EXHIBIT H

GEORGIA INSTITUTE OF TECHNOLOGY

Georgia Tech

Net Zero Freight Systems Program

CREATING THE NEXT®

EXECUTIVE SUMMARY

Freight systems are one of the most challenging systems to decarbonize. The Net Zero Freight Systems Program is developing the solution pathways for a resilient freight system with zero greenhouse gas emissions, much lower environmental impacts, and much greater societal benefit than today's system.

We address the grand challenge of achieving Net Zero Freight Systems by simultaneously addressing fuels, vehicles, and the design of effective material movement systems.

We combine teaching and research with industrial, government, and civil society engagement to identify and amplify priority improvement opportunities. We provide vision, pathways, options, and analysis to decision makers and the public, and we track progress over time.

The planned duration for the Net Zero Freight Systems Progam is three years with an anticipated launch in early 2022.

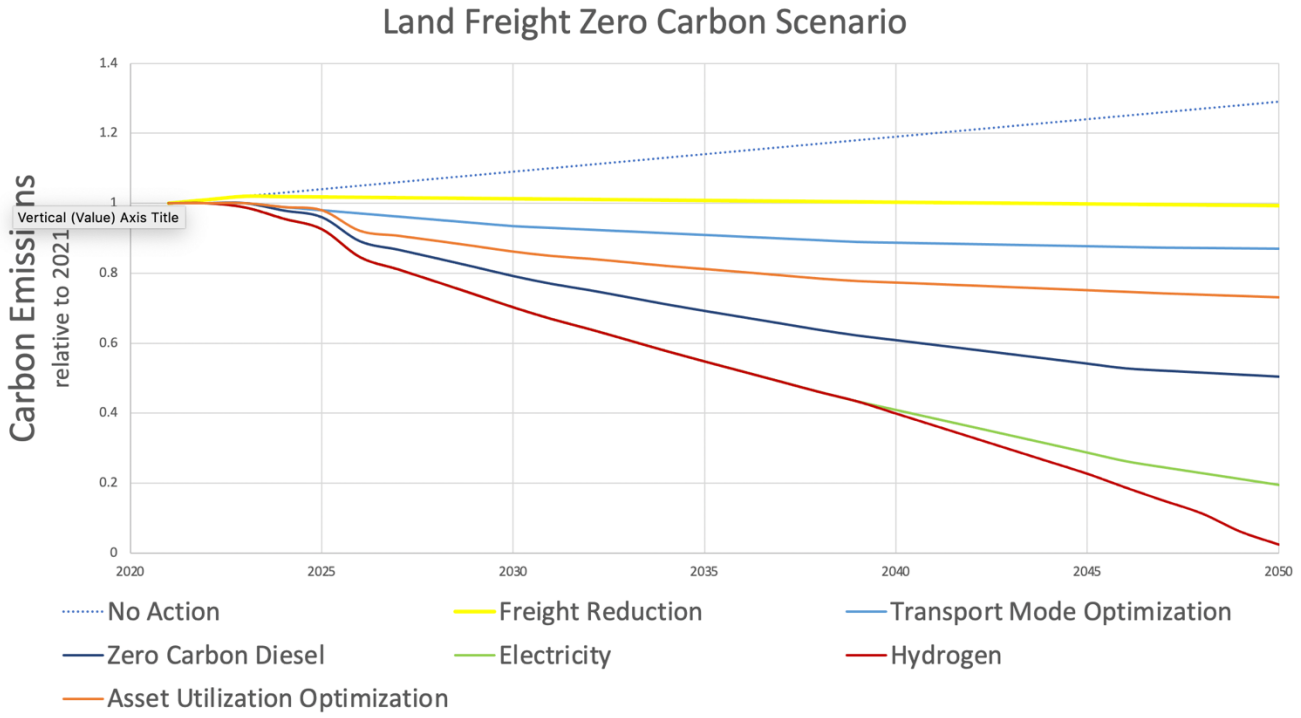
The Georgia Tech team is seeking funding totalling $2.9 million with these key components:

- $2.58 million for Salaries and Benefits of Research Faculty, Scientists, Graduate Students, and Support Personnel
- $150 thousand for travel
- $170 thousand for materials, computing equipment, database access, and publication

NET ZERO FREIGHT GRAND CHALLENGE: PROGRAM GOALS

Freight systems, encompassing freight transportation and logistics, are one of the most challenging systems to decarbonize. All of the main decarbonization approaches for freight are seen as years away.

Achieving net-zero is no trivial matter, as illustrated by the diagram below from the Alliance Innovation through Collaboration in Europe (ALICE), of which Georgia Tech is a member, alongside a few leading universities and hundreds of companies, with the support of the European Commission. If nothing is done, ALICE predicts a 30% increase in land freight induced GHG emissions by 2050 relative to the current state. The estimate shows that only by concurrently succeeding in freight reduction, asset utilization optimization, transport mode optimization, and migrating gradually toward zero carbon diesel, electricity, and hydrogen, is for the challenge to be met.

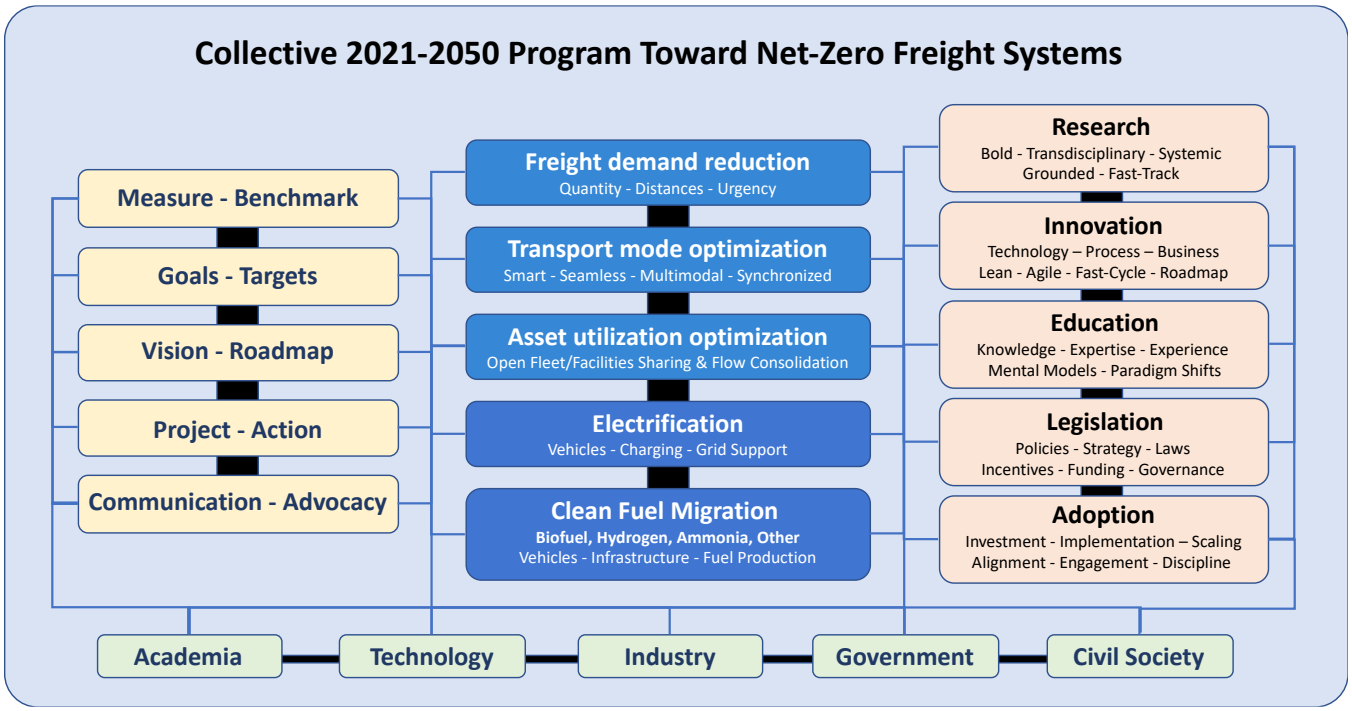


We thus address the grand challenge of achieving Net Zero Freight Systems by simultaneously addressing Freight Emissions Technology and Freight Systems Design. Freight Emissions Technology addresses the fuels and vehicles, while Freight Systems Design addresses the effectiveness of material movement systems. By combining academic, technology, industry, governmental, and civil society efforts across these threads, we will work to identify and amplify priority improvement opportunities, provide visions, pathways, options and analysis to decision makers and the public, and track progress over time.

NET ZERO FREIGHT SYSTEM PROGRAM OVERVIEW

Synthesized in the diagram below, Georgia Tech's Net Zero Freight System Program is a comprehensive collective endeavor of research, innovation, education, legislation, and adoption by academia, technologists, industry, government, and civil society, toward reaching net zero carbon emissions. The goal for these activities is to enable achieving order-of-magnitude improvements in terms of freight demand reduction, transport mode optimization, asset utilization optimization, electrification, and clean fuel migration, that jointly lead to net zero freight systems.

Over the duration of the program, Georgia Tech and stakeholders are to engage in measuring and benchmarking life-cycle emissions and approaches; setting, tracking, and adapting performance and capability goals and targets; co-creating visions for comprehensively and effectively addressing the challenge, and developing, tracking, and adapting a roadmap from the current state to the net zero state; develop, steer, realize projects and actions, and assess their impact; as well as communicating and advocating the challenge, the vision, the progress, and the need for engagement.



Georgia Tech's contribution to this program combines leadership, research, innovation, education, and outreach to the key stakeholders and society at large. Georgia Tech is further to focus on reaching net zero carbon emissions for U.S. freight transportation and logistics, with a special focus on the US southeast. The overarching goal is to support the US southeast, and the nation, in reaching net zero emissions from freight transportation and logistics by the year 2050, and to become a worldwide role model in doing so.

The research program includes deep cross-technology evaluations for low carbon fuels and infrastructure, road mapping the industrial development for producing resilient, socially beneficial low carbon fuels and freight systems in the southeast, quantifying system level opportunities for freight transport reduction and transport operations efficiency, and tracking progress over time.

The educational program creates, and steers the large-scale adoption of, learning modules and educational curriculum for engineers, managers, planners, and analysts so they are workforce-ready to impactfully contribute to implementing net zero carbon freight systems, supply chains, and energy systems that are concurrently efficient, resilient, and socially beneficial. We particularly aim to leverage the net zero freight system program to launch a new educational program in Sustainable Systems Engineering.

The outreach program provides data, analysis, assessments, testimony, and evaluation of public and private sector initiatives, covering technologies, business strategies, operating models, infrastructure needs, and policy options. The audience of stakeholders in the state of Georgia, the US southeast, and the nation includes industrial leadership, policy makers, entrepreneurs, students, and the general public.

Georgia Tech's overall program shares key alignments and shines with complementarities in regard of the program recently introduced in Europe by the Alliance for Logistics Innovation through Collaboration in Europe (ALICE). We at Georgia Tech have a long history of collaboration with the ALICE leadership. For example, ALICE has adopted the Physical Internet, introduced by Professor Montreuil, as a strategic vision for guiding the evolution of supply chains, logistics, and freight transportation on the pathway toward zero-emission by 2050. We strongly believe and are engaged in global collaboration toward achieving the net-zero goal, and will ensure that the program is nurished by this collaboration, and proves to be a strong contributor.

INVESTIGATION THREADS

FREIGHT EMISSIONS TECHNOLOGY

The research program will include deep cross-technology evaluations for low carbon fuels and infrastructure, roadmapping the industrial development for producing low carbon fuels and freight systems in the southeast, quantifying system level opportunities for freight transport reduction and transport operations efficiency, and tracking progress over time.

- Electrification is already cost effective for urban delivery trucks, and can expand to medium and some long-haul trucking.
- Biomass can fully supply hard-to-electrify transportation: aviation, maritime and rail; doing so will use 75% of US sustainable biomass resources.
- Hydrogen technologies can develop to support long-haul trucking.
- Carbon capture from air can also make freight transport fuels.
- Meeting the net zero freight challenge will require transformative efficiencies in freight management, and development of new industries and infrastructure.

We will develop comprehensive net zero freight transport system assessments, focusing on the southeast, that link to national and global level net zero carbon plans.

Net zero emission means zero emissions of greenhouse gases, without offsets. Social benefits metrics will include employment, equity, service provided by delivered freight, and community impacts of new infrastructure. Environmental impacts will include a broad range of air, water, and land impacts. Resilience addresses system robustness, capability, and flexibility.

Research will be targeted to support infrastructure and policy decisions and to inform stakeholders and the public.

FREIGHT SYSTEMS DESIGN

A key focus of the Freight Systems Design thread is moving the world of freight movement from emissions-intense movements across lowly-connected dedicated point-to-point and hub-and-spoke freight systems toward low-emissions movements across resilient hyperconnected[1] freight systems in line with the emerging Physical Internet introduced by Prof. Montreuil [2].

Large-scale simulation and optimization experiments have resulted in potentiality assessment of overall induced greenhouse gas emission reductions of 20-30% with hyperconnected transportation, 20-30% with hyperconnected distribution, and 40-60% combined hyperconnected transportation and distribution, without accounting for breakthroughs in automation and robotization, and in vehicle energy efficiency and emission reduction. They achieve such high performance while offering better service capability, better quality of life for operators (truckers, handlers, etc.), better resilience, and better compatibility with the e-commerce induced omnichannel supply chains.[3]

In various phases of investigation, experimentation, and adoption across the world, this emerging type of system enables seamless open asset sharing and flow consolidation across supply through standardized encapsulation, modularization, protocols, and interfaces. Ultimately, it relies on interconnected mesh networks with modular carriers flowing freight in modular containers between open-access logistics hubs and deployment centers distributed in multiple tiers across the territory. Both the users of the freight systems, and those who provide the services enacting the freight systems, are leveraging global monitoring systems for ubiquitous tracking and tracing, and overall supply chain visibility; open digital transactional

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[1] *Hyperconnectivity stems from having the system components intensely interconnected on multiple layers, namely digital, physical, operational, business, legal, and personal, ultimately anytime, anywhere.*

[2] *Montreuil B. (2011). Towards a Physical Internet: Meeting the Global Logistics Sustainability Grand Challenge, Logistics Research, Vol. 3, No. 2-3, p. 71-87. https://doi.org/10.1007/s12159-011-0045-x*
Montreuil B. (2013). Introducing the Physical Internet, TEDx Bucharest, http://www.youtube.com/watch?v=H2taJUbYUZQ&feature=youtu.be
Montreuil B. (2020). The Physical Internet: Shaping a Global Hyperconnected Logistics Infrastructure, IPIC 2020 International Physical Internet Conference, Shenzhen, China, 2020/11/18, Keynote Speaker, https://www.picenter.gatech.edu/sites/default/files/ipic2020-keynotehyperconnectedlogisticsinfrastructure_20201116_web.pdf
Montreuil B. (2021). The Physical Internet: Origin, Progress, and Projection, 2021 Physical Internet Symposium, Tokyo, Japan, 2021/01/21, Keynote Speaker, https://www.picenter.gatech.edu/node/658

3 As examples, refer to Ballot, É, B. Montreuil, R.D. Meller (2014), The Physical Internet: The Network of Logistics Networks, (English language adaptation of Ballot & Montreuil (2014)), La Documentation Française, Paris, France, 205p.
Hakimi D., B. Montreuil & A. Hajji (2015). Simulating Physical Internet Enabled Hyperconnected Semi-Trailer Transportation Systems, 2nd International Physical Internet Conference, Paris, France, 2015/07/06-08, 11 p.
Kim, N., B. Montreuil, W. Klibi, N. Kholgade (2020). Hyperconnected Urban Fulfillment and Delivery, Transportation Research Part E Logistics and Transportation Review, Vol. 145, 23p. https://doi.org/10.1016/j.tre.2020.102104

platforms; smart data-driven analytics, optimization, and simulation capabilities supporting operational, tactical, and strategic decisions.

Key assets of hyperconnected freight systems include logistic hub, deployment centers, modular containers, and modular carriers.

- **Logistic hubs** act as proximity origin-destination and longer-haul inter-hub connections. They enable seamless, efficient, fast and safe decoupling, transshipment, crossdocking, and consolidation. They enable short circuits getting truckers back home daily if they so desire. They enable to concurrently perform energy fueling or battery swapping/charging.
- **Deployment centers** allow to pre-position short-stay goods near markets to enable convenient customer delivery with minimal distance, time, and emissions. Their open access allows highly distributed deployment as pertinent, with much more capability than achievable by individual companies or small groups of companies. They alternatively enable locating long-stay anticipatory, smoothing, and stockpiling inventory in locations inducing low emissions.
- **Modular containers** act as private nests for goods in open public spaces, notably carriers and facilities. They are openly flowing across multi-party supply chains, industries, and territories. From small tote size to maritime intermodal container size, they shape an evolution from the cases and pallets, extending and improving containerization to encompass packaging, handling, and transport containers. They are easy to handle, store, condition, and transport; they are smart and connected; and they are eco-friendly, being light, reusable, recyclable, and having a minimal off-service footprint.
- **Modular carriers** must be well adapted to modular goods containerization, seamless multi-modal inter-hub operations. Each carrier is to ease loading, transporting, and unloading containerized multi-party freight; maximizing space utilization and freight protection; and interconnecting with other modes. Fleets should allow adapting to shipping volume and weight, through different carrier sizes, such as different combinations of tractors and trailers.

This exemplifies the type of freight systems design research, innovation, implementation, and adoption that is required to meet the net-zero freight systems challenge. This enables fast successes paving the way to a roadmap of more transformative and impactful actions. Even though applicable generically across the world, our research program is anchored in the US Southeast that has a strong potential for worldwide leadership in this endeavor.

The Freight Systems we address in this program are those associated with all physical goods movement at all levels, yet with a focused emphasis:

- Global: emphasis on import/ export oriented intercontinental flows;
- Continental: emphasis on the USA, connections with Canada and Mexico;
- Regional: emphasis on US Southeast, its key industries & inter-region connections;
- Facility: emphasis on logistic hubs, ports, and deployment centers.

RESEARCH AND INNOVATION CONDUCT

Research and Innovation activities takes place through a teaming of faculty, research scientists, PhD students, masters students, and research partners with other universities, industry, and government organizations.

An interdisciplinary approach is taken throughout the research threads. From Georgia Tech, researchers come from the College of Engineering, Ivan Allen College of Liberal Arts, College of Science, College of Design, and the Scheller College of Business. Likewise, industry and NGO partners bring an array of capabilities, challenges, and resources to the table.

Several historic logistics operating model paradigms must be broken to achieve the desired innovation culture and societal gains in quality of life. These paradigms include reliance on company-specific logistics infrastructure and use of relatively simple (and suboptimal) transportation and routing mechanisms. Accordingly, a key unique characteristic of the Net Zero Freight Systems Program is that substantial focus is placed on the use of multi-party/consortium research, innovation, and application programs, so to investigate and exploit new paradigms such as the Physical Internet and its hyperconnected supply chains and logistic systems.

EDUCATION

We aim to establish Sustainable Systems Engineering at the Georgia Institute of Technology, to serve as a model for engineering education to reach net zero emissions. The program will ensure that supply chain engineers have the knowledge, capability and skills to implement and innovate for net zero carbon supply chains and energy systems over the course of their careers.

The program, courses, and modules established at Georgia Tech will serve as a model for national and international adoption.

Building on the student-initiated Macro-Energy Systems Coalition at Georgia Tech, Stanford, Princeton, and other leading universities, the program will provide a model that can be adapted nationally and internationally at diverse institutions, focusing on undergraduate and masters' students. A PhD level program will also train a select cohort of PhD students for careers in net zero supply chain innovation.

OUTREACH, INCLUSION, AND IMPLEMENTATION

The entire program prioritizes outreach, inclusion and support for implementation. Program establishment will begin with discussions with colleagues at colleges and universities in Atlanta, including leading HBCUs, and will work closely with the soon-to-be-launched *Center for Academics, Success, and Equity (CASE)* at Georgia Tech.

The outreach program provides data, analysis, assessments, testimony, and evaluation of public and private sector initiatives. Outreach will cover technologies, business strategies, infrastructure needs, and policy options.

The community of stakeholders in the state of Georgia, the US southeast, and the nation includes industrial leadership, policy makers, entrepreneurs, students, and the general public.

To continually ensure a diverse participation and inclusion throughout the program, an advisory board will be established with representation from key constituencies internally and externally:

> Georgia Tech: faculty and graduate students from multiple disciplines/colleges/centers
>
> External: industry, government, and community partners, and researchers from other colleges and universities.

The board will meet a minimum of twice a year to provide input to program direction, progress, and findings.

Mechanisms used for inclusion include: Early discussions across stakeholder organizations and with key faculty at local colleges and universities; leveraging of our existing network to engage them in helping to grow the collective, and engaging others in taking leadership role in the colletive.

Mechanisms used for outreach include: Presentations and testimony for decision-makers and policy-makers; Online and Classroom Courses, Seminars, Webinars, Workshops, and Conferences. Additionally, publishing through a wide range of academic and industry journals will be conducted. Educational Programming for outreach will include the multitude of learning and communicating mechanisms now available and the distinct needs of differing constituencies.

Beyond what we can do at Georgia Tech, we envision a collective effort across the freight transport, logistics, supply chain, small business, and community stakeholders. Industry leader and stakeholder workshops will be conducted to help drive consensus on approaches leading to net zero freight systems, and to develop ongoing working relationships needed to achieve resilient, socially beneficial net zero freight systems. Supporting this broader collective is core to the success of the Georgia Tech program.

PROGRAM TIMING

The planning horizon for the Net Zero Freight Systems Progam is three years. The program is anticipated to launch in early 2022, leveraging several existing research and education threads dealing with greenhouse gas emissions reduction and the science and engineering behind freight movement.

The program will raise funds through government grants, industry sponsorships, forum memberships, and other mechanisms to continue on an ongoing basis until achieving the net zero goal.

PROGRAM FUNDING

The Georgia Tech team is seeking funding totaling $2.9 million to support the Net Zero Freight Systems Program over the three-year planning horizon.

The anticipated program funding needs by component are:

Research Faculty/Scientists/Support Personnel	$ 980k
Graduate Student Research Teams (including tuition support)	$ 1,600k
Travel	$ 150k
Materials/Computing/Databases/Publication	$ 170k

As Audi CO2 Cy Pres Settlement Funds would be a donation, Georgia Tech would not apply standard indirect costs, so funds are to be directly used to move forward the Net Zero Freight Systems program.

PROGRAM LEADERS

Homed in Georgia Tech's Suppply Chain and Logistics Institute, the Net Zero Freight System Program is engaging multiple units of Georgia Tech, each bringing different perspectives, skill sets, passions, and networks. The program is being co-led by Professors Benoit Montreuil and Valerie Thomas.

Benoit Montreuil

Professor, School of Industrial and Systems Engineering

Coca-Cola Material Handling & Distribution Chair

Director of the Supply Chain & Logistics Institute

Director of the Physical Internet Center

Dr. Montreuil is leading the International Physical Internet Initiative, engaging academic, industry and government leaders worldwide into research and innovation projects on smart, hyperconnected, resilient, and sustainable logistics, supply chains, transportation, businesses, and regions.

His main research interests generically lie in developing concepts, methodologies and technologies for creating, optimizing, transforming and enabling businesses, supply chains and value creation networks to thrive in a fast evolving hyperconnected world.

He stands at the crossroads of industrial and systems engineering; operations research; computer sciences; operations, logistics, supply chain, strategic management; and sustainability science. His research builds mostly on a synthesis of optimization modeling and mathematical programming, discrete & agent-based simulation modeling, systems science & design theory.

He has vast experience in collaborative research and innovation with industry and regions, notably with leaders such as Americold, BRP, Cisco Systems, Inland Empire, Mercedes, MiTek, Nissan, Procter & Gamble, SF Express, The Home Depot, and UPS.

Dr. Montreuil received a bachelor's degree in industrial engineering from Université du Québec à Trois-Rivières and a master and a Ph.D. in Industrial Engineering from Georgia Tech. After serving on the industrial engineering faculty of UQTR and Purdue University, from 1988 to 2014 he was a Professor of operations and decisions systems in the faculty of Business Administration at Université Laval in Quebec City, Canada.

Valerie Thomas

Professor, School of Industrial and Systems Engineering, and School of Public Policy

Anderson-Interface Chair of Natural Systems

Dr. Thomas's research interests are energy and materials efficiency, sustainability, industrial ecology, technology assessment, international security, and science and technology policy. Current research projects include the environmental impacts of biofuels, and electricity system development.

Dr. Thomas currently chairs the US National Academy's study on *Current Methods for Life Cycle Analyses of Low-Carbon Transportation Fuels in the United States*, a study sponsored by Breakthrough Energy.

From 2013 to 2019, she served on the DOE/USDA Biomass Research and Development Technical Advisory Committee. From 2004 to 2005, she was the American Physical Society Congressional Science Fellow, serving in the legislative office of Rep. Rush Holt. Dr. Thomas was a Member of the U.S. EPA Science Advisory Board from 2003 to 2009. She is a Fellow of the American Association for the Advancement of Science, and of the American Physical Society.

From 1986 to 1989, she was a post-doctoral Research Fellow at the Department of Engineering and Public Policy at Carnegie Mellon University. From 1989 to 2004, she was a Research Scientist at Princeton University, in the Princeton Environmental Institute and in the Center for Energy and Environmental Studies, and was a Lecturer in the Woodrow Wilson School of Public and International Affairs.

Dr. Thomas received a B. A. in physics from Swarthmore College and a Ph.D. in theoretical physics from Cornell University.

ABOUT GEORGIA TECH

The Georgia Institute of Technology is a top 10 public research university with over 40,000 students who study in person at the main campus in Atlanta, at Georgia Tech-Lorraine in France, at Georgia Tech-Shenzhen in China, as well as through distance and online learning. Students represent 50 states and 149 countries.

Tech's engineering and computing Colleges are the largest and among the highest-ranked in the nation. The Institute also offers outstanding programs in business, design, liberal arts, and sciences.

With more than $1 billion annually in research awards across all six Colleges and the Georgia Tech Research Institute (GTRI), Georgia Tech is among the nation's most research-intensive universities. It is an engine of economic development for the state of Georgia, the Southeast, and the nation.

Georgia Tech's mission is to develop leaders who advance technology and improve the human condition. Its mission and strategic plan are focused on making a positive impact in the lives of people everywhere.

For more than 135 years, the people of Georgia Tech have dared to imagine and then create solutions for a better future. The innovative culture and leadership continue, for Progress and Service for all.

RANKINGS

Academic Excellence

Georgia Tech is ranked #4 in Best Undergraduate Engineering Programs. All of our graduate engineering programs rank in the top 10. (Source: U.S. News & World Report)

Scheller College of Business ranks #19 in Undergraduate Business Programs and #17 for their Part-Time MBA (Source: U.S. News & World Report). Scheller is also ranked #4 in the U.S. and #15 in the world on the Corporate Knights Better World MBA Ranking list.

Computer Science ranks #1 by U.S. News & World Report's Undergraduate Program Rankings, #8 by U.S. News & World Report's Graduate School Rankings and Times Higher Education World University Rankings, and #21 in The Guardian's QS World University Rankings.

In the category of Architecture and the Built Environment, Georgia Tech ranks #19 in The Guardian's QS World University Rankings, and our graduate urban planning program is ranked #7 in the U.S. by Planetizen.

Research Leadership

Georgia Tech is one of the South's largest industrial and engineering research agencies.

The Institute plays a leading role in the Georgia Research Alliance, a centerpiece of the state's economic development strategy.

Research is conducted for industry and government by the Georgia Tech Research Institute, various academic schools and departments, and more than 100 interdisciplinary research units.

U.S. News and World Report ranks us at #11 for Undergraduate Research/Creative Projects, and #19 for Senior Capstone Projects.

Diversity

The Institute is consistently rated among the top universities in the nation for graduation of underrepresented minorities in engineering, physical sciences, and architecture and planning.

With more than 60 chartered student organizations exploring religious, racial, sexual, and ethnic identity (but open to all), our students find a way to celebrate, strengthen, and share their part of the robust cultural melting pot that thrives in our community.

Innovation & Entrepreneurship

Georgia Tech is ranked #4 in Most Innovative Schools by U.S. News & World Report.

The Advanced Technology Development Center (ATDC) is recognized by Forbes magazine as one of 12 incubators “changing the world.” Founded in 1980, ATDC is the oldest technology incubator in the U.S. with more than $2 billion raised by 150 graduates.

Georgia Tech Research Corporation is #32 on the list of Top 100 Worldwide Universities Granted U.S. Utility Patents.

U.S. News & World Report Rankings

Overall

#3 Co-op and Internship Programs

#4 Most Innovative Schools

#8 Top Public Universities

#11 Undergraduate Research / Creative Projects

#15 Best Colleges for Veterans

#19 Senior Capstone Projects

#24 Learning Communities

#35 National Universities

As of September 2020

Undergraduate

#4 Best Undergraduate Engineering Program

- #1 Civil Engineering
- #1 Industrial / Systems Manufacturing Engineering
- #2 Aerospace / Aeronautical / Astronautical Engineering
- #2 Biomedical Engineering
- #2 Chemical Engineering
- #2 Mechanical Engineering
- #4 Electrical / Electronic / Communications Engineering
- #4 Environmental / Environmental Health Engineering
- #4 Materials Science & Engineering
- #5 Computer Engineering

#5 Best Computer Science Program

- #1 Cybersecurity
- #2 Software Engineering

Graduate

#8 Best Graduate Engineering School

- #1 Industrial Engineering
- #2 Biomedical Engineering
- #2 Civil Engineering
- #4 Aerospace Engineering
- #4 Chemical Engineering
- #5 Mechanical Engineering
- #5 Computer Engineering
- #5 Electrical Engineering
- #6 Environmental Engineering
- #6 Nuclear Engineering
- #7 Materials Science & Engineering

#8 Best Computer Science Graduate Program

- #7 Artificial Intelligence
- #9 Theory
- #10 Systems
- #16 Programming Language

Diverse Magazine "Producers of Minority Degrees" Rankings

Bachelor's

Engineering

- #1 Total Minority
- #1 African-American
- #2 Two or More Races
- #3 Asian-American

Computer and Information Sciences

- #9 Asian-American
- #10 Two or More Races

Top 100 Producers of Bachelor's Degrees, 2019

Master's

Architecture and Related Services

- #3 African-American
- #9 Total Minority
- #12 Asian-American

Computer and Information Sciences and Support Services

- #1 Asian-American
- #2 Two or More Races
- #2 Total Minority
- #4 Hispanic

Engineering

- #1 Two or More Races
- #1 Total Minority
- #6 Asian-American
- #8 African-American

Top 100 Producers of Graduate Degrees - Master's, 2019

Doctorate

Architecture and Related Services

- #3 African-American
- #5 Asian-American
- #8 Total Minority

Business Administration, Management, and Operations

- #11 Asian-American

Computer and Information Sciences, and Support Services

- #4 Two or More Races
- #4 Hispanic
- #6 Total Minority
- #7 African-American
- #9 Asian-American

Engineering

- #1 Native American
- #2 Two or More Races
- #2 Total Minority
- #3 Asian-American
- #5 Hispanic
- #9 African-American

Physical Sciences

- #1 African-American
- #12 Total Minority
- #15 Asian-American
- #15 Hispanic

GEORGIA TECH UNITS: NET ZERO PROGRAM RESOURCES

Georgia Tech has a wide range of resources that the Program Leaders will call upon to achieve the objectives of the Net Zero Freight Systems Program. The key units that may be involved are noted below with a one-page summary of each unit following.

- **SUPPLY CHAIN AND LOGISTICS INSTITUTE**
- **PHYSICAL INTERNET CENTER**
- **STRATEGIC ENERGY INSTITUTE**
- **SMART CITIES AND INCLUSIVE INNOVATION CENTER**
- **CENTER FOR QUALITY REGIONAL DEVELOPMENT**
- **STEWART SCHOOL OF INDUSTRIAL AND SYSTEMS ENGINEERING**
- **SOCIALLY AWARE MOBILITY LAB**
- **BROOK BYERS SUSTAINABILITY CENTER**
- **ENTERPRISE INNOVATION INSTITUTE**

SUPPLY CHAIN & LOGISTICS INSTITUTE

https://scl.gatech.edu

The Georgia Tech Supply Chain & Logistics Institute (SCL) is the largest supply chain and logistics leadership institute in the world providing comprehensive research, education, and outreach programs. For more than thirty years, SCL has been a world leader across a broad range of supply chain and logistics domains. In recent years, it has been uplifted to be one of the first interdisciplinary research centers of Georgia Tech.

SCL Mission: To enable supply chain professionals, businesses and governments to transform complex supply chains and trade corridors toward improving supply chain, logistics, and freight transportation performance by providing education, innovation and solutions for global and domestic supply chains.

Benoit Montreuil
Coca-Cola Material Handling & Distribution Chair and Professor and Director, Supply Chain and Logistics Institute

Timothy Brown
Managing Director for Supply Chain and Logistics Institute

PHYSICAL INTERNET CENTER

https://www.picenter.gatech.edu/

Affiliated to SCL, the Physical Internet (PI) Center is key to the Net Zero program, with its research focus on transforming the way physical objects are moved, stored, realized, supplied and used, pursuing order-of-magnitude improvements in global logistics, supply chain and freight transportation efficiency, capability, resilience, and sustainability.

With a core team of 20+ doctoral students, the PI Center performs research on (1) novel Physical Internet oriented concepts and frameworks, for example on hyperconnected urban logistics and hyperconnected omnichannel supply chains; (2) potentiality assessment of Physical Internet and hyperconnected logistics, transportation, and supply chains through analytical, optimization and/or simulation, relative to impact on efficiency, capability, resilience, and sustainability; (3) technology oriented research, bridging the gap toward more potent Physical Internet solutions, for example with new logistic hub technologies, new protocols for container routing and parcel consolisation, hyperconnected mesh network design technologies; and (4) empirical validation research through field or virtual pilot testing, case studies, and living labs.

Benoit Montreuil

Professor and Director,
Physical Internet Center

Data rich and computing intensive collaborative research is conducted with industry collaborators such as Americold, BRP, Cisco Systems, Inland Empire, Mercedes, MiTek, Nissan, Procter & Gamble, SF Express, South Shore Industries, The Home Depot, and UPS.

The researchers of the PI Center are leveraging technologies available in the PI Lab and in the SIReN Lab on Sentient Immersive Response Networks, including computing and storage server networks, cloud connectivity, control tower oriented graphical user interfaces, and virtual reality technologies, as well as a variety of analytics, optimization, simulation, and digital twin software.

STRATEGIC ENERGY INSTITUTE

https://research.gatech.edu/energy

Founded in 2004, the Strategic Energy Institute (SEI) serves as system integrator for the more than 1000 campus researchers working across the entire energy value chain. We are deeply engaged in building community, developing resources, and projecting thought leadership, all with the aim of marshalling the full resources of Georgia Tech around tackling the tough energy and environmental problems society faces.

As the nation's largest technologically focused university, Georgia Tech is playing an integral role in developing the technologies that are enabling more equitable, lower cost, and cleaner generation, storage, distribution, and utilization of energy. Researchers at Georgia Tech are not just helping to create cleaner, more efficient fuel options or mitigate the environmental impact of conventional energy supplies, they are creating better performing, more economically viable energy options.

Specific SEI affiliate labs bringing relevant capabilities to the Emissions Reduction and Remission Program include:

- Carbon Neutral Energy Solutions Laboratory (CNES)
- Ben T. Zinn Combustion Laboratory
- Climate and Energy Policy Lab (CEPL)
- Direct Air Capture Center (DirACC)
- Energy Policy and Innovation Center (EPICenter)

SMART CITIES AND INCLUSIVE INNOVATION CENTER

Home | Smart Cities and Inclusive Innovation (gatech.edu)

Georgia Tech's initiative on Smart Cities and Inclusive Innovation (SCI2) develops innovative approaches to shaping resilient and sustainable communities. Through research and development, strategic partnerships, and cutting-edge programming we bring Georgia Tech's interdisciplinary expertise in technology and policy to the development of smart cities and communities.

SCI2 serves as a focal point for interaction with external and internal partners to deliver innovative, real-world solutions in building resilient and sustainable communities.

SCI2's goal is to provide communities of any size with applied, multidisciplinary research on the most challenging, complex civic and societal issues.

Empowered Communities

Engaged Students

Strategic Alliance

Thought Leadership

Debra Lam

Executive Director - Partnership for Inclusive Innovation

Managing Director - Smart Cities and Inclusive Innovation

CENTER FOR QUALITY GROWTH AND REGIONAL DEVELOPMENT

CQGRD Homepage | Center for Quality Growth and Regional Development (gatech.edu)

CQGRD conducts research related to five program areas: Air Quality and the Natural Environment; Community Design; Healthy Places; Land Development and Regional Governance; and Transportation and Infrastructure. Our research team has expertise that spans each of these and related program areas. This allows us to address many critical issues, develop state of the art approaches to problem solving, and deliver timely analyses and results.

We work with a variety of organizations to develop unique solutions to many emerging and current challenges and opportunities confronting the places in which we live.

CGQRD is proud to work with several partners to deliver a variety of educational and outreach programs. Through these collaborations CQGRD delivers programs designed to educate public officials, researchers, and the general public about important urban issues; promote social equity; and improve the practice of urban planning.

Catherine Ross

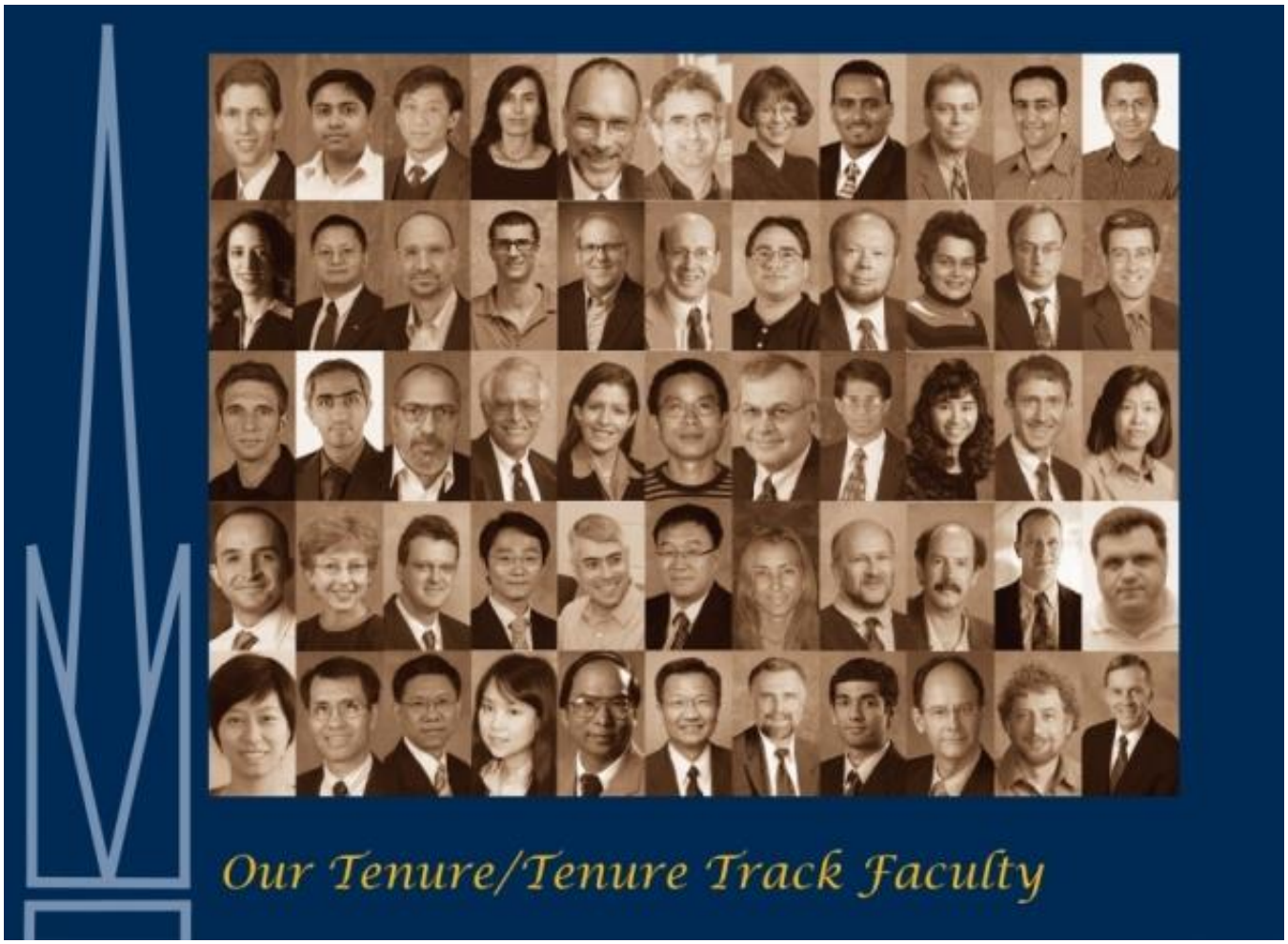
Director, Center for Quality Growth and Regional Development

STEWART SCHOOL OF INDUSTRIAL & SYSTEMS ENGINEERING

ISyE Home | ISyE | Georgia Institute of Technology | Atlanta, GA (gatech.edu)

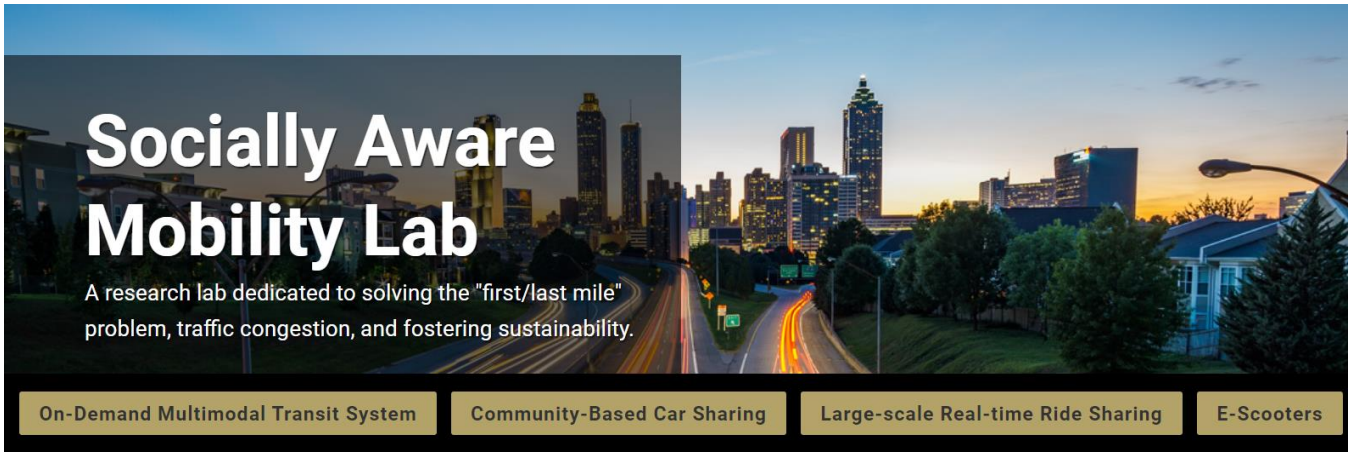
The Stewart School of Industrial & Systems Engineering (ISYE) is the largest program of its kind in the nation. ISYE has ranked #1 for 31 consecutive years and the undergraduate program has ranked #1 for 27 consecutive years.

ISYE is the home of Georgia Tech's world-class programs in topics such as: Operations Research, Analytics, Data Science, Systems Engineering, and Supply Chain Engineering.



SOCIALLY AWARE MOBILITY LAB

https://sam.isye.gatech.edu/



The Socially Aware Mobility project is poised to have tremendous impact on the metro Atlanta area, revolutionizing and modernizing the transit system for the 21st century. Funded in part by a grant by the National Science Foundation, the project aims to bring equitable accessibility, decrease congestion, and increase mobility to all users of the transportation system. Through optimization and machine learning, the project will create a scalable, On-Demand Multimodal Transit System (ODMTS) model, which will be validated through implementation in the Atlanta region. By providing solutions to increase mobility while simultaneously decreasing congestion, the project stands to have significant impact on the way we navigate around our community.

BROOK BYERS INSTITUTE FOR SUSTAINABLE SYSTEMS

About Us | BBISS | Georgia Institute of Technology | Atlanta, GA (gatech.edu)

The vision for the Brook Byers Institute for Sustainable Systems is to create knowledge and technologies that will improve environmental, social, and economic outcomes. The BBISS's approach is to holistically integrate the disciplines of science, engineering, social science, policy, planning, design and business into the institute's work.

While its interests span across a wide range of research problems, the BBISS is particularly focused on the emerging science of Gigatechnology. Gigatechnologies are the largest engineered systems that humans create: infrastructure, such as transportation networks, energy grids, water, sewer, and storm water systems, and food production and distribution systems.

Clean Air Research

The trend towards urbanization takes a toll on the quality of the air that city dwellers breathe. The fact that the majority of people now live in cities means that a huge proportion of the global population are living in airsheds where the air quality may pose health risks, at least for part of the year. Characterizing and understanding the scope of this problem is not only critical to making progress towards solutions, but helps people maintain their health by providing real-time information about the risks of poor air quality.

ENTERPRISE INNOVATION INSTITUTE

Home | Enterprise Innovation Institute at Georgia Tech (gatech.edu)

Enterprise Innovation Institute (EI2) is Georgia Tech's business outreach organization and serves as the primary vehicle to achieve Georgia Tech's goal of expanded local, regional, and global outreach.

EI2 is the nation's largest and most comprehensive university-based program of business and industry assistance, technology commercialization, and economic development. When compared to counterparts at other universities, EI2 is unique because we bring all of these areas of expertise into a single organization and are able to connect our clients to more than one program or service to meet your individual needs.

Reporting through the executive vice-president for research at Georgia Tech, EI2 serves startups, industry, the public sector, and students to help increase your bottom line, improve competitiveness, and positively impact the economy. In addition, EI2 provides connections to Georgia Tech's vast resources, including world-class research, state-of-the-art facilities, internationally recognized experts, and upper-echelon students.