Research at Tech

Workshop on:

Next Generation Manufacturing of Printed and Flexible Electronics

March 19, 2015

Georgia Tech

Georgia Tech Organizational Chart

President
EVP (Academic Affairs) & Provost
EVP (Administration & Finance)
EVP (Research)

President's Office

Academic *education & research*	Applied Research	Economic Development	Professional & Continuing Education
Colleges *Architecture *Business *Computing *Engineering *Sciences *Ivan Allen – *liberal arts*	**Georgia Tech Research Institute (GTRI)** Market Focused Translational Research	**Enterprise Innovation Institute (EII)** *Advanced Technology Development Center (ATDC) *Venture Labs *Strategic Partners	**Global Learning Center (GLC)** In Tech Square **Non-Atlanta Locations** Savannah + 12 U.S. locations, France, Ireland, Singapore, Panama, China

Interdisciplinary Research Institutes -- e.g., nanotechnology, materials, biotech, manufacturing

Georgia Tech Research Corp. – holds IP, conducts contract/license negotiations

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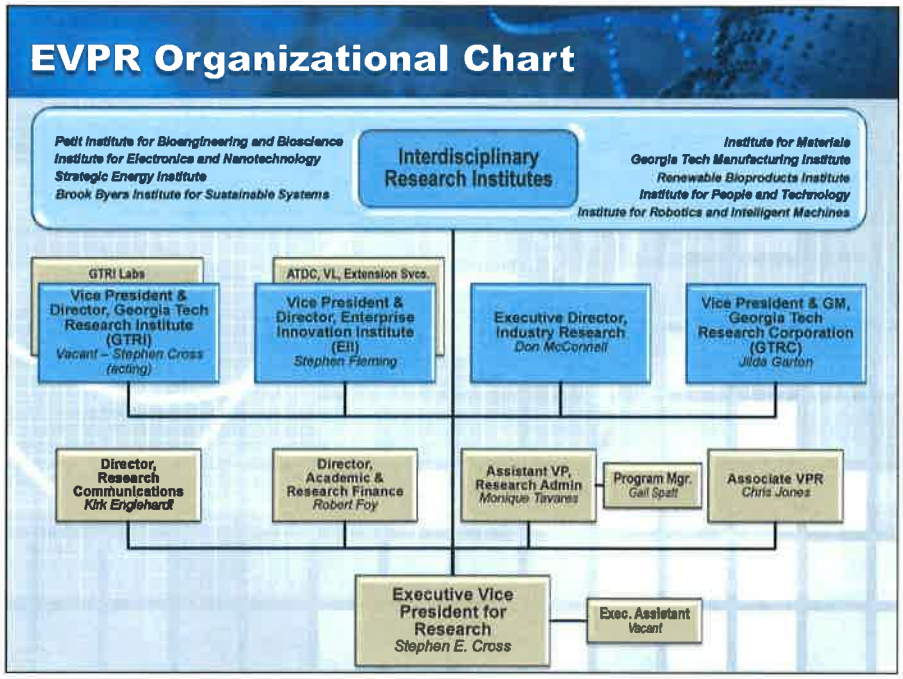
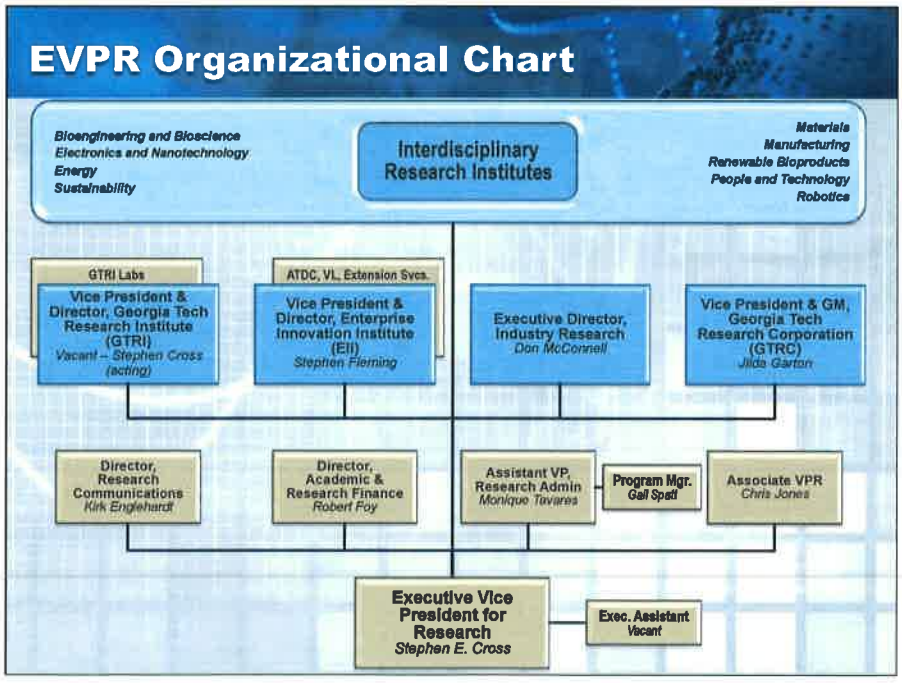
Georgia Tech


EVPR Organizational Chart
Petit Institute for Bioengineering and Bioscience
Institute for Electronics and Nanotechnology
Strategic Energy Institute
Brook Byers Institute for Sustainable Systems
Interdisciplinary Research Institutes
Institute for Materials
Georgia Tech Manufacturing Institute
Renewable Bioproducts Institute
Institute for People and Technology
Institute for Robotics and Intelligent Machines
GTRI Labs
Vice President & Director, Georgia Tech Research Institute (GTRI)
Vacant – Stephen Cross (acting)
ATDC, VL, Extension Svcs.
Vice President & Director, Enterprise Innovation Institute (EII)
Stephen Fleming
Executive Director, Industry Research
Don McConnell
Vice President & GM, Georgia Tech Research Corporation (GTRC)
Jilda Garton
Director, Research Communications
Kirk Englehardt
Director, Academic & Research Finance
Robert Foy
Assistant VP, Research Admin
Monique Tavares
Program Mgr.
Gail Spatt
Associate VPR
Chris Jones
Executive Vice President for Research
Stephen E. Cross
Exec. Assistant
Vacant


EVPR Organizational Chart
Bioengineering and Bioscience
Electronics and Nanotechnology
Energy
Sustainability
Interdisciplinary Research Institutes
Materials
Manufacturing
Renewable Bioproducts
People and Technology
Robotics
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EVPR Office

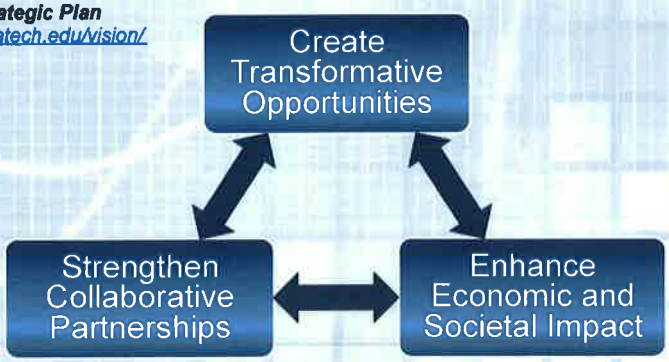
The Office of the Executive Vice President provides leadership and strategic direction across the entire university

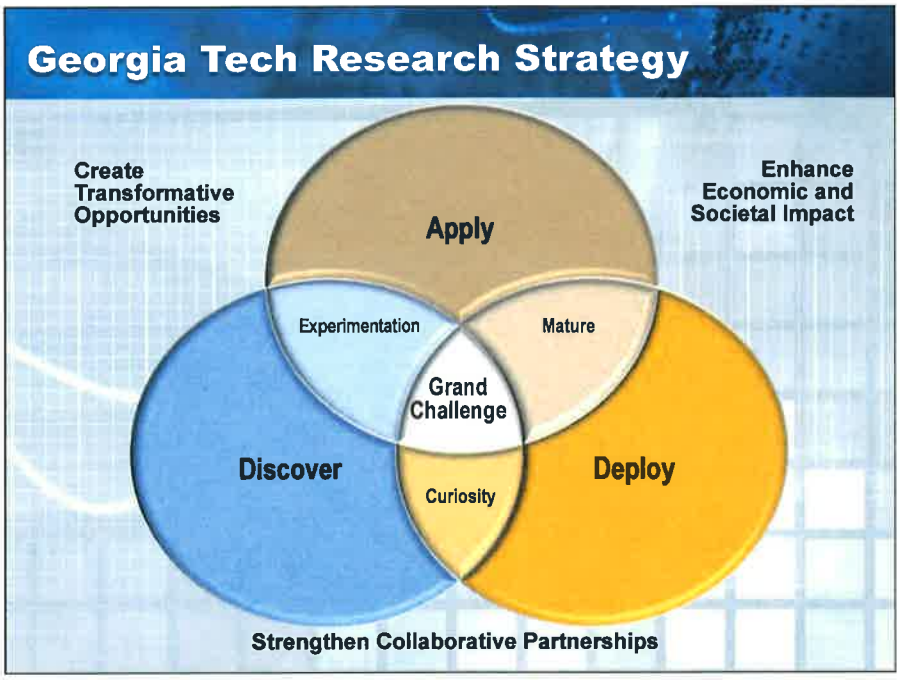
Georgia Tech Interdisciplinary Research Institutes	Georgia Tech's 'Intellectual Crossroads'
Georgia Tech Enterprise Innovation Institute	Nation's largest university-based economic development and industry assistance org.
Georgia Tech Research Institute	Tech's applied research arm since 1934
Georgia Tech Research Corporation	Internationally renowned affiliated company that oversees contracting and licensing

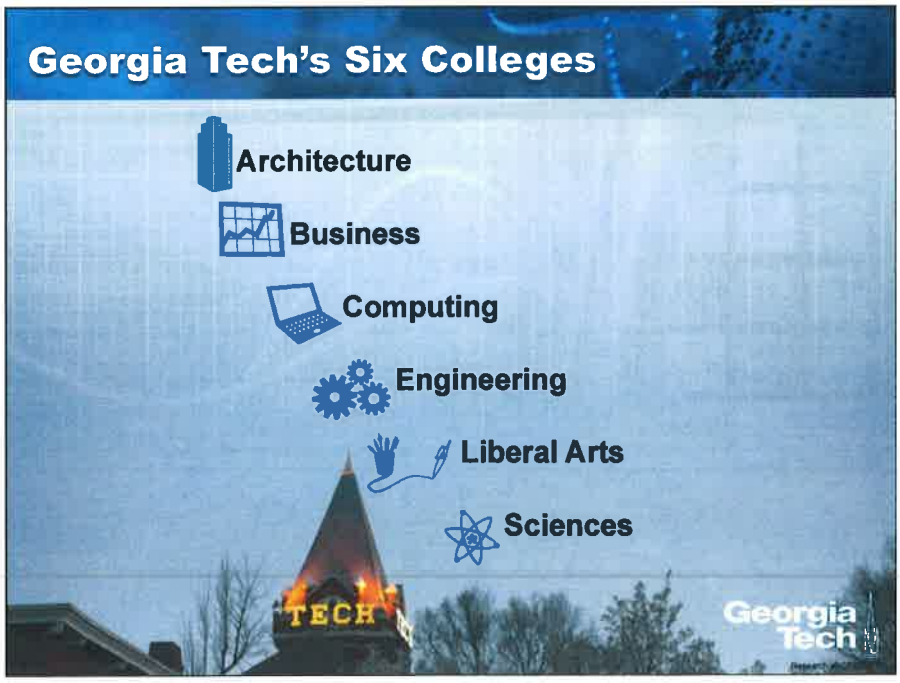
Georgia Tech Research Strategy

"Institutional reputation is largely tied to recognized expertise in specific areas of research and scholarship."

GT Strategic Plan
www.gatech.edu/vision/




Georgia Tech Research Strategy
Create Transformative Opportunities
Enhance Economic and Societal Impact
Apply
Experimentation
Mature
Grand Challenge
Discover
Deploy
Curiosity
Strengthen Collaborative Partnerships


Georgia Tech's Six Colleges
Architecture
Business
Computing
Engineering
Liberal Arts
Sciences
TECH
Georgia Tech

Georgia Tech Colleges and Schools

College of Architecture
- Architecture
- Building Construction
- City & Regional Planning
- Industrial Design
- Music

College of Computing
- Computational Science & Engineering
- Computer Science
- Interactive Computing

College of Engineering
- Aerospace Engineering
- Biomedical Engineering (joint with Emory)
- Chemical and Biomolecular Engineering
- Civil & Environmental Engineering
- Electrical & Computer Engineering
- Industrial & Systems Engineering
- Materials Science & Engineering
- Mechanical Engineering

Georgia Tech Colleges and Schools

Ivan Allen College of Liberal Arts
- Economics
- History, Technology & Society
- International Affairs
- Literature, Media & Communication
- Modern Languages
- Public Policy

Ernest Scheller Jr. College of Business
- MBA Programs
- Undergraduate Program
- Doctoral Program
- Executive Education

College of Sciences
- Applied Physiology
- Biology
- Chemistry & Biochemistry
- Earth & Atmospheric Sciences
- Mathematics
- Physics
- Psychology

Student Information

Average SAT for Entering Freshmen*: 1420

Undergraduates:	14,558
Master's:	3,535
Ph.D.:	3,378
TOTAL	**21,471**

Top Interviewing Companies – FY13

Accenture	Airwatch
Bank of America	Bechtel
Deloitte Consulting	ExxonMobil
General Electric	IBM
Microsoft	Schlumberger

**Fall 2013*

Rankings

2014 BEST COLLEGES U.S.News RANKINGS

#1 Industrial Engineering Program (Undergraduate and Graduate)

#5 Undergraduate Engineering College

#6 Graduate Engineering College

#7 Public University in the Country for Undergraduate Studies

TEN Undergraduate Engineering Programs Ranked in the **Top 6**

ELEVEN Graduate Engineering Programs Ranked in the **Top 10**

#1 Engineering Degrees (Bachelor) Awarded to Minority Students
-ASEE/Diverse: Issues in Higher Education

#1 Engineering Degrees (Bachelor) Awarded to Women
-American Society for Engineering Education (ASEE)

Georgia Tech Facts & Figures

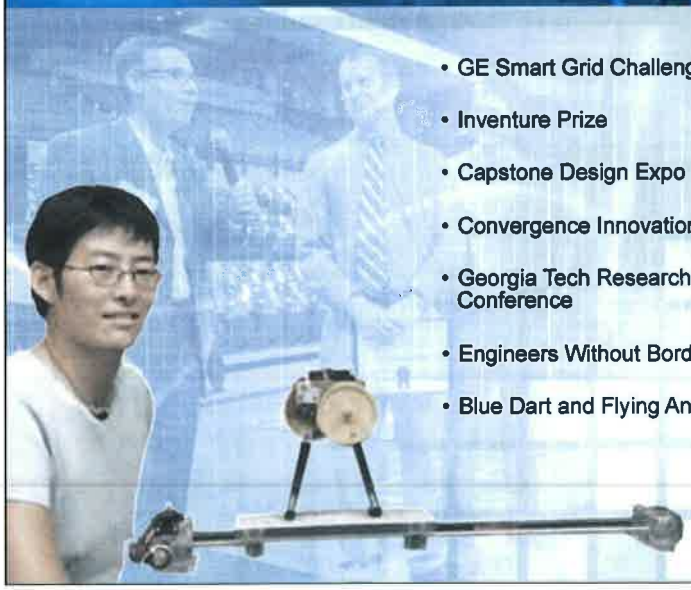
Established in 1888

Largest Engineering College in the U.S.

Total Students	21,471
Academic Faculty	1,073
Research Faculty & Professionals	4,242

60% of Invention Disclosures List At Least One Student

Student Driven Innovation



- GE Smart Grid Challenge
- Inventure Prize
- Capstone Design Expo
- Convergence Innovation Competition
- Georgia Tech Research & Innovation Conference
- Engineers Without Borders
- Blue Dart and Flying Android Projects

Powering the Economy

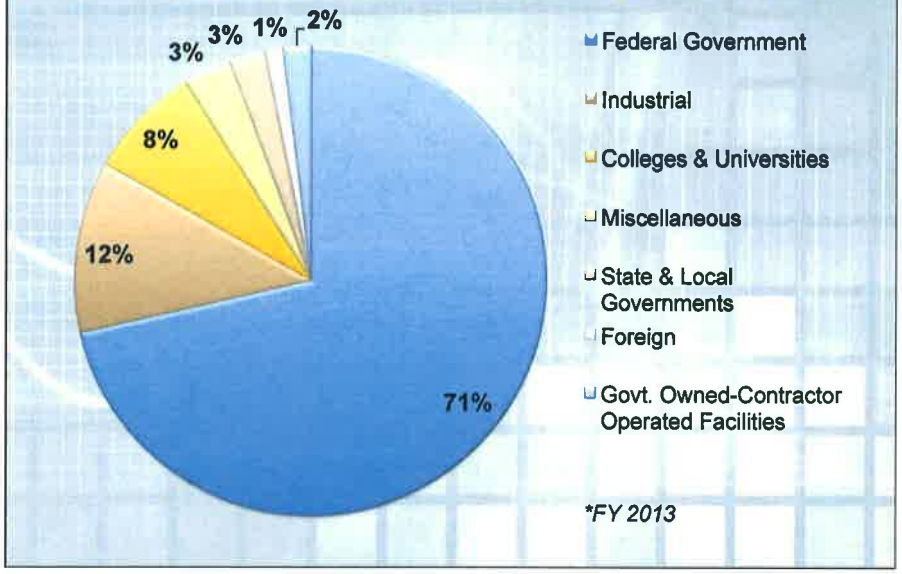
- 200+ centers focused on interdisciplinary research for industry & government
- 835+ U.S. patents & 500+ active license agreements with companies to commercialize Georgia Tech research (as of 2013)
- Over 155 start-up companies were created using technologies developed at Georgia Tech, since 1994.
- ...a total of 15 startups and 88 U.S. patents issued in 2013 alone.
- 60% of Georgia Tech's invention disclosures list at least one student

Research by the Numbers

	2013	2012	2011
Disclosures	$295M	$391M	$383M
Patents Issued	88	74	78
Technologies Transferred	113	159	73
Industry Contracts (not under government prime)	607	602	980
Licenses	111	97	61

*not just based on GT IP, all companies assisted in creation locally

Research Numbers – Awards*

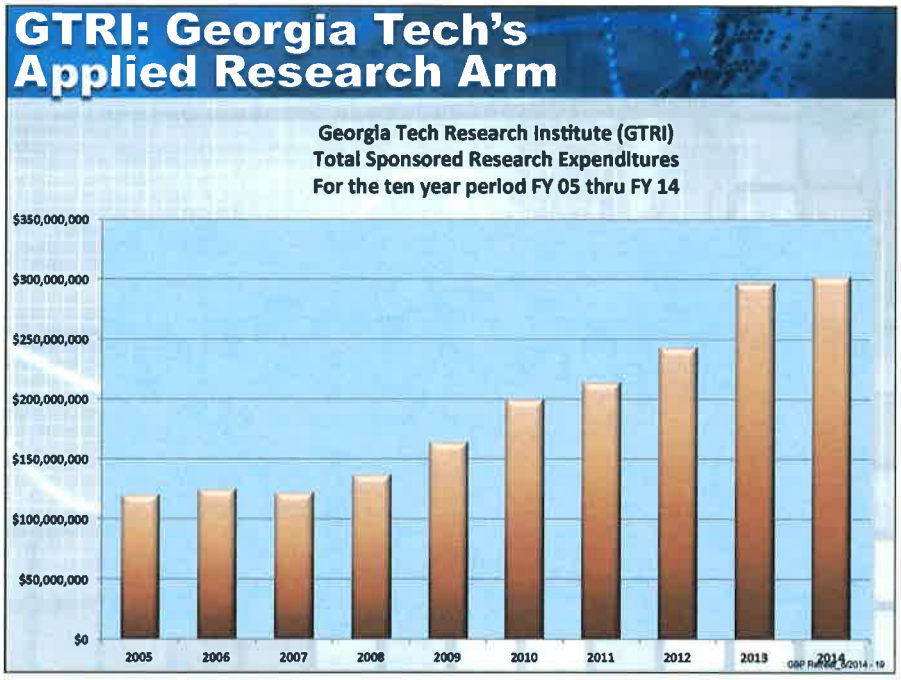


Federal Research Expenditures

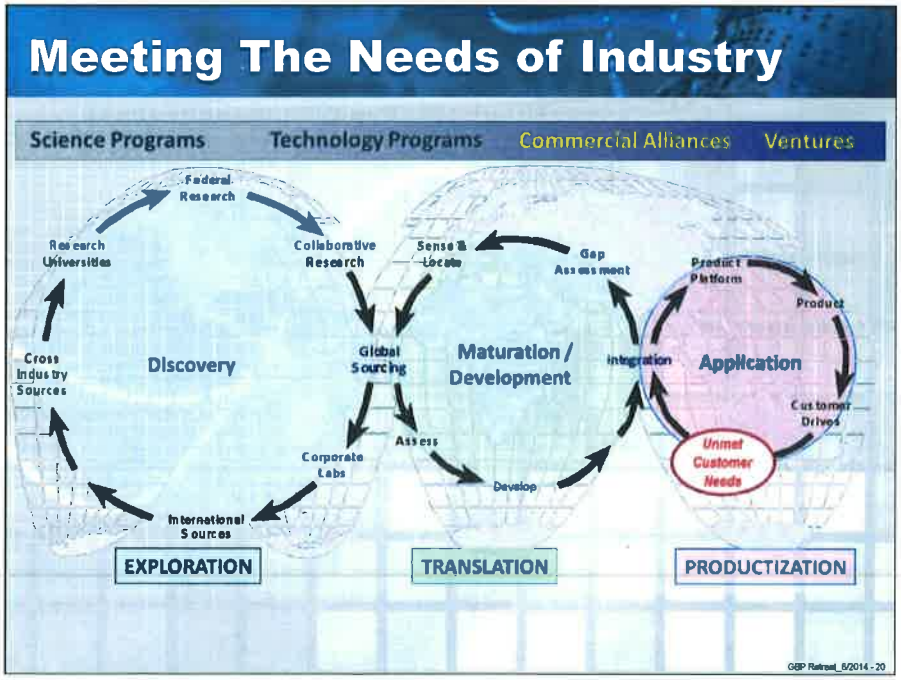
Top 10 Federal Research Sponsors	FY2013
Department of Defense	$337,611,000
National Science Foundation	$70,376,000
Dept of Health & Human Services / NIH	$38,890,000
Department of Energy	$25,373,000
NASA	$14,011,000
Homeland Security	$7,767,000
Department of Transportation	$5,658,000
Department of Education	$3,478,000
Department of Justice	$3,358,000
Department of Commerce	$3,229,000

Total Federal Research Expenditures	**$522,130,000**
Grand Total – Research Expenditures (All Sources)	**$730,488,000**

GTRI: Georgia Tech's Applied Research Arm



Meeting The Needs of Industry



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Georgia Tech

Interdisciplinary Research Institutes

BIOENGINEERING AND BIOSCIENCE

Parker H. Petit Institute for Bioengineering & Bioscience

ELECTRONICS AND NANOTECHNOLOGY

Institute for Electronics and Nanotechnology

ENERGY AND SUSTAINABLE INFRASTRUCTURE

Strategic Energy Institute

Brook Byers Institute for Sustainable Systems

MATERIALS

Institute for Materials

MANUFACTURING, TRADE, & LOGISTICS

Georgia Tech Manufacturing Institute

NATIONAL SECURITY

Georgia Tech Research Institute

RENEWABLE BIOPRODUCTS

Renewable Bioproducts Institute

PEOPLE AND TECHNOLOGY

Institute for People and Technology

ROBOTICS

Institute for Robotics and Intelligent Machines

Manufacturing, Trade and Logistics

Georgia Tech conducts basic and translational research in Manufacturing, supplemented by Tech's strengths in design, energy, materials, policy and management.

- Innovative products and manufacturing processes
- Supply network integration
- Enterprise transformation
- Accelerating innovation
- Concurrent maturation of technology, manufacturing, business cases and a skilled workforce for robust ecosystems
- Thought leadership in advanced manufacturing

Part of U.S. Advanced Manufacturing Partnership

Georgia Tech

Electronics and Nanotechnology

Our research in the complementary fields of electronics and nanotechnology - supported by strengths in related areas - provides the foundation for a broad range of advances with industrial applications.

- Microelectronics
- Sensors
- Defense Electronics
- Packaging Technology
- Wireless Communications
- Micro-electromechanical Systems (MEMS)
- Quantum Systems
- Photovoltaics
- Advanced Electronic Materials.
- Piezoelectric Nanogenerators and Nanodevices
- Diagnostic and Therapeutic Nanoparticles
- Nanoscale Sensors
- Nanometer-scale Structures

Georgia Tech

Materials

The discovery and development of new and improved materials at Georgia Tech fuels wide-ranging advances that enable solutions to 21st century grand challenges in energy, mobility, security, health, communications and sustainability.

Interdisciplinary teams representing more than 200 Georgia Tech faculty members explore:

- Materials and interfaces for catalysis, separation, storage and environmental applications
- Electrodes for energy applications
- Organic and inorganic photonics and electronics
- Lightweight materials
- Nanomaterials and devices
- Materials in extreme environments
- Novel graphene structures for electronics
- Forest biomass and lignocellulosic materials
- Tissue repair and regeneration
- Coatings to modulate bioresponses and delivery of biotherapeutics
- Bio-enabled materials synthesis and processing
- Materials design, data sciences and informatics

Georgia Tech

The Georgia Tech Way

Our
highly collaborative environment
permeates the entire institute.

Solving complex industry problems requires
bringing the right experts together quickly.

Contact

Christopher W. Jones

Associate Vice President for Research

cjones@chbe.gatech.edu

www.research.gatech.edu

Georgia Tech

Interdisciplinary Research Institutes

Support & connect
those doing basic & applied research across
the entire Georgia Tech campus

Blur the lines between academic disciplines through
collaboration and interdisciplinary teaming

Make it easier to
move research results into real-world use


Easier Access to Expertise


Core Research Areas
Big Data
Bioengineering and Bioscience
Electronics and Nanotechnology
Energy and Sustainable Infrastructure
Manufacturing, Trade, and Logistics
Materials
National Security
Renewable Bioproducts
People and Technology
Public Service, Leadership, and Policy
Robotics
Systems

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Big Data

Georgia Tech supports multidisciplinary research teams that are developing innovations in computational methods to advance big data analysis and applying them to industry, business and the public sector.

- High Performance Computing
- Data Analytics & Visualization
- Machine Learning
- Digital Signal Processing
- Modeling & Simulation
- Optimization
- Storage & Computing Systems
- Computing & Math Foundations

Georgia Tech

Bioengineering and Bioscience

Georgia Tech creates collisions between the sciences and engineering in unique and collaborative ways to understand complex biological processes and systems to improve human health and the environment.

- Medical Devices Development
- Biomaterials
- Regenerative Medicine
- Pharmaceutical Technologies
- Healthcare Robotics
- Accessibility and Rehabilitation Tools
- Immunology Engineering
- Biomanufacturing
- Neuro Engineering
- Stem Cell Engineering
- Cancer Research
- Systems Biology

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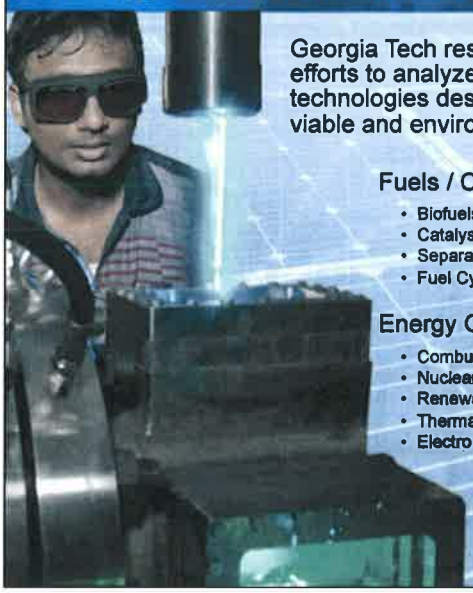
Georgia Tech

Energy and Sustainable Infrastructure



Georgia Tech researchers focus on interdisciplinary efforts to analyze, model and develop innovative technologies designed to provide an economically viable and environmentally friendly future.

Fuels / Chemicals
- Biofuels
- Catalysis
- Separations
- Fuel Cycle

Energy Utilization
- Energy Efficiency
- Carbon Management
- Transportation

Energy Generation
- Combustion
- Nuclear
- Renewables
- Thermal Systems
- Electro Chemical Systems

Energy Transmission & Distribution
- Autonomous Grid
- Flow Control
- Electric Vehicles
- Storage

Georgia Tech

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Georgia Tech

National Security

Georgia Tech has helped meet the need for mission-critical defense and security research since the 1950s. Today, we apply scientific, engineering and policy know-how to help solve some of the toughest problems of the modern battlefield.

- Electronic warfare
- Threat assessment
- Soldier survivability
- Cybersecurity
- System modernization and integration
- Autonomous systems
- Sensor technologies
- Radar
- Reverse engineering of complex systems

Georgia Tech

Renewable Bioproducts

Georgia Tech's multi-disciplinary, cross-industry capabilities, such as those at the new Renewable Bioproducts Institute, focus on providing opportunities and addressing challenges in bioproducts industries.

- Facilitating development of chemical feedstocks and fuels through biorefining to create new revenue from renewable materials
- Developing the potential of renewable and sustainable biocomposites and nanocellulosic materials from biomass
- Developing operational excellence strategies to improve manufacturing efficiency and reduce costs

Georgia Tech

People and Technology

Remotoscope, developed and tested by Georgia Tech and Emory researchers, is a smartphone attachment designed for at-home diagnoses of ear infections.

- **The Institute for People and Technology (IPaT)** connects industry, government and nonprofit leaders with Georgia Tech's world-class researchers and innovations to transform media, health, education and humanitarian systems. IPaT integrates academic and applied research through living laboratories and multidisciplinary projects to deliver real-world, transformative solutions that balance the needs of people with the possibilities of new technologies.
- IPaT creates transformative opportunities, builds powerful partnerships and maximizes societal impact of the exciting research being done at Georgia Tech through: transdisciplinary research, translational impact and transformational leadership.

Georgia Tech

Public Service, Leadership and Policy

Georgia Tech provides an integrated approach to addressing many of today's most complex policy issues.

- We seek to influence policy at local, state, national and international levels by facilitating research-based dialogue.
- Our policy research directly supports our interdisciplinary scientific and engineering exploration.

Georgia Tech

Robotics

Georgia Tech is revolutionizing the way humans collaborate with robots and how autonomous systems can enhance society, the economy and culture.

- Mechanisms
- Control
- Perception
- Autonomous Systems
- Military Systems
- Artificial Intelligence/Cognition
- Human-Computer Interaction
- Application Technologies
- Policy and Ethics

Georgia Tech

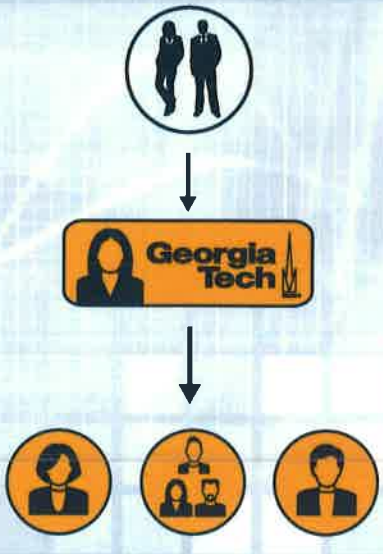
Systems

Systems research and education at Georgia Tech address the needs of both government and industry, focusing on the systems themselves, as well as the underlying development processes.

- Requirements Derivation
- Design Methods
- Networking
- System Interfaces
- Modeling and Simulation
- Test and Evaluation
- Advanced Manufacturing
- Production and Plant Processes
- Operations Research
- Cycle Time Reduction
- Decision Processes

Georgia Tech

One Way to Work with GT



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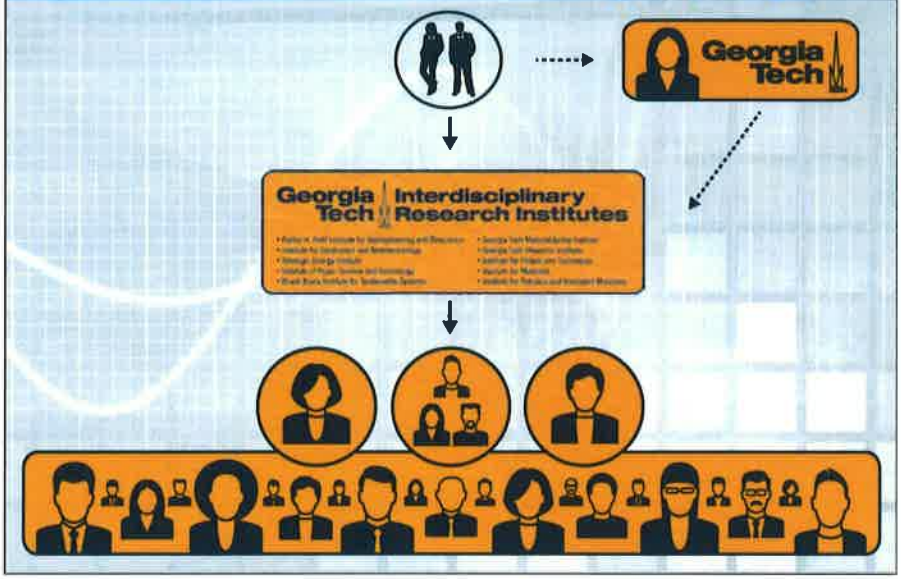

Contract Continuum

Easy industry engagement at all stages of R&D

- **Basic Research:** Explore fundamental challenges in a technical area
- **Applied Research:** Identify solutions to real-world challenges
- **Demonstration:** Improve an existing technology
- **Specialized Testing:** Test new and existing products

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