

Graduate Studies

Transportation Systems Engineering

TRANSPORTATION SYSTEMS are the building blocks of modern society. Efficient and safe movement of information, people, goods, and services ensures a thriving economy and such mobility improves quality of life. However, transportation systems by their very nature also affect the environment through operations, construction, and maintenance of transportation facilities, and through the travel behaviors they encourage. The study of transportation therefore must not only focus on efficient and safe design and operations but also on the link between travel behavior, urban form, and environmental quality.

The transportation systems graduate program in the School of Civil and Environmental Engineering (CEE) at Georgia Tech provides in-depth of knowledge on the design and performance of transportation systems, encouraging students to add breadth to their education by understanding the environmental, institutional, and societal context in which these systems operate. The technical core courses include urban transportation planning, traffic engineering, design of highway and transit facilities, transportation administration, and statistical analysis. Students supplement these courses with technical electives and are encouraged to take courses from other academic units at Georgia Tech. Many students choose to enroll in the dual degree program in City Planning and Civil and Environmental Engineering.

UNIVERSITY TRANSPORTATION CENTER

Georgia Tech is home to a U.S. Department of Transportation (DOT) University Transportation Center (UTC). The UTC at Georgia Tech works with local, state, and regional agencies to provide leadership on research, education and technology transfer to address issues related to transportation system productivity (including all modes of passenger and freight travel), economic growth, and finance. The U.S. faces critical challenges to preserve and enhance its urban and regional transportation systems and its international goods movement infrastructure. With substantial increases in demand, these systems require both public and political attention, as well as consideration of innovative finance strategies.

The UTC is aligned with the Georgia Transportation Institute (GTI). GTI was originally established in 2000 as a focal point to coordinate transportation research in the State of Georgia. As such, GTI includes several partner universities within the state, and conducts research, development, education, and technology transfer pertaining to all forms of transportation. Working through the GTI, research sponsors are able to access all of the resources available within the Institute as well as other research institutions across the state. Georgia Tech conducts approximately \$6M in transportation-related research on an annual basis.

NATIONALLY RANKED

Georgia Institute of Technology is consistently the only technological university ranked in *U.S. News & World Report's* listing of America's top ten public universities. *U.S. News & World Report* also ranks Georgia Tech's graduate and undergraduate civil engineering programs as No. 3 in the nation. *Diverse: Issues in Higher Education* ranks Georgia Tech as No. 1 in engineering doctoral degrees awarded to minority students. The diversity and strength of these programs provide students with the unique opportunity to specialize in many areas of concentration. Environmental impacts, freight planning, intermodal transportation, geographic information systems, intersection operations, modal emissions modeling, infrastructure/asset management, traffic flow theory, and travel behavior analysis reflect the broad range of expertise among transportation systems faculty and researchers in the School. The faculty expects the graduates of the program to be well educated on the latest concepts and technologies in the transportation community.

ATLANTA AREA

Georgia Tech students work with some of the leading transportation researchers in the country, and Atlanta provides a living transportation laboratory. Students study first-hand what makes a good transportation system work. Frequent site visits to the Georgia DOT's Transportation Management Center, the world's busiest airport, intermodal freight yards, the transit control center, highway construction sites, and nearby ports bring students in direct contact with complex systems. Throughout the year, various activities are also organized by the local chapter of the Institute of Transportation Engineers (ITE). Recent outings include white water rafting in Tennessee, a picnic luncheon with representatives from a local consulting firms, and the faculty verses students pool tournament.



Transportation Systems Engineering Graduate Studies

RESEARCH

The transportation faculty in the School of Civil and Environmental Engineering is involved in a wide range of research topics. Recent projects include new planning methods for transportation investment, analysis of truck only toll lanes, enhanced methods for monitoring and modeling travel behavior, analysis of driver safety in the conversion of carpool to high-occupancy toll lanes, analysis of airline passenger behavior, application of advanced technologies in the transportation system, the development of new models for estimating vehicle emissions, improved concepts for intermodal transportation, sustainable development and transportation, application of geographic information systems in program management, and the development of decision support tools for infrastructure management. Many of these projects are interdisciplinary in nature and involve faculty and students from other academic programs. Research Facilities include a unique Traffic Signal Lab, Instrumented Vehicle Lab, and an Intelligent Transportation Systems (ITS) Laboratory.

SELECTED COURSES

- Computer-Aided Site Engineering & Road Design
- Construction Engineering Management
- Construction Safety and Health
- Discrete Choice Analysis
- Environmental Impact Analysis
- Freight Planning
- Geometric Design
- GIS in Transportation
- Infrastructure Management: IT Applications
- Infrastructure Systems
- Multimodal Transportation Systems
- Pavement Technology
- Project Front End Planning and Monitoring
- Signalized Intersections & Networks
- Simulation Models in Transportation
- Spatial Analysis
- Statistical Analysis of Travel Demand
- Traffic Engineering
- Traffic Flow Theory
- Transportation Administration & Policy Analysis
- Transportation Energy & Air Quality
- Transportation Energy Infrastructure Management
- Transit Systems Planning & Design
- Urban Transportation Planning



FACULTY

Adjo Amekudzi, PhD, Associate Professor

Civil infrastructure/asset management, infrastructure decision support systems, sustainable infrastructure systems.

Ioannis Brilakis, PhD, Assistant Professor

Computing and information technologies for the architecture, engineering, construction, and facilities management industries. Sensing and data collection for civil infrastructure development; visual pattern recognition for construction site multimedia data analysis, classification, retrieval and processing.

Laurie Garrow, PhD, Associate Professor

Travel behavior analysis, application and estimation of advanced discrete choice models, and airline passenger behavior.

Randall Guensler, PhD, Professor

Motor vehicle activity, instrumented vehicle deployment, transportation planning, vehicle emissions, air quality modeling, environmental impact assessment, and environmental policy analysis.

Michael P. Hunter, PhD, Associate Professor

Traffic operations and design, signal optimization, safety, and transportation simulation.

Jorge Laval, PhD, Assistant Professor

Traffic flow theory and simulation, freeway operations, queuing theory and network modeling.

John Z. Luh, PhD, PE, Adjunct Professor

Highway planning and design, freeway interchange planning and design, ITS design, traffic signal design, and traffic engineering.

John D. Leonard II, PhD, Associate Dean

Advanced technology applications, ITS, traffic operations, traffic engineering, traffic safety, computer simulation, network modeling, computer programming, and systems analysis.

Michael D. Meyer, PhD, PE, Professor

Transportation planning, multimodal evaluation, policy analysis, mass transit planning, institutional analysis and project implementation, public works economics and finance, environmental impact analysis, sustainable development, and engineering design.

Michael O. Rodgers, PhD, Adjunct Professor, GTRI Fellow and Principal Engineer, GTRI

Air quality and transportation, transportation modeling and simulation, mobile source emissions modeling, remote sensing of vehicle emissions, transportation statistics.

Frank Southworth, PhD, Principal Research Scientist

Freight and passenger transportation planning, public transit planning and evaluation, evacuation planning, land use transportation interaction and sustainable transportation systems, and transportation geography.

Jochen Teizer, PhD, Assistant Professor

Construction and infrastructure, laser range sensing, 3D modeling, RFID and wireless resource tracking, real-time pro-active safety, project monitoring, information technologies and management.

Yichang James Tsai, PhD, PE, Associate Professor

Optimization of spatial sensing and information technology, GPS/GIS, image/laser sign processing, infrastructure/asset management, pavement technology, safety and security, and port logistics.

Kari E Watkins, PhD, PE Assistant Professor

Public transit planning and operations; complete streets design; mode choice decision-making; and information technology in transportation.

