant programs.

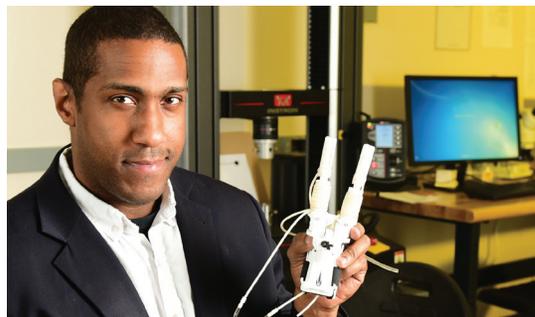
Our students are doing cutting-edge research in highly collaborative environments, which is a common element of our team-driven culture. Our research laboratories are dedicated to addressing unmet clinical challenges and have access to superior resources only found in world-class institutions.



INNOVATION
Cutting-edge research. Team-driven culture.



INCLUSION
Community. Diversity. Engagement.



IMPACT
Research that matters.



INSPIRATION
Make your path. Limitless possibilities.

The **Wallace H. Coulter Department of Biomedical Engineering** is consistently named as one of the top-ranked biomedical engineering graduate programs according to U.S. News & World Report.

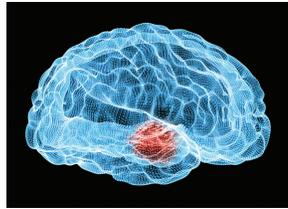
In 2019, the **National Academy of Engineering** awarded the Bernard M. Gordon Prize for Innovation in Engineering and Technology Education to three Coulter Department faculty members.



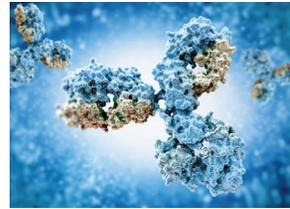
Pictured left: The Roger A. and Helen B. Krone Engineered Biosystems Building at Georgia Tech. Front cover: Left side picture shows the U.A. Whitaker Building at Georgia Tech. Right side picture shows the Health Sciences Research Building at Emory University (HSRB) and the two-story Brumley Bridge connecting HSRB to the Emory-Children's Center building.

Expansive Research Opportunities

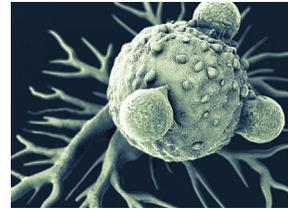
Students have an abundance of opportunities to work in their desired fields:



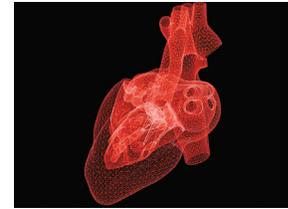
Neuroengineering



Cancer Technologies



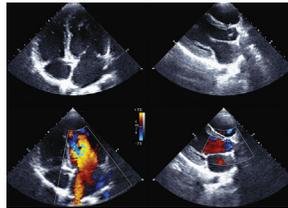
Immunoengineering



Cardiovascular Engineering



Engineering Education



Biomedical Imaging & Instrumentation



Biomedical Informatics and Systems Modeling



Biomedical Robotics



Biomaterials and Regenerative Technologies

Outstanding Medical Facilities and Resources



Yerkes Vaccine Center



Centers for Disease Control and Prevention



Children's Healthcare of Atlanta



Grady Memorial Hospital



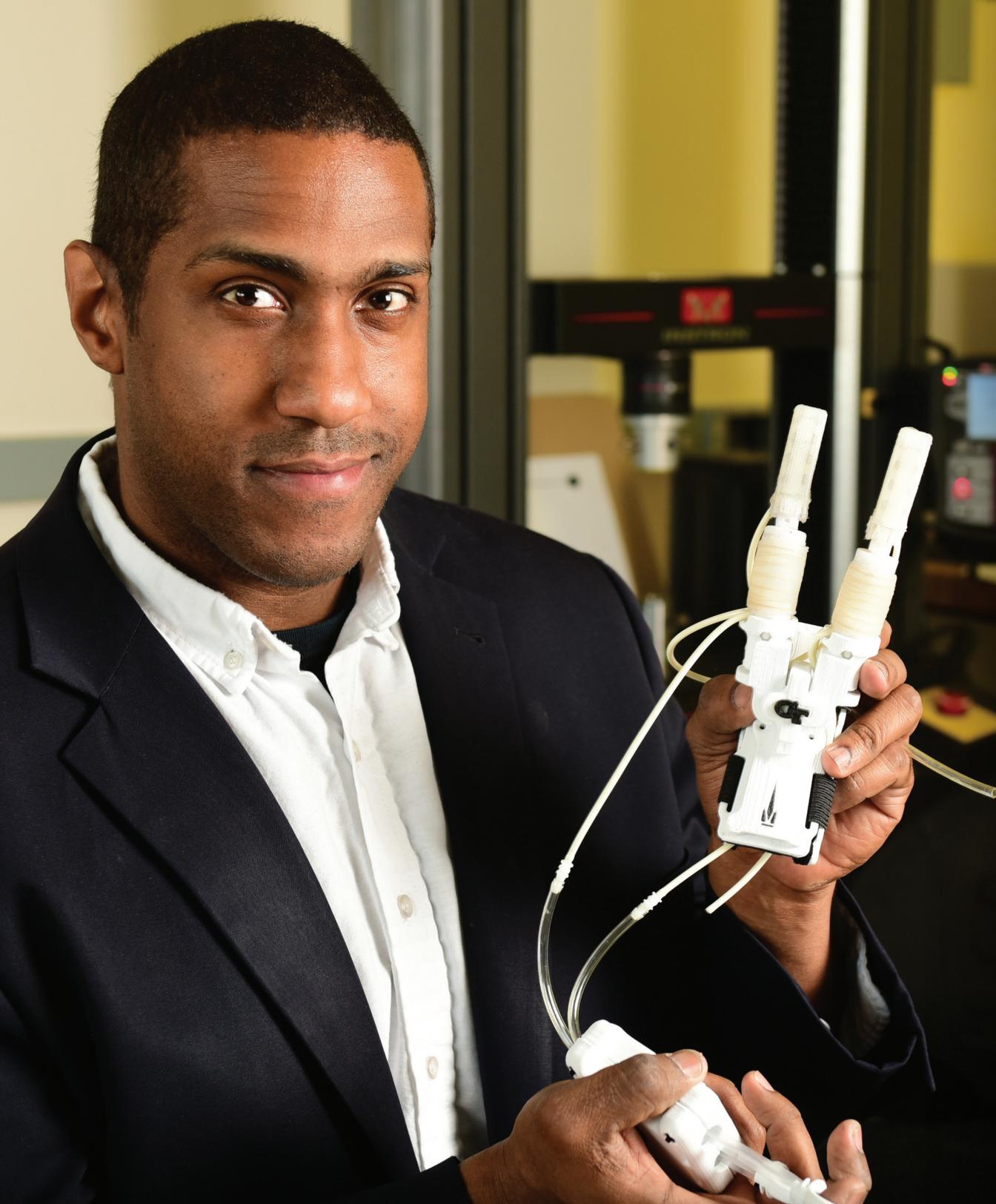
Winship Cancer Institute

National Institutions Located Nearby:

Centers for Disease Control and Prevention (HQ), The American Cancer Society (HQ)

Research facilities: Yerkes Regional Primate Research Center; Wayne Rollins Research Center; Woodruff Memorial Research Building; Marcus Autism Center; Atlanta Clinical Research Network Sites; Whitehead Biomedical Memorial Building; Emory Pediatrics Building; Winship Cancer Institute

Teaching facilities: Grady Memorial Hospital; Emory University Hospital; Emory University Hospital Midtown; Egleston Children's Hospital at Emory University; Atlanta Veterans Affairs Medical Center; Wesley Woods Geriatric Hospital



» “The opportunities presented to me during my time in the BME program at Georgia Tech and Emory have been unique and vast. The quantity and breadth of faculty allowed me to find a project in which I was truly interested, and departmental involvement has given me valuable social, outreach, and professional development opportunities.”

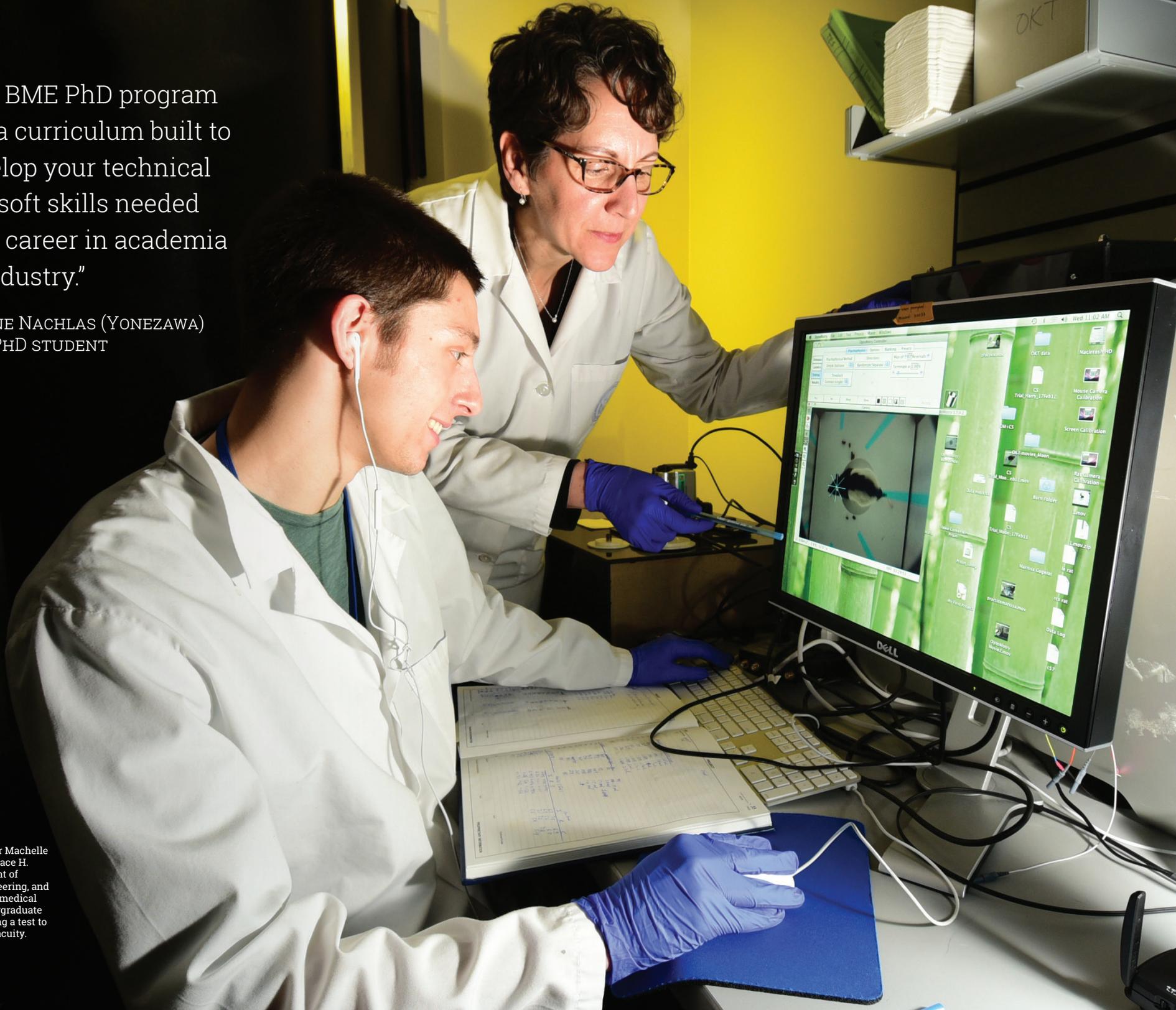
– JULINE DEPPEN
BME PHD STUDENT

Pictured: Frank Hammond, assistant professor in the Wallace H. Coulter Department of Biomedical Engineering and the George W. Woodruff School of Mechanical Engineering

» “The BME PhD program has a curriculum built to develop your technical and soft skills needed for a career in academia or industry.”

– ALINE NACHLAS (YONEZAWA)
BME PHD STUDENT

Pictured: Professor Machele Pardue in the Wallace H. Coulter Department of Biomedical Engineering, and Kyle Chesler, a biomedical engineering undergraduate student, performing a test to determine visual acuity.



» Looking for a Ph.D. Program? We offer many degree program options!

GEORGIA TECH & EMORY UNIVERSITY

Get a Ph.D. or M.D./Ph.D. from two institutions

Biomedical Engineering Ph.D. Programs

» Ph.D. in Biomedical Engineering

We are training the next generation of biomedical engineers to become independent, thought-provoking leaders. Graduates of this joint program leave armed with a strong foundation in engineering principles and bioscience knowledge.

» M.D. / Ph.D. in Biomedical Engineering

The M.D. / Ph.D. is a dual degree program. Participants receive their Ph.D. in Biomedical Engineering from the Wallace H. Coulter Department of Biomedical Engineering, and their M.D. from Emory University. Application is through the Emory School of Medicine.



Enrolled students are full students at both Emory University and the Georgia Institute of Technology with all the benefits associated with them: parking permits, email addresses, e-journal subscriptions, student groups/clubs, classes to take, seminar series, and more!

GEORGIA TECH

Interdisciplinary Ph.D. Programs

The Wallace H. Coulter Department of Biomedical Engineering participates in several interdisciplinary programs.

» Bioengineering

The bioengineering program integrates engineering principles with life sciences to improve health, the environment, and engineering applications. Students work with participating program faculty members from the Colleges of Engineering, Computing, Sciences, and Architecture as well as the Emory University School of Medicine.

» Bioinformatics

An interdisciplinary degree housed in the School of Biology. Bioinformatics is emerging as a strategic discipline at the frontier of biomedical research, where concepts from the natural sciences are merged with engineering and computer science techniques.

» Computational Science

A joint program between the Colleges of Computing, Sciences and Engineering. Prepares students for positions in industry, government and academia that emphasize research and development in areas such as engineering software systems, web technologies, software for consumer product and drug design, software and systems for modeling and simulation, systems integration, data mining and visualization, high performance computing and computational modeling.

» Machine Learning

The machine learning program is a collaborative venture between the Colleges of Computing, Engineering, and Sciences. 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 real-world questions.

» Robotics

Open to students enrolled in a participating home school in the College of Computing or the College of Engineering. Educates a new generation of robotics researchers who are prepared to be impactful contributors upon entering the high-tech workforce.

GEORGIA TECH, EMORY UNIVERSITY & PEKING UNIVERSITY

One degree from three institutions

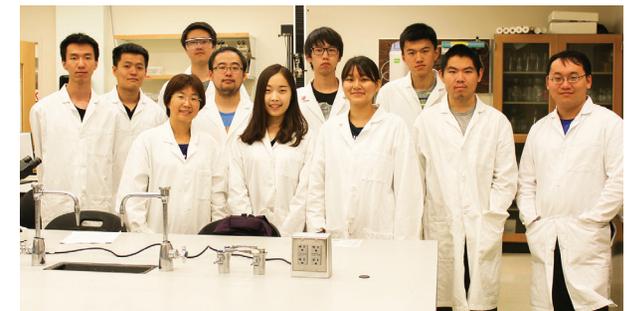
Biomedical Engineering Ph.D. Program

To meet the needs of a rapidly changing society and global economy, three internationally renowned institutions, Peking University, Emory University and The Georgia Institute of Technology, have forged an unprecedented partnership in biomedical engineering.

This joint Ph.D. program offers a unique means for U.S. and Chinese students to learn and work in a global economy and in global health settings.

Students apply to the program through the school designated as the home campus, either the Department of Biomedical Engineering at PKU in Beijing or the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory in Atlanta.

Most of the classes and research will take place on the home campus. However, students will also spend at least one year taking classes and participating in research in the co-advisor's lab on the secondary campus. A single dissertation will satisfy the thesis requirements of all three institutions. Students will be fully supported as long as they maintain satisfactory progress in the program.



Pictured: PKU students during a summer visit in the Bala Pai lab in the Whitaker Building.

» Financial Support Through Graduate Training Grants

Training grants enhance graduate research training by promoting fundamental, interdisciplinary and innovative research training essential for future biomedical researchers. Students appointed to a training grant are financially supported for a portion of their training. Below are the current training grants available to Biomedical Engineering Ph.D. students:

NIH: Research Training Program in ImmunoEngineering

The objective of this program is to train pre-doctoral biomedical engineering and bioengineering students in state-of-the-art immunology, with application of rigorous engineering principles, within a strong professional development environment, to equip them to be able to take on prominent positions in ImmunoEngineering academia and industry.

NIH: Biotechnology Cellular and Tissue Engineering

The objective of this biotechnology training program is to provide advanced and integrated training for predoctoral engineering students in cell and tissue engineering and to develop future leaders for the biotechnology industries.

NIH: Computational Neuroscience

The program aims to make a significant contribution to fulfilling the need for highly trained scientists capable of integrating experimental results using computational and theoretical approaches to understand the complexity of brain processes underlying neurological and psychiatric disorders.

NSF: Stem Cell Biomanufacturing

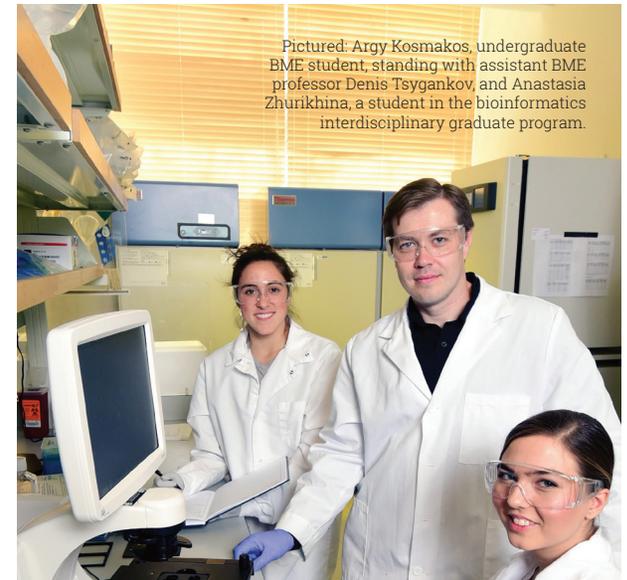
The NSF-funded Integrative Graduate Education and Research Traineeship (IGERT) program in Stem Cell Biomanufacturing was awarded to Georgia Tech in 2010 to educate and train the first generation of Ph.D. students in the translation and commercialization of stem cell technologies for diagnostic and therapeutic applications.

NIH: Computational Biology and Biomedical Genomics

The goal of our program is to provide training for a broad-based set of students with expertise in computational biology and predictive health, which encompasses research from integrative genomics to medical informatics.

NIH: Rationally Designed, Integrative Biomaterials

The objective of the GTBioMAT program is to provide advanced and integrated training for pre-doctoral science and engineering students in the rational design, synthesis, and application of the next generation of integrative biomaterials.



Pictured: Argy Kosmakos, undergraduate BME student, standing with assistant BME professor Denis Tsygankov, and Anastasia Zhurikhina, a student in the bioinformatics interdisciplinary graduate program.

NIH: Training Program in Computational Neural Engineering

The mission of the CNE Training Program is to train the next generation of researchers at the intersection of computational neuroscience, data science, and clinical neurophysiology.

NSF: Healthcare Roboticians

The Georgia Institute of Technology and Emory University faculty members are uniting to train the next generation of engineering students in healthcare robotics technologies, so they can better understand the changing needs of patients and their caregivers and healthcare providers.



Pictured: Dillon Brown, a bioengineering graduate student, and Victoria Yang, research specialist in biomedical engineering. They are analyzing imaging data for corneal curvature and axial components to determine how the eye changes with the development of myopia or near-sightedness.

» “The number of outreach opportunities and ways to be involved in the BME community are beyond what I expected to find as a graduate student. The department is very supportive of student leadership and involvement.”

– SIMONE DOUGLAS
BME PHD STUDENT



Pictured: Ph.D. students mentor high school students in the Project ENGAGES program. Olivia Burnsed, Bioengineering Ph.D. student, is mentoring Niara Botchwey and Clinton Smith.

Fellowships and Awards Opportunities

Fellowships are monetary awards, usually designated for graduate students. Many are nationally competitive.

There are often specific requirements and expectations, with some fellowships being limited to particular fields of study. Students applying for fellowships should carefully read the requirements on the fellowship website before applying. Fellowship students are required to maintain full-time enrollment.

Access Resources from Two Institutions

Take advantage of extensive resources from both institutions that assist in all phases of fellowship awards, from submission to award management. Both campuses have offices which help with fellowship paperwork, grant proofreading, proposal and grantsmanship tips, and post-award accounting. In addition to the individual campus offices, our curriculum is designed to hone skills in grant writing and scientific reasoning, both critical skills for receiving fellowships.

The BME Department also has many internal fellowship opportunities drawn from both campuses. These include, but are not limited to:

- GT President's Fellowship
- Alfred P. Sloan Award
- Gouizeta Fellowship
- Emory Jones Fellowship
- Research area specific awards
- Laney Graduate School Admissions Fellowships:
 - George W. Woodruff Fellowship
 - Centennial Scholars Fellowship
 - Laney Graduate School Fellowship

» **Twenty percent of current Ph.D. students are awarded one or more external fellowships and training grants.**

» **Twenty-five percent of incoming Ph.D. students are awarded admissions fellowships.**

» **Thirty percent of eligible Ph.D. students are awarded National Science Foundation Graduate Research Fellowships.**

Professional Development Resources That Expand Your Career Options

Our Ph.D. programs provide a wide range of scientific training and industry experience opportunities to graduate students. We prepare students for career success as pioneering future leaders in academics, business, industry, and government. Our goal is to develop students that have the skills needed to succeed both academically as well as professionally.

Our program provides important skills and options to help graduate students excel in the program:

COURSEWORK

- Emory University Jones Program in Ethics
- Biomedical engineering seminar course
- Career services workshops

MENTORSHIP TRAINING

- Teacher training short course
- Teaching and Research Practicum
- Teaching Assistantship

CERTIFICATE PROGRAMS

- International Management for Graduate Students Certificate (Scheller College of Business)
- Management of Technology Graduate Certificate (Scheller College of Business)
- Tech to Teaching Certificate Program (Center for Teaching and Learning)
- Certificate Program in Translational Research (Laney Graduate School at Emory)
- Graduate Certificate in Engineering Entrepreneurship for Non-business Students (Scheller College of Business)
- Graduate Certificate in Science, Technology, and Society (Ivan Allen College of Liberal Arts)
- Graduate Communication Certificate Program (Center for Teaching and Learning with the Communication Center)
- Doctoral Certificate in Public Policy (Ivan Allen College of Liberal Arts)

DUAL DEGREE PROGRAMS

- M.D. / Ph.D.
- Dual Degree MBA (Scheller College of Business)

INTERNSHIPS

- Part-time or full-time internship to gain experience in a career field

PROGRAMS

- Graduate Leadership Program (Scheller College of Business and the Coulter Department)
- BEST Program – Broadening Experiences in Scientific Training (Emory, Georgia Tech, and NIH supported)
- Office of Technology Transfer Internship (Emory University Office of Technology Transfer)
- The Technological Innovative: Generating Economic Results (TIGER®) Program (Scheller College of Business)

ADDITIONAL RESOURCES

- Center for Career Discovery and Development at Georgia Tech
- Georgia Tech Professional Development Resources
- Georgia Tech Communications Center
- Bioengineering and Bioscience Unified Graduate Students (an interdisciplinary graduate student group)
- Emory Professional Development Resources
- Emory Writing Center
- Biotechnology Career Fair
- Career, Research, and Innovation Development Conference

» Learn, Live, and Work in Atlanta

ATLANTA: A Thriving Metropolis

Atlanta is an integral and exciting aspect of the Georgia Tech and Emory educational experience. Atlanta is one of the Southeast's most vibrant, progressive, and dynamic cities. When students are not studying, they explore Atlanta's rich and diverse culture through museums, music venues, professional sports teams, shopping districts, and the best cuisine in the south. Atlanta's warm climate allows for year-round outdoor activities. Mountains, lakes, campsites, and hiking trails are all within an hour's drive – and access to Hartsfield-Jackson Atlanta International Airport makes the whole world just a flight away.



Atlanta ranks No. 1 among major American cities in tree coverage percentage at 53.9 percent.



ATLANTA'S COST OF LIVING IS LOWER THAN THE NATIONAL AVERAGE

City	Cost of Living Index (100 = average)
Durham, NC	88.3
St. Louis, MO	90.0
Atlanta, GA	97.7
Baltimore, MD	118.8
Philadelphia, PA	116.2
Boston, MA	148.6
San Francisco, CA	188.5
New York, NY	230.8 *
Palo Alto, CA	409.0 **

Source: Council for Community and Economic Research (C2ER) Cost of Living Index, 1st Qtr. May, 2017, Vol. 50 No. 1
 * Index represents Manhattan, NYC
 ** The Palo Alto, CA cost of living data is derived from the C2ER for the 4th Qtr. of 2016

Above: The Chattahoochee River National Recreation Area is located within Metro Atlanta. The Georgia Aquarium in Atlanta is the world's largest indoor aquarium.

Opposite Page: The 211-acre Piedmont Park is open year-round to athletes, nature lovers and anyone who enjoys a stroll through beautiful green space in midtown Atlanta.

Join a Vibrant and Diverse BME Community Supported by Great Student Organizations!



Pictured: Six BME graduate students and one faculty advisor are honored at the annual BME Graduate Awards event.

The **Bioengineering and Bioscience Unified Graduate Students (BBUGS)** group serves as the core student group for the bioengineering and bioscience community.

The **Graduate Student Advisory Board (GSAB)** is an organization within the BME department that serves a critical role in providing student input to the graduate program as well as a way for students to engage in the BME community.

Inscripto Emory SciComm: Popular science website that hosts content created, written, and produced by Emory graduate students.

Black Graduate Student Association: Dedicated to the enhancement of the graduate experience for African-American students and students of African descent at Emory University.

The **Graduate Sustainability Group (GSG)** is the first graduate-level association with a specific focus on sustainability at Emory.

oSTEM: Out in Science, Technology, Engineering, and Math is a national professional development organization aimed at supporting the LGBTQIA community at Georgia Tech.

Project ENGAGES: A high school science education program developed at Georgia Tech in partnership with Coretta Scott King, B.E.S.T. Academy, and KIPP Atlanta Collegiate.

wBME brings together female graduate students and post-doc researchers across the BME department to develop a community of successful women.

Alliance for Diversity in Science and Engineering (ADSE@GT): an organization that aims to promote and support underrepresented groups in STEM graduate programs.

The **Biomedical Engineering Alliance for Minorities (BEAM)** serves to bolster the retention of underrepresented minority (URM) students in the BME department through professional development. The organization aims to create a support system that fosters an affirming community for URM BME students that will help them thrive and successfully matriculate through the GT/Emory BME program.

Petit Undergraduate Research Scholars Program: Graduate students serve as mentors.

Preparing Graduates for a Range of Career Paths

Coulter Department Ph.D. students have pursued a variety of careers in many areas.

ACADEMIC INSTITUTIONS*

*Tenure Track

Arizona State University
 Auburn University
 Baylor College of Med
 Boston University
 Duke University
 East Carolina University
 Emory School of Medicine
 Emory University
 Engineering College of Aarhus
 Franciscan University of Steubenville
 Geisinger Health System
 Georgia Tech
 Karolinska Institutet
 Khalifa University
 Kyungwon University (Korea)
 Mississippi State
 National University of Singapore
 North Carolina State University
 Ohio State University
 Oregon State University
 Rensselaer Polytechnic Institute
 Rutgers University
 ShanghaiTech
 Stony Brook University
 SUNY Upstate Medical University
 Texas Tech
 UC Davis
 UC Davis School of Veterinary Medicine
 University of Louisville
 University in Israel
 University of Alabama at Birmingham
 University of Arkansas
 University of Calgary
 University of Chicago

University of Florida
 University of Illinois
 University of Kentucky
 University of Miami
 University of Michigan
 University of North Carolina
 University of Pennsylvania
 University of Pittsburg
 Vanderbilt University
 Virginia Commonwealth University
 Worcester Polytechnic Institute
 CDC

GOVERNMENT

CIA
 FDA
 NASA Johnson Space Center
 National Institutes of Health
 NIH
 US Army Corps of Engineers
 US Army Intelligence
 US Environmental Protection Agency
 USPTO

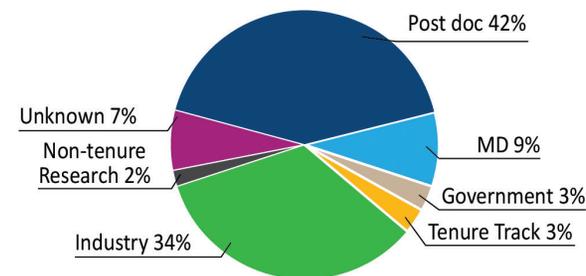
INDUSTRY

3M
 Access Biomedical Solutions
 Allen Institute for Brain Science
 Amgen
 Amniox Medical
 Apple Inc
 Axion Biosystems
 AxoGen, Inc
 Bain & Company

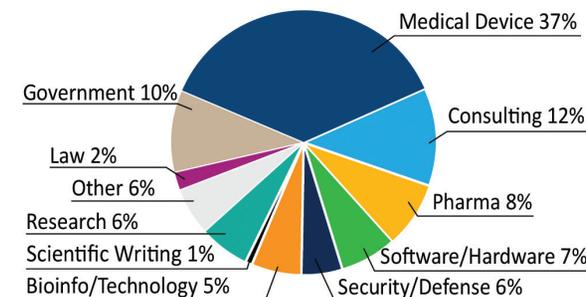
Bard Peripheral Vascular
 Bayer
 BD Medical
 Beckman Coulter
 Becton Dickinson Medical
 Biogen
 Boston Scientific
 Center for Rehab Medicine, Emory University
 Children's Health Care of Atlanta
 Clarion Healthcare
 Complete Genomics Inc
 Cook Biotech
 Coyne Scientific
 Edwards Lifesciences
 Epic
 Gaumard Scientific
 Genentech
 Google
 Halyard Health
 Integra Lifesciences
 Intel
 Intuitive Surgical
 Kimberly Clark
 Kinetic Concepts, Inc.
 Kite Pharma
 Leica Microsystems
 Lympha Tech
 McKinsey & Company
 McNeil Consumer Health
 MedShape Inc
 Medtronic
 Merck
 Merial
 Microsoft
 Northrop Grumman
 Novetta

OmniGuide
 Organogenesis
 PerkinElmer
 Plexon Inc.
 Procter & Gamble
 Regenerative Matrix
 Saint Joseph's Translational
 Research Institute
 Siemens Medical Solutions
 Synthetic Genomics
 Takeda Pharmaceuticals
 Teledyne Scientific & Imaging
 W.L. Gore Medical Products
 Xenco Medical

After Graduation



Industry Placement



DID YOU KNOW?

- There are more than 2,000 bioscience companies and 30,000 bioscience jobs in Georgia (TEconomy/BIO, 2014)
- No. 1 Metro Area for Openings for STEM Graduates per Capita (WalletHub, January 2017)
- No. 2 Next Big Tech Hubs that Are (Still) Affordable (Realtor.com, April 2017)
- No. 3 City for Minority Entrepreneurs (Expert Market, May 2017)
- No. 3 City Poised to Become Tomorrow's Tech Meccas (Forbes, March 2017)
- Metro Atlanta is the nation's Health Information Technology (HIT) capital with more than 225 companies, employing more than 30,000 people
- Atlanta is one of America's ten best healthcare cities (iVantage Health Analytics, 2015)
- Atlanta's airport serves 150 U.S. destinations and more than 75 international destinations in 50 countries, and is within a two-hour flight of 80 percent of the United States population.

» THE NATIONAL SCIENCE FOUNDATION (NSF)

has awarded nearly \$20 million to a consortium of universities, led by Georgia Tech, to support a new engineering research center (ERC) that will work closely with industry and clinical partners to develop transformative tools and technologies for the consistent, scalable and low-cost production of high-quality living therapeutic cells. The NSF Engineering Research Center for Cell Manufacturing Technologies (CMA^T) could help revolutionize the treatment of cancer, heart disease, autoimmune diseases and other disorders by enabling broad use of potentially curative therapies that utilize living cells.

The deadline to apply for the PhD program is December 1. All interested students must apply through the Institute's Graduate Admissions Office.

» **Apply here: www.grad.gatech.edu** »

To reach the BME PhD program via email, contact: gradstudies@bme.gatech.edu

Pictured: Research scientist Sommer Durham and research technician Naima Djeddar set up and initiate process steps for automated cell culture on the AMBR 15 micro-bioreactor in the Roger A. and Helen B. Krone Engineered Biosystems Building at Georgia Tech. Their work supports the NSF Engineering Research Center for Cell Manufacturing Technologies (CMA^T).

GEORGIA TECH

Creating the Next®

EMORY UNIVERSITY

One Emory: Engaged for Impact



**Wallace H. Coulter Department of
Biomedical Engineering**



**EMORY
UNIVERSITY**

Georgia Institute of Technology
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bme.gatech.edu

Emory University
Health Sciences Research Building
1760 Haygood Drive
Atlanta, Georgia 30322
bme.emory.edu

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The Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University affirms our institutions' efforts to increase equity, diversity, and inclusion on our campuses. We strive to create a welcoming, diverse and inclusive environment that values, celebrates, and respects the individual and communal differences that make us human, and aspire to cultivate global leaders in engineering and medicine who are champions of inclusive excellence.