2016 Impact Report

CREATING THE NEXT®...

Collaboration
Discovery
Partnership
Community
Bioengineer
Startup company
Insight
Breakthrough
Accomplishment
Experimentation
Bioscientist
Ingenuity
Exploration
Teamwork
Creativity
Innovation
Biotechnology

Georgia Tech | Parker H. Petit Institute for Bioengineering and Bioscience

Message from the Executive Director

The Petit Institute is in the business of creating the next – the next collaborative discovery, the next educational opportunity, the next startup company… and we couldn't do it without our thriving bio-community of faculty, students, and staff.

It's hard to believe it has now been seven years since my appointment as Executive Director of the Petit Institute. In that time, we have nearly doubled the number of faculty we support and tremendously expanded our interdisciplinary research, education programs, and core facilities. The growth has been amazing, but also brings challenges such as how to focus our research priorities. The strategy we have adopted has been to identify and lead a limited number of signature initiatives (e.g. cell and tissue manufacturing), while simultaneously creating an inclusive innovation ecosystem that helps catalyze and cultivate faculty-led initiatives. The execution of this strategy has resulted in an expansion of the number of research centers the Petit Institute supports from one in 2009 to 18 currently.

Here are a few additional 2016 highlights of which we all can be proud:

- Successful five year review by the Georgia Tech Office of the Executive Vice President of Research
- Increased diversity of the Petit Scholars class
- Published a national roadmap for cell manufacturing highlighted at the White House
- Launched the $24 million Marcus Center for Therapeutic Cell Characterization and Manufacturing
- Distinguished Lecturer Kristi Anseth, Ph.D., University of Colorado
- Recruitment of Children's Healthcare of Atlanta Scholar Scott Hollister and GRA Eminent Scholar Shu Takayama
- Hosted >160 Petit Institute events with more than 9,500 attendees
- Finalist for the $40 million National Science Foundation Engineering Research Center on Cell Manufacturing Technologies
- Winning team on the NIST (National Institute of Standards and Technology) National Manufacturing Innovation Institute Award to establish the first National Advanced Biomanufacturing Institute

Thanks to everyone for an incredibly successful 2016! It's been my privilege to lead the Petit Institute over the past seven years, and I'm so excited for what the future holds as we continue to support collaborations and partnerships across campus and around the world.

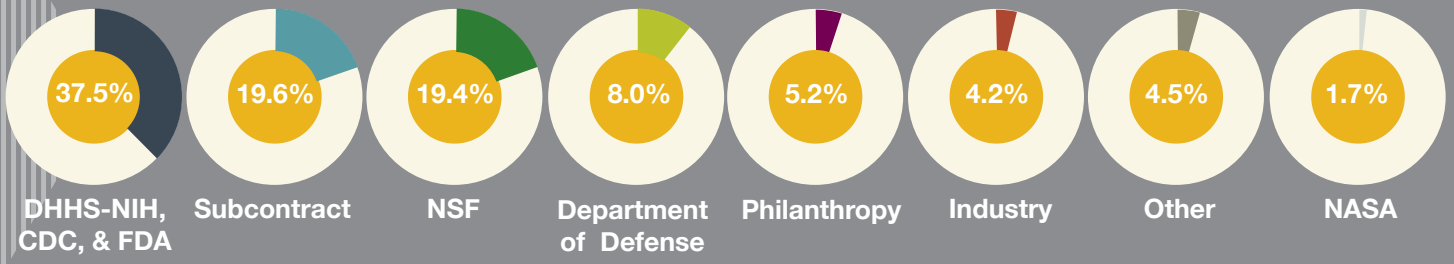
Robert E. Guldberg, Ph.D., Executive Director
Parker H. Petit Institute for Bioengineering and Bioscience

Building a community within Georgia Tech and our partner institutions that

catalyzes, cultivates, and deploys

interdisciplinary research and education in bioengineering and the biosciences for economic and societal benefit.

Research Funding $70.9 Million



18 Research Centers

15 State-of-the-art Core Facilites

>160 Petit Institute Events

9500 attendees

BIO-COMMUNITY

Georgia's Top Teacher Works in Petit Institute Lab

Casey Bethel, who spends his summers as a researcher in the lab of Raquel Leiberman at the Petit Institute, was named Georgia's 2017 Teacher of the Year. A science teacher at New Manchester High School in Douglasville, Bethel has spent the last six summers in the Lieberman lab, thanks to the Georgia Intern Fellowships for Teachers (GIFT) program.

Yoganathan Honored for Lifetime Achievement

Longtime Petit Institute researcher Ajit Yoganathan was recognized for a lifetime of contributions and advancements in cardiovascular research at the International Symposium on Biomechanics in Vascular Biology and Cardiovascular Disease at Emory University. Yoganathan, the Wallace H. Coulter Department Regents' Professor, also delivered the keynote speech.

Susan Thomas Gets DoD Support

Petit Institute researcher Susan Thomas received a Cancer Research Program Career Development Award from the Department of Defense. Thomas, assistant professor in the Woodruff School of Mechanical Engineering, will use the three-year, $529,000 award to develop targeted therapies for melanoma, a disease that disproportionately affects United States military personnel.

Manu Platt Makes ABC 40-under-40

The Atlanta Business Chronicle selected Petit Institute researcher Manu Platt to its annual list of 40 leaders under the age of 40 who have made significant career achievements and demonstrated a commitment to community service. Platt is an associate professor in the Wallace H. Coulter Department of Biomedical Engineering.

2016 Petit Institute Above and Beyond winners

The Petit Institute recognized faculty, staff, and students with year-end awards at the annual holiday party. Above and Beyond Awards went to Matt Torres (junior faculty), Johnna Temenoff (senior faculty), Jerry Grillo (staff award), Laura Paige (staff award), Robert Mannino (trainee award), Elma Kaitaz (trainee award), and Lavanya Rishishwar (trainee award). The Suddath Award went to Christine He, with Clarissa Whitmire placing second, and Moustafa Ali placing third.

RESEARCH BREAKTHROUGHS

Seed of Discovery

Petit Institute researchers Brandon Dixon and Fred Vannberg collaborated on a study of the lymphatic transport of exosomes that illustrates a potentially efficient pathway for targeted therapeutics. This research was supported by a Petit Institute Interdisciplinary Seed Grant.

Gibson Lab Granted $2.3 Million

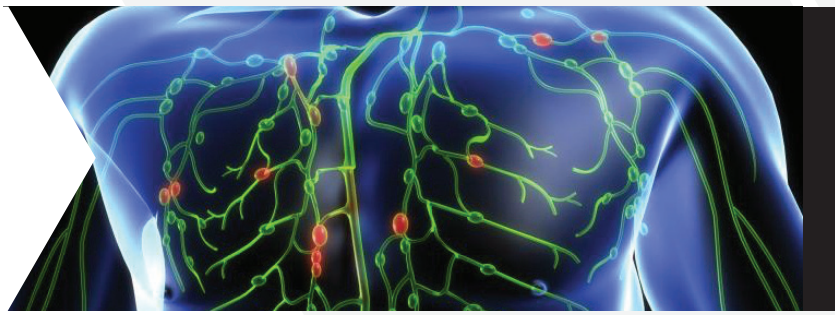
The lab of Petit Institute researcher and School of Biological Sciences professor Greg Gibson was awarded a grant of $2.3 million from the National Institutes of Health (NIH) to study the subtle genetic underpinnings of autoimmune-related diseases by taking a computational approach.

Grant Aimed at Curing HIV/AIDS

Phil Santangelo, a Petit Institute researcher and professor in the Coulter Department of Biomedical Engineering, is part of a five-year, $35.6 million grant from the National Institutes of Health to develop new strategies for preventing and curing HIV/AIDS. The research consortium is being led by Emory University.

Disease Devils in the Details

Petit Institute researcher Hang Lu led a study that exposed masses of hidden traits and possible subtle genetic connections relevant to unseen influences on disease. The computational genetics work using digital optics could prove useful to understanding debilitating disorders.



Punching Cancer with RNA Knuckles

A novel targeted therapy developed in the Petit Institute lab of John McDonald purged ovarian tumors in limited, *in vivo* tests in mice. The nanohydrogel delivered a payload of RNA that, when combined with chemotherapy, stopped ovarian cancer growth (and broke down resistance to chemotherapy). The research was published in *Scientific Reports*.

Tails of Robots and Times Past

Robotic research from lab of Petit Institute researcher Dan Goldman demonstrates how animals could have first started moving about on dry land. The study was sponsored by National Science Foundation and United States Army published in the journal *Science*.

CMaT
Cell Manufacturing Technologies

Cell Manufacturing

Cell manufacturing took center stage at the Petit Institute in 2016. The Marcus Foundation granted Georgia Tech $15.7 million to build a new $23 million research center to develop processes and techniques for manufacturing living cells for cell-based therapies. Leading the center will be Petit Institute researcher and Wallace H. Coulter Department of Biomedical Engineering professor Krishnendu Roy.

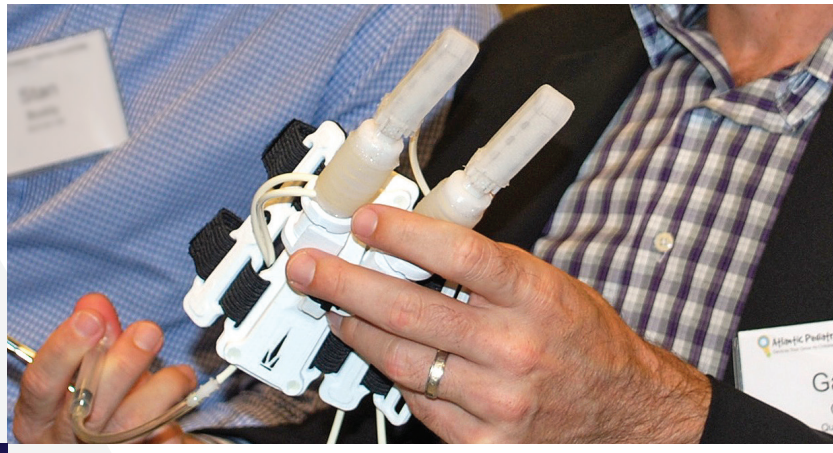
Roy also helped lead an industry-driven consortium in development of a national roadmap charting the path to large-scale production of cell-based therapeutics for use in a broad range of illnesses.

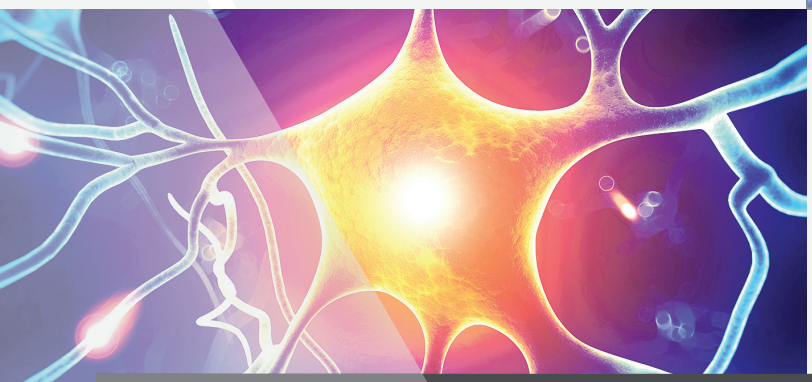
In addition, Roy and Johnna Temenoff led the submission for the National Science Foundation Engineering Research Center on Cell Manufacturing Technologies (CMaT).

PARTNERSHIPS

Collaborators in Science

Georgia Tech and the Petit Institute saw its relationship with pharma and biotech company UCB continue to grow and flourish in 2016. In addition to providing undergraduate research scholarships and student internships to Georgia Tech students, UCB announced the opening of its Solution Accelerator at the Centergy Building in Technology Square on campus, which will help the company work with the university to develop innovative medicines and solutions to treat severe diseases of the immune and central nervous systems.





CellectCell, a company co-founded by Petit Institute researcher Andrés García, headed steadily toward commercial viability with the beginning of pilot production of the CellectCell MicroCassette™ a product to allow researchers and manufacturing companies to select for cell types with higher sensitivity and specificity than what is currently available.

Petit Institute Faculty Startups...

Company	Faculty Member
APK Advanced Medical Technologies	James Greene
Artificial Platelets	Tom Barker
BetterWalk	Partha Unnava
Bionic Sciences	Maysam Ghovanloo
CellectCell	Andrés García
Clean Hands Safe Hands	James Rains
Clearside Biomedical	Mark Prausnitz
IV 3D Imaging	Levant Degertekin
Kidney Injury Dysfunction Support (KIDS)	Ajit Yoganathan
Lena Biosciences	Michelle LaPlaca
Lymphatech	Brandon Dixon
Micron Biomedical	Mark Prausnitz
Prana Biotech	Ravi Bellamkonda
Sanguina	Wilbur Lam
Sonar Optical IV Catheter	Stanislav Emelianov
Sophia Biosciences	Adegboyega Yomi Oyelere
Vertera Spine	Robert Guldberg

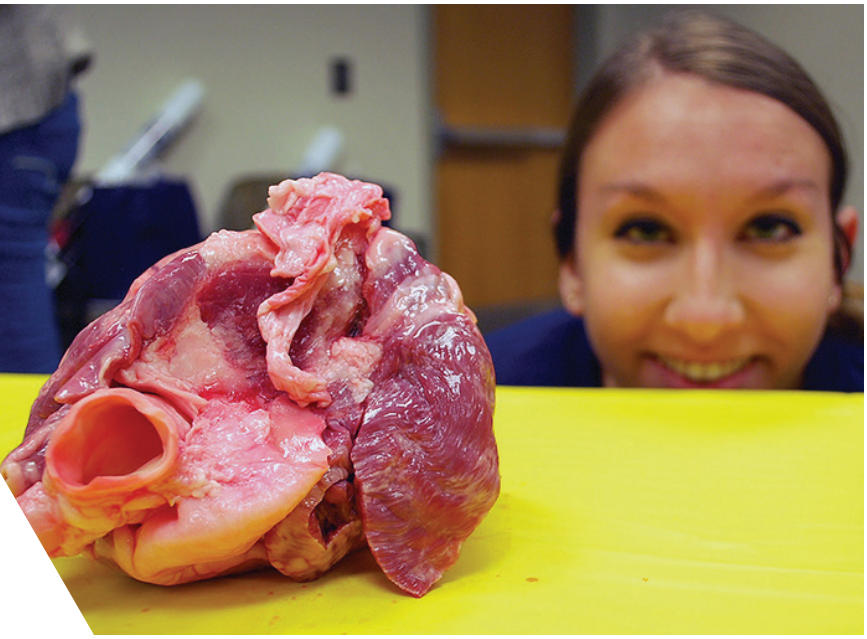
RISING STARS

The Petit Institute continued fostering a new generation of researchers through several different programs.

Project ENGAGES (Engaging New Generations at Georgia Tech through Engineering and Science), a high school education program for minority students, added a fifth local public high school to the roster.

The Petit Undergraduate Research Scholars program had its largest and most diverse class of students yet (22 students: 11 males, 11 females).

The Bioengineering and Bioscience Unified Graduate Students (BBUGS) hosted another record-setting Buzz on Biotech event, drawing 300+ regional high school and middle school students to the Georgia Tech campus.



And a new interdisciplinary graduate program saw its first class of students begin pursuit of their advanced degrees: the **Quantitative Biosciences (QBioS)** graduate program started in earnest, joining the already busy **BioEngineering** and **Bioinformatics** programs supported by the Petit Institute.

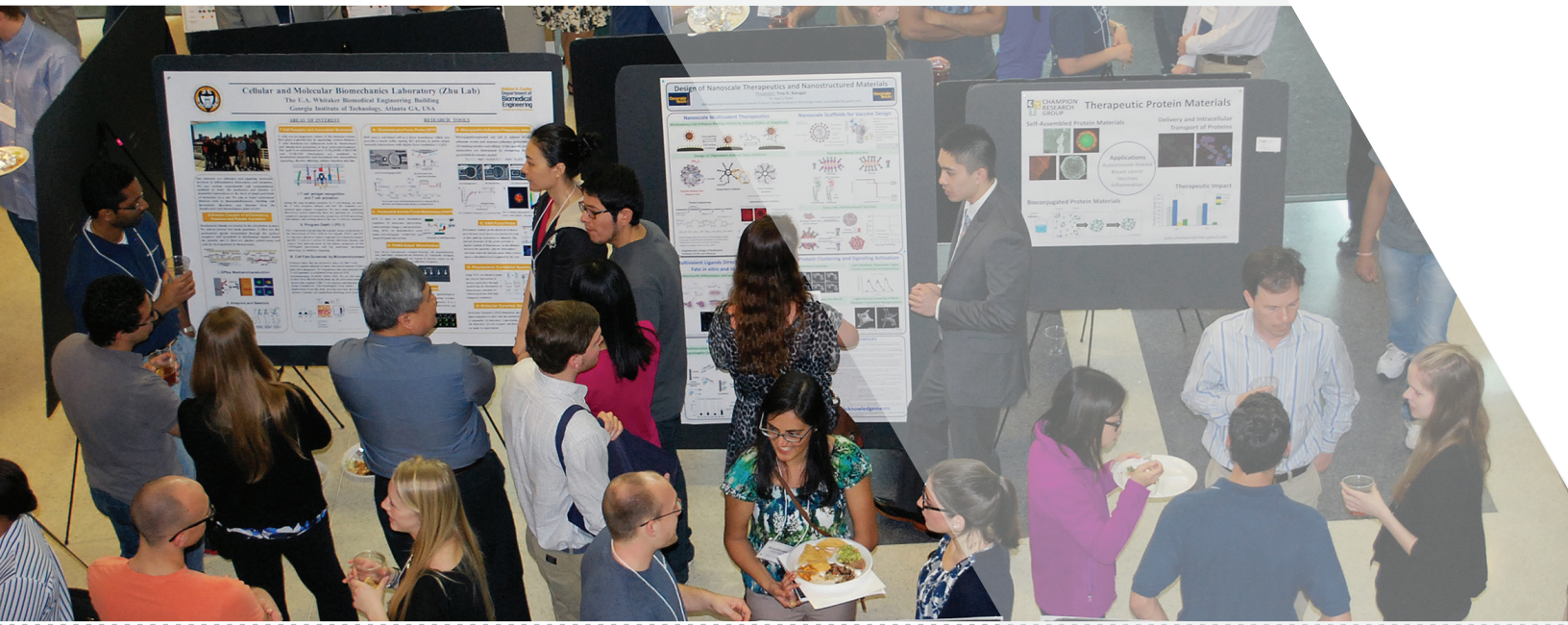
Petit Institute Leadership

Robert E. Guldberg, Ph.D.
Executive Director, Parker H. Petit Institute for Bioengineering and Bioscience
The Petit Director's Chair in Bioengineering and Bioscience
Professor, George Woodruff School of Mechanical Engineering

Nicholas V. Hud, Ph.D.
Associate Director, Parker H. Petit Institute for Bioengineering and Bioscience
Director, NSF Center for Chemical Evolution
Regents' Professor, Chemistry and Biochemistry

Petit Institute Faculty Steering Committee

- Greg Gibson, Professor, School of Biological Sciences
- Robert E. Guldberg, Executive Director, Petit Institute and Professor, School of Mechanical Engineering
- Nicholas V. Hud, Associate Director, Petit Institute and Regents' Professor, School of Chemistry and Biochemistry
- King Jordan, Associate Professor, School of Biological Sciences
- Ravi Kane, Professor, School of Chemical and Biomolecular Engineering
- Wilbur Lam, Assistant Professor, Department of Biomedical Engineering
- Raquel Lieberman, Associate Professor, School of Chemistry and Biochemistry
- Valeria Milam, Assistant Professor, School of Materials Science and Engineering
- Manu Platt, Associate Professor, Department of Biomedical Engineering
- Todd Streelman, Professor, School of Biological Sciences
- Todd Sulchek, Associate Professor, School of Mechanical Engineering
- Joshua Weitz, Professor, School of Biological Sciences



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