NATIONAL CENTER FOR TRANSPORTATION SYSTEMS PRODUCTIVITY AND MANAGEMENT

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GEORGIA INSTITUTE OF TECHNOLOGY FLORIDA INTERNATIONAL UNIVERSITY UNIVERSITY OF ALABAMA AT BIRMINGHAM UNIVERSITY OF CENTRAL FLORIDA

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he National Center for Transportation Systems Productivity and Management (NCTSPM) is a Tier 1 University Transportation Center (UTC) sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration.

CONSORTIUM PARTNERS

Georgia Institute of Technology Georgia Transportation Institute Florida International University University of Central Florida University of Alabama at Birmingham

This publication is a report of NCTSPM's transportation research, education and technology transfer activities for January 1, 2013 – December 31, 2013

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NCTSPM

Georgia Institute of Technology O. Lamar Allen Sustainable Education Building 788 Atlantic Drive Atlanta, GA 30332-0355 P 404-894-2236 F 404-894-2278 nctspm@ce.gatech.edu

CREDITS

Editor: Audrey F. Leous Contributing Writer: Breanna Poteet Design & Layout: Jess Hunt, Audrey F. Leous

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Faculty at: Georgia Institute of Technology, Florida International University, the University of Central Florida, and the University of Alabama, Birmingham contributed to the content of this report.

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U ur country's transportation system is truly a national treasure, built on decades of investments from local, regional, and national entities. We should be proud not only of the unprecedented levels of mobility achieved but of the impact it has had on the economic health and the quality-of-life enjoyed by all citizens.

But we must not sit back and live off the efforts of the past. Future generations will not be able to enjoy the many benefits of our transportation infrastructure if the pressing issues of today are not addressed: persistent shortfalls in funding and transportation

workforce capacity, space for infrastructure, and social and political capital. In such a constrained resource environment, achieving meaningful and measurable improvements to the transportation system is ultimately about answering three questions:

- · How do we get most out of the existing transportation systems?
- · How should we build for the future?
- · How should we balance our available resources between the questions above?

To answer these questions, NCTSPM is supporting research, education and training to improve the productivity and management of the U.S. transportation system.

NCTSPM research projects cover a variety of topics: the economic impact of variable message signs to mega-region impacts; reducing state DOT's operating and maintenance costs; contributing to infrastructure health and longevity; and improving performance measurement, data usage, and adoption of new technologies.

NCTSPM also invests heavily in outreach, technology transfer, and workforce development initiatives. In 2013, NCTSPM sponsored research symposia, conferences, workshops, and seminars. These events touched not only NCTSPM researchers and students but elected officials and transportation professionals in the public and private sectors as well.

Education is key to our efforts. Students at each of the universities at NCTSPM are receiving financial assistance to invest in their education and gaining valuable knowledge through direct experience on research projects. They are also benefiting from internships supported by NCTSPM, as well as networking and presenting their work at conferences. K-12 initiatives expose younger students to the field of civil engineering as well as broader STEM initiatives.

Looking ahead to 2014, NCTSPM will continue to sponsor similar events, educational opportunities, and research efforts. In so doing, we will address the challenges currently facing the transportation field while also creating the tools we need to manage future innovation and success. We invite you to join us in this mission.

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Michael P. Hunter Director, NCTSPM





The National Center Program seeks to harness the power of the outstanding universities of the United States to tackle one of the most difficult and important issues of our time: how to have a better, smarter, and more cost-efficient transportation system. The current federal legislation, MAP-21, § 514, sets as a primary goal the *"enhancement of surface transportation efficiency. . . to enable existing facilities to meet a significant portion of future transportation needs. . . ."* In a nutshell, how can we do more with what we have already invested and how can we manage the system to have accountability and

measurement of success? The National Center for Transportation Systems Productivity and Management is a key part of that important effort.

Thanks to the excellent and tireless efforts of Director Michael Hunter, the Deputy Directors, Michael Rodgers and Catherine Ross, and the support and hard work of so many talented professionals in universities across the nation who perform the important work of the Center, we have already become a leader in the nation in transportation research and study. In 2012 we were selected as one of the 10 "Tier 1" national centers, and continue to be a strong part of major university consortia throughout the Southeast and nation. Our stated goals in these programs were to improve "transportation systems" performance and management, including addressing the critical interactions between safety, infrastructure and services, and economic competitiveness." We are thankful for support from the beginning in those efforts by Georgia Tech and other great universities and their leaders, by federal, state and local transportation leaders and agencies, and by private supporters such as the Robert W. Woodruff Foundation.

A key focus of all of our projects is to improve the productivity and management of the United States' transportation system in an accountable and measurable way. Thanks to all of you, the National Center for Transportation Systems Productivity and Management has been a great success, and looks forward to a bright future.

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F. T. Davis, Jr. *Chairman, Board of Advisors*

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NCTSPM

The National Center for Transportation Systems Productivity and Management (NCTSPM) is a National University Transportation Center (UTC) funded by the US Department of Transportation (USDOT) Research and Innovative Technology Administration (RITA) in cooperation with the Departments of Transportation of Georgia, Florida, and Alabama.

The scope of the Center program in research, education, and technology transfer is multi-modal, multi-disciplinary, multi-sector, and needs driven. The theme of NCTSPM is transportation systems performance and management, and its focus is on addressing critical interactions between safety, state-of-good-repair, and economic competiveness. NCTSPM supports transportation-related research, education, workforce development, and technology transfer. It disseminates research results and other products of the Center to the transportation community and actively explores international cooperative activities with research entities in selected countries where similar research interests exist.

J.S. Department of Transportation Research and Innovative Technology Administration (UTC Program Office)

NCTSPM Director's Office

Advisory Board Tread Davis, Chair Kenneth Stewart, Liaison

Michael O. Rodg

NCTSPM Staff Audrey F. Leous, Program Administrator Jess Hunt, Senior Designer

University of Alabama at Birmingham Representative Fouad H. Fouad iversity of tral Florida resentative am Radwan

Florida International University Representative Georgia Institute of Technology Representative Catherine Ross

Georgia Transportation Institute Representative Michael Rodgers



Michael P. Hunter Georgia Institute of Technology NCTSPM Director



Michael O. Rodgers Georgia Institute of Technology NCTSPM Deputy Director



Catherine Ross Georgia Institute of Technology NCTSPM Deputy Director



Albert Gan Florida International University



Audrey F. Leous Research Scientist and Program Manager



Fouad H. Fouad

Alabama-Birmingham

University of

Essam Radwan University of Central Florida



Jess Hunt Senior Designer













FLORIDA INTERNATIONAL UNIVERSITY (FIU)

is a public research university in Miami, Florida. With a student body of nearly 50,000, FIU serves a large number of economically disadvantaged students. Nearly 50 percent of all undergraduate students at FIU receive financial aid, and nearly 60 percent of those recipients come from families with annual household incomes under \$30,000. FIU is the largest producer of Hispanic engineers in the continental United States. It is also home to The Lehman Center for Transportation Research (LCTR) established in 1993 to meet the transportation research, education, and training needs of the South Florida region.

GEORGIA INSTITUTE OF TECHNOLOGY (Georgia

Tech) is ranked seventh among U.S. News & World Report's top public universities and enrolls 21,000 students within its six colleges. Georgia Tech is the nation's leading producer of engineers as well as a leading producer of female and minority engineering Ph.D. graduates; it ranks among the nation's top ten universities (without a medical school) in research expenditures. Georgia Tech is home to the Center for Quality Growth and Regional Development, an applied research center created to help society achieve a sustainable, equitable, superior quality of life through effective planning, policy, and design.

GEORGIA TRANSPORTATION INSTITUTE (GTI),

a partnership between the Georgia Department of Transportation and participating Georgia universities, seeks to address today's real-world transportation challenges, focusing on issues critical to the state of Georgia. GTI universities actively participating in the NCTSPM currently include Georgia Tech, The University of Georgia, Mercer University, Georgia Southern University, Georgia State University, Southern Polytechnic State University, and Spelman College—the latter being a historically African American institution.

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

(UAB) offers an academic experience to nearly 18,000 students, fueled by innovative curricula, strong mentoring, and groundbreaking research and scholarship in a highly interdisciplinary environment. UAB is a member of the University Transportation Center for Alabama and is also home to the UAB Sustainable Smart Cities Research Center, which seeks to foster cross-disciplinary research and training, and to develop innovative solutions for sustainable smart cities and communities.

UNIVERSITY OF CENTRAL FLORIDA (UCF), situated

in the prime location of Orlando, offers opportunities in many fields that benefit students while they are in school, helping them land a career upon graduation. More than 56,000 students attend classes on UCF's main campus and its ten regional campuses, which are located throughout Central Florida. UCF houses the Center for Advanced Transportation Systems Simulation (CATSS). CATSS has a theme consisting of four core research focuses: Advance Intelligent Transportation Technologies and Communications, Traffic Safety, Simulation and Advanced Training for Transportation Applications, and Congestion Pricing.

OTHER PARTNERING ORGANIZATIONS

Georgia Department of Transportation Florida Department of Transportation Alabama Department of Transportation

OTHER COLLABORATORS

Morehead State University Saint Louis University



BOARD OF ADVISORS

The following are members of the NCTSPM Advisory Board:



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Photo not available George Overstreet Executive Board Member of the Alabama Trucking Association, Vice President of Operations



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Yvette Taylor Regional Administrator, FTA

he budget of the NCTSPM is more than \$14 million, with approximately \$6.9 million from the USDOT and more than \$7 million in matching funds from participating state DOTs, universities, local government agencies, and foundations. The following charts indicate the relative allocations to research, programmatic activities (e.g., technology transfer, education, workforce development), and administration. It is a primary goal of the NCTSPM, as a national university transportation center, to support high-quality, relevant research and critical national needs as well as serve as the training ground for the next generation of transportation professionals. As such, many of the research allocations indicated below represent financial support for graduate and undergraduate students at each of the participating institutions.



ALLOCATION ACROSS FUNCTIONS

- Research: 66%
- Programs: 27%
- Administration: 7%

Note: Center programs include technology transfer, outreach, education, and workforce development.



ALLOCATION ACROSS UNIVERSITIES

- Georgia Tech/GTI: 49%
- University of Alabama at Birmingham: 18%
- Florida International University: 17%
- University of Central Florida: 16%

Supporting research, education and training to improve the productivity and management of the U.S. transportation system.

NEWS AND ACCOMPLISHMENTS



Dr. Lawrence F. Kahn recently won the American Concrete Institute (ACI)'s 2013 Delmar L. Bloem Distinguished Service Award. A longtime member of the ACI, Kahn was recognized for his outstanding leadership of Committee 562, an ACI group which recently produced the first-ever standards to guide the evaluation, repair, and rehabilitation of concrete buildings.



Dr. Mohamed Abdel-Aty was appointed Chair of the Civil, Environmental, and Construction Engineering Department at the University of Central Florida. He was also selected to be the "Editor-in-Chief" of the Journal of Accident Analysis and Prevention, the premier journal in safety. *Photo courtesy Mohamed Abdel-Aty.*



Georgia Tech's **Dr. Kari Edison Watkins** was named to Mass Transit Magazine's 2013 40 Under 40 List, which honors professionals who have made significant contributions to the public transit industry.



INTERNATIONAL

NCTSPM is committed to exploring international cooperative activities with research entities in selected countries where similar research interests exist. The map below illustrates some of international collaboration being pursued by the researchers at NCTSPM.



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Essam Radwan (UCF) presented at International Association of Management of Technology (IAMOT)

Paris, France

Kari Watkins (GT) presented at the International Conference on Urban Transportation Systems (ICUTS)

Istanbul, Turkey

Essam Radwan (UCF) invited to speak at 2nd International Conference on Traffic and Logistic Engineering

Rome, Italy

Essam Radwan (UCF) invited to be keynote speaker at RSS2013 (Roadway Safety and Simulation) International Conference

Darmstdat, Germany

Vivek Ghosal (GT) presented at the Conference on Production, Logistics and Traffic: Dynamic Integration, Future Trends and Future Solutions Optimization

United Kingdom

Nasim Uddin (UAB) is using UTC funds to leverage an ongoing NSF collaboration on Bridge Weigh-in-Motion (WIM) Systems with universities in Ireland and the UK

London, England

Necati Catbas (UCF) invited to the inaugural Global Grand Challenges Summit

Shanghai, China Mohamed Abdel-Aty (UCF) organized and presented at the 2nd International Symposium on Traffic Safety at Tongji University

Changsha, China

Mohamed Abdel-Aty (UCF) conducted two seminars at Central South University (CSU)

Beijing, China
 Essam Radwan and
 Mohamed Abdel-Aty
 (UCF) presented at
 the Road Safety on
 4 Continents (RS4C)
 Conference

Tokyo, Japan Kari Watkins (GT) and Mohamed Abdel-Aty (UCF) presented at ITS World Congress

Beijing, China Essam Radwan

(UCF) delivered a fourday short course on traffic engineering and management at Beijing Jiatong University

FEATURED PROJECTS

ransportation systems are an important building block of a nation's economy. Just within the U.S., these systems provide accessibility and mobility for hundreds of millions of users as well as the means for transporting the goods that these users require. However, the U.S. is facing serious challenges in preserving and enhancing its transportation systems. To help address these challenges, the NCTSPM was established to conduct and support research, education, and technology transfer that improves the productivity and management of the U.S. transportation system, in an accountable and measurable way. From overarching projects to research focused on a single aspect of the transportation system, the center focuses on addressing the critical interactions between safety, economic competiveness, and the state-of-good-repair of the transportation system. We believe that dramatic improvements in the transportation system are likely if these interactions are better understood and significantly enhanced.

As an example, consider our nation's freight movements and the imminent expansion of the Panama Canal. The increased movement of goods brought about by this expansion will not only have significant impacts on the national economy, but also on the transportation system itself. If not properly anticipated, the increased freight movement demands on the highway system resulting from this expansion, or other sources, will likely result in increased congestion, reduced infrastructure lifespans (particularly bridges), an increased frequency of incidents, as well as other impacts. NCTSPM is actively investigating these issues.

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To better anticipate these impacts, NCTSPM is supporting the development of the information framework necessary to predict how increased port activity will affect regional transportation networks and identifying potential transportation policy implications through the project "A Megaregional Perspective of Freight Movement and Economic Competitiveness" (PI: Catherine Ross, Ph.D.). On the highway network, these anticipated increases in truck freight movements must be accommodated by increasing the number of trucks, truck weights, or a combination of both. All of these approaches are potentially detrimental to bridge longevity. The NCTSPM project "Impact and Feasibility Study of Solutions for Doubling Heavy Vehicles" (PI: Nasim Uddin, PE, F.ASCE) is exploring the impacts on bridge durability and longevity of meeting increasing freight demands through using a smaller number of heavier trucks.

A complementary study, "Next-Generation Wireless Bridge Weigh-in-Motion System Incorporated with Nondestructive Evaluation Capability for Transportation Infrastructure Safety" (PI: Yang Wang, Ph.D.) seeks to deliver a rapidly deployable, low-cost, and wireless system for a bridge weigh-in-motion (WIM) and nondestructive evaluation (NDE) system to directly examine bridge loading impacts in the field. Through innovative use of technology, the WIM functionality uses an existing bridge structure as a type of "weighing scale".

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In this way, overloaded vehicles that potentially endanger the safety of transportation infrastructure can be immediately identified and appropriate actions taken. As an additional benefit, the NDE technologies present in the sensor can assist in the long-term monitoring of crack or damage growth in critical structural members to allow DOTs to more effectively manage their bridge repair programs in an era of low and/or declining budgets.

Beyond freight movements, NCTSPM researchers are also exploring other innovative uses of technology to improve transportation system safety and operations. In "Integrating Safety in Developing a Variable Speed Limit System" (PI: Mohamed Abdel-Aty, Ph.D.) researchers are developing a freeway variable speed limit (VSL) system that incorporates traffic safety. Using state-of-art techniques in both traffic operations and safety, this innovative project is one of the first attempts to develop a VSL algorithm by combining a traffic flow prediction model with a real-time crash risk evaluation model. NCTSPM researchers are also exploring the interaction between safety and physical infrastructure. The project "Full-Scale Wall of Wind Testing of Variable Message Signs Structures to Develop Drag Coefficients for AASHTO Supports Specifications" (PI: Arindam Chowdhury, Ph.D.) is developing the information necessary to design Variable Message Sign support structures with smaller, lighter structural elements without jeopardizing the safety of these cornerstones of intelligent transportation system (ITS) infrastructure.

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"Full-Scale Wall of Wind Testing of Variable Message Signs Structures to Develop Drag Coefficients for AASHTO Supports Specifications". Photos courtesy D. Meyer.

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Increasingly critical to the successful interaction between safety, state of good repair, and economic competiveness, the critical elements of NCTSPM's mission, is information technology (IT). The transportation sector has experienced an IT revolution in all of these areas. NCTSPM research projects are being directed toward enhancing the nation's transportation system by giving transportation system managers and planners access to the timely and accurate information necessary to allow data-driven operations and management decision making. Drawing from the experience of practicing transportation professionals as well as principles applied and lessons learned in the healthcare, organizational management, and educational fields, the project "Evidence-Based Design Applications to Transportation Asset Management" (PI: Adjo Amekudzi, Ph.D.) is exploring the best ways to use evidence-based transportation asset management (EB-TAM) to demonstrate to practitioners and decision makers that a culture of documentation can add value to the business of performance-based decision making and understand the value of additional evidence.

In terms of timeliness, we at NCTSPM believe that the transportation sector is in the midst of a second IT-driven revolution - socially networked transportation (SNT) which operationalizes the functionality of social networks for the transportation sector. SNT leverages preexisting IT investments to realize new services and functions that significantly enhance mobility. In "Information Services in Social Networked Transportation" (PI: Kari Watkins, Ph.D., P.E.) the impact of integrating IT into existing infrastructure networks, combining research in social networking and transportation is being explored with a focus on information flow, the use of third party data, and connected vehicle safety standards at traffic management centers (TMCs). Furthering this work in "Mobile Technology Usage among the Transit-Riding Populace" (PI: Kari Watkins, Ph.D., P.E.) also seeks to understand how ITS is changing in a mobile data society, evaluating the need and evolution of data standards, and the risks and rewards of using nontraditional, outside data to improve public transit service.



"...NCTSPM is promoting an understanding of how the interactions and interrelationships among many factors dictate the success of a transportation system and how we can influence and manage these relationships to deliver reliable and efficient transportation both now and in the future."

The projects outlined on the preceding pages are only a fraction of the ongoing activities at NCTSPM aimed at both predicting and influencing our future transportation system. The interdisciplinary, collaborative research supported by NCTSPM is promoting an understanding of how the interactions and interrelationships among many factors dictate the success of a transportation system and how we can influence and manage these relationships to deliver reliable and efficient transportation both now and in the future.

"Information Services in Social Networked Transportation" and "Mobile Technology Usage among the Transit-Riding Populace"





n 2012, NCTSPM selected 22 research projects to receive funding. The following projects were initiated in 2012 and will be completed at various times throughout 2014.



Development of a Prototype Evidence-Based Database and Planning Tool: Applying Performance Management Principles in Asset Management Program Development

Principal Investigator: Adjo Amekudzi, Georgia Tech In this study, Dr. Amekudzi addresses uncertainties regarding transportation asset management (TAM) and explores difficulties regarding quantifying benefits of TAM systems. TAM is constantly evolving, rather than static in nature, and as such its benefits must be viewed in context. This research is developing an evidence-based planning tool and database to aid agencies in planning their asset management programs, and is doing so by applying an evidence-based design (EBD) framework. EBD designs or retrofits facilities with evidentially proven features in order to capitalize on observed benefits of these features. In the context of TAM, this involves evaluating the impacts of adopted tools on system performance.



Photo courtesy of Flickr user janoma.cl



Photo courtesy Virginia Sisiopiku Digital Advertising Billboards and Driver Distractions (UAB, FIU)

Principal Investigator: Virginia Sisiopiku, UAB In response to growing concern among the public regarding the potential distraction of digital billboards to motorists, Dr. Sisiopiku hopes to arrive at a firm conclusion as to whether these billboards pose a distraction and safety risk to their viewers. There is significant data which suggests that distractions amounting to greater than two seconds contribute to the vast majority of traffic incidents, however, the controversy lies in whether digital billboards, which are lighted and feature bright colors and changing backgrounds, constitute a portion of this distraction interval. Building on the expertise of the project team, this study undertakes a comprehensive approach for establishing potential correlations between the presence of digital billboards and crash risk.

Optimizing Emergency Medical Services (EMS) Through the Use of Intelligent Transportation Systems (ITS) Technologies (UAB, FIU)

Principal Investigator: Andrew Sullivan, UAB

EMS operations can greatly benefit from the integration of ITS technologies into the transportation system's infrastructure and into the emergency vehicles themselves. The expected benefits from this synergy are tremendous for the healthcare sector, the transportation sector, and the public. This research project investigates needs and opportunities associated with the use of ITS as a tool for improving healthcare delivery practices during routine as well as emergency operations.



Photo courtesy Mohammed Hadi

Performance Measurements of Transportation Systems Based on Fine-Grained Data Collected by Automatic Vehicle Identification (AVI) and Automatic Vehicle Location (AVL) Systems (UCF, FIU)

Principal Investigator: Mohammed Hadi, UCF

Performance measurement is an important component of planning and operating transportation systems. Increasingly, transportation agencies have been interested in using data collected from point traffic detectors for the estimation of transportation system performance measures and the use of these measures in the active management of transportation systems. Some agencies have utilized or are considering using AVI technologies for estimating travel time in real-time applications. This project investigates the opportunities for more detailed performance measurements of transportation systems based on AVI, AVL, and automatic passenger counters (APC) data and the utilization of derived measures for active performance management of the transportation systems.

Information Services in Social Networked Transportation

Principal Investigator: Hans Klein, Georgia Tech Over the past twenty years, the transportation sector has experienced an information technology (IT) revolution, as the national program in ITS planned and launched a wide variety of IT-based systems. Today, the transportation sector is poised for a second IT-driven revolution, social networked transportation (SNT), which realizes the functionality of social networks in the transportation sector. SNT leverages preexisting IT investments to realize new services and functions that significantly enhance mobility. This project combines research in social networking and research in transportation to achieve useful insights into SNT. It seeks to understand the functions and the benefits of SNT, the processes that make SNT possible, and the institutional innovations needed to facilitate those processes.

Mobile Technology Usage among the Transit-Riding Populace

Principal Investigator: Kari Edison Watkins, Georgia Tech If transit agencies hope to retain choice riders and increase ridership, they need to allow riders to maintain some control over their trips by providing them with real-time information. Unknown wait times mean riders will stand at a corner scanning the horizon for an approaching bus, wondering when or if it will come. By knowing when the bus will actually arrive, the entire picture changes. This project analyzes how transit information should be presented to the public in an equitable manner. This addresses the prevailing use of smartphones for real-time transit data, the market penetration of smartphones among transit riders, and other ways to make the data accessible to the public.





Bringing Freight Components into Statewide and Regional Travel Demand Forecasting

Principal Investigator: David Jung-Hwi Lee, Georgia Tech This study explores various possible ways that GPS-based truck movement data can contribute to freight demand forecasting at the state and regional levels. A GPS-based database of truck travel will help address the lack of detailed and disaggregated existing data, so that regional planning organizations can easily develop freight demand models (FDMs) in conjunction with travel demand forecasting models. Incorporated with other existing data, a set of GPS data provides detailed O-D information, critical routes for goods movement, operating speeds of a large sample of trucks along major highways, travel times, flows for intercity truck traffic, etc.

Development of Risk Management Strategies for State DOTs to Effectively Deal with Volatile Prices of Transportation Construction Materials

Principal Investigator: Baabak Ashuri, Georgia Tech Transportation agencies across the nation are facing rising costs for construction of new highways, as well as maintenance and modernization of existing infrastructure systems. Therefore, the purchasing power of transportation agencies has been declining due to construction cost inflation. The objective of this project is to enhance transportation agencies' understanding of the opportunities, challenges, and best practices for utilizing risk management strategies for material price volatility in transportation projects. This project will deliver a comprehensive risk management guide that systematically addresses risk management for material price volatility in different types of highway projects at various phases of project development.

Freight Movement and Economic Competitiveness from the Megaregion Perspective

Principal Investigator: Catherine Ross, Georgia Tech Over the next thirty years, the majority of population and economic growth in the United States will concentrate in the emerging networks of metropolitan centers and their areas of influence known as megaregions. Increasing international free trade in the global economy will place additional pressure on existing freight infrastructure within and between megaregions. This project examines policy implications of the megaregional approach for freight planning in a global economy. The project is constructing U.S. megaregionlevel freight data, identifying major region pairs of freight movement within and between megaregions, assessing the characteristics of the identified major region pairs, and analyzing the impacts of the identified freight movement on the regional economic growth in core and rural areas of megaregions.

Economic Development and Workforce Impacts of State DOT Expenditures

Principal Investigator: Thomas Boston, Georgia Tech This research is measuring the economic development impact of the Georgia DOT's highway expenditures on economic activity, income, employment, and workforce development, and generalizing these results to other state DOTs. The analysis examines impacts in every prime contract and subcontract award made by the Georgia DOT over the past three years. A statewide input-output model is being used to estimate the multiplier effect of the award on economic activity, income, and employment throughout the state. Special attention is being given to economically disadvantaged communities and environmental justice areas.



Reducing Service Interruptions in Linear Infrastructure Systems (Transportation and Water/Sewer) by Synchronizing Schedules for Selected Maintenance Activities (UCF, Georgia Tech)

Principal Investigator: Berrin Tansel, UCF

Lifeline systems are facilities that provide the main utility or transportation services to a community (e.g., electric and potable water transmission and distribution, wastewater collection and treatment). The extent of interdependency of the lifeline system plays a significant role in the vulnerability of a community. Increasing population density and increased vulnerability of the coastal areas to hurricanes has created major challenges for communities, especially with increasing awareness after recent disasters. This research is demonstrating the infrastructure limitations (design and operation) of lifeline facilities for coastal communities, identifying critical bottlenecks in service quality, and showing how failure will propagate through the system. It also explores how to develop coordinated maintenance schedules to minimize (or reduce) service interruptions and increase maintenance cost effectiveness.

Traffic Management Centers (TMCs): Challenges, Best Practices, and Future Plans

Principal Investigator: Xia Jin, FIU

TMCs are the "brains" for most freeway and arterial management systems. TMCs monitor and manage the traffic flow and the transportation network, as well as provide traveler information through the deployment of various ITS technologies and proactive management strategies. This research is providing an updated and comprehensive scan of current practices in TMC operations. The results of this study will help agencies assess their practices, learn from others' experiences, improve the performance and services of the centers, and contribute to the efficient management of the transportation network and effective implementation of technologies in responding to traffic conditions and emergencies.



Photo courtesy Flickr user spike55151



Photo courtesy Nasim Uddin

Impact and Feasibility Study of Solutions for Doubling Heavy Vehicles (UAB, FIU)

Principal Investigator: Nasim Uddin, UAB

Many of the details used in older steel bridge girders are prone to fatigue failures directly related to truck weight. Repetitive loading may cause fatigue cracking in these steel members and limit the service life of a bridge. Truck weight frequency distributions by vehicle type (i.e., truck weight histograms) are needed to estimate the effects on remaining life and the costs caused by changes in legal and permit truck weights. Because carrying higher payloads can reduce the operating costs of truck operators, the possibility of a growing share of freight on the hightways will be considered in estimating the future truck weight distribution and truck traffic. The goal of this project is to determine if allowing an increase in truck weight provides better or worse bridge durability and longevity when compared to increasing the number of trucks to meet freight demands.



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Factors Influencing Visual Search in Complex Driving Environments (Georgia Tech, UCF, Morehead State)

Principal Investigator: Michael Hunter, Georgia Tech Human factors engineering, which attempts to account for the capabilities and limitations of drivers, promises to provide ways to improve safety by designing more forgiving systems and environments. By understanding a driver's perception of the environment, engineers can make informed design changes to operational environments (such as temporary work zone areas and approaches) and reduce the potential for driver confusion, thus improving safety for both workers and drivers. The central focus of this research is to identify changes in the visual search patterns of drivers as environments become more complex. The overarching focus of the project is safety enhancement.

Next-Generation Wireless Bridge Weigh-in-Motion (WIM) System Incorporated with Nondestructive Evaluation (NDE) Capability for Transportation Infrastructure Safety (Georgia Tech, UAB)

Principal Investigator: Yang Wang, Georgia Tech Overloaded commercial vehicles can endanger the safety of transportation infrastructure and cause expensive premature structural damage. Bridge WIM is a method through which an existing bridge is used as a weighing scale to identify the axles and gross weight of passing trucks. The system can provide information on overloading and potentially protect the bridge from sudden collapse. This project is developing rapidly deployable, portable wireless bridge WIM systems with enforcement and monitoring capability. The research will deliver a low-cost, easy-to-install-and-maintain, reliable monitoring system for long-term next-generation WIM and NDE deployment on bridges.

Full-Scale Wall of Wind Testing of Variable Message Sign (VMS) Structures to Develop Drag Coefficients for American Association of State Highway and Transportation Officials (AASHTO) Supports Specifications (FIU, UAB)

Principal Investigator: Adrindam Chowdhury, FIU The use of ITS technologies on highways is an attractive option for traffic facility operators. VMS structures are the cornerstone of ITS infrastructure, as they relay messages to motorists warning of hazards ahead such as fog, traffic congestion, accidents, construction, and lane closings. VMS messages are of paramount importance in ensuring safety and avoiding fatal crashes. The objective of this project is to develop accurate drag coefficients for incorporation into AASHTO Supports Specifications to foster safer and more economic design of VMS structures.

Integrating Safety in Developing a Variable Speed Limit (VSL) System

Principal Investigator: Mohammed Abdel-Aty, UCF VSL systems have been widely used in the U.S. and European countries. They represent a vital component of an Active Traffic Management System, which has been suggested by the Federal Highway Administration as the next step in tackling the U.S. freeway congestion problem. This research is one of the first attempts to develop a VSL algorithm based on real-time safety risk estimation.



"Integrating Safety in Developing a Variable Speed Limit (VSL) System". Photo courtesy Mohammed Abdel-Aty.

Micro-Dynamics of Business Location and Growth and its Effects on the Transportation Network and Congestion in Georgia and the Southeast Region

Principal Investigators: Vivek Ghosal and Frank Southworth, Georgia Tech

This project is examining selected industries that are: a) economically important in Georgia/the broader Southeast region, and b) some of the important drivers of demand for transportation. Examining the link between the microdynamics of industrial location and growth and the demand for transportation is important for several reasons. A more efficient and less congested transportation system, for example, will mean lower costs for the industries. To understand the complexities of transportation and its impact, one needs to focus on some of the core industries that generate demand for the various modes of transportation. The research is novel in its use of pooling new as well as existing data sources to explore the little understood linkages between the micro-foundation of industry dynamics and economic activity, and the macro-congestion aspects of freight transport.

Automated Data Collection for Origin/Destination Studies of Freight Movement

Principal Investigator: Amr A. Oloufa, UCF

The collection of reliable origin/destination data for freight has profound consequences for a large range of applications in both planning and operations. In an exploratory project, the principal investigator and his research team developed a novel approach for tracking trucks using their license plate numbers, allowing for speed and travel time measurements for each truck. This information can then be used in an origin/ destination model. That project demonstrated the feasibility of the approach; however, more work needs to be done before a system can be adopted for wide application. In this project, limitations in the previous effort are being addressed, and a field test incorporating three gantries covering a total of nine lanes is underway.



(continued)

Enhanced Role of Activity Center Transportation Organizations in Regional Mobility

Principal Investigator: Angshuman Guin, Georgia Tech Major activity centers, with concentrations of employment, and residential and shopping activities, are an important part of the metropolitan form of today's urban areas. In many cases, these activity centers have formed transportation management associations (TMAs) to support the transportation needs of the employees working within the TMA boundary. In addition, many of these same areas have formed community improvement districts (CIDs), which allow for the commercial landowners in the districts to selfimpose taxes to provide funds for transportation and other improvements. One of the areas that these organizations have not been actively involved in has been the real-time operations of the transportation system. This research is supporting the implementation of road operations strategies under the auspices of the Buckhead CID in Atlanta, GA, assessing the feasibility and effectiveness of activity center management associations in such strategies, and generalizing the results of the research to other activity center contexts.

Efficient Utilization of the Existing ITS and the Viability of a Proactive Traffic Management System for the Orlando-Orange County Expressway Authority System

Principal Investigator: Mohamed Abdel-Aty, UCF There is a wider range of vehicle detection devices in use than ever before on freeways and expressways, from the popular inductive loop and magnetometer to video and radar-based detectors. The Central Florida Expressway System utilizes an Automatic Vehicle Identification (AVI) system for Electronic Toll Collection (ETC) as well as for the provision of real-time information to motorists within the Advanced Traveler Information System (ATIS). Data are gathered using AVI tag readers that are installed for the purpose of toll collection and additional tag readers installed solely for the purpose of estimating travel times. The main objective of this research is to investigate the viability of using the automatic vehicle identification (AVI) traffic data in the identification of freeway real-time "hot-spots" in a proactive traffic management framework. Guidelines will be provided to adapt the existing structure of the AVI system (e.g. locations, spacing, and archiving system) to provide more useful data.

GRTA/GDOT Real-Time Tracking and Choice Data

Principal Investigator: Randall Guensler, Georgia Tech The primary goals of this project are: 1) to demonstrate the capabilities of smart phone systems to provide more reliable freeway and arterial travel time data than currently provided by VDS spot speed measurements, and 2) to facilitate the monitoring and analysis of real-time HOT corridor and GRTA Express Bus performance data. The team is collecting second-by-second vehicle activity data from volunteers who use the HOT corridor and major arterials and comparing these with travel time estimates derived from VDS spot speed data. They are assessing the potential benefits of more widespread deployment of the developed Commute Warrior App throughout the region. Finally, focus groups will be conducted to gather information regarding the potential impacts of real-time data on their use of HOT lane and express bus services.



Photo courtesy CQGRD

Georgia SPLOST Database and Clearinghouse for Transportation Finance

Principal Investigator: Catherine Ross, Georgia Tech This project developed a web-based tool and data repository of SPLOSTs (Special Purpose Local Option Sales Tax) for the state of Georgia to compare some of the variables that influence whether a SPLOST will pass or fail. This data is now available in a dynamic interactive format, which means that relationships between key factors in SPLOST approval, such as adjacencies and geographic patterns across the state, are now clearly visible. The accessibility of this data as well as the development of the data repository and the interactive tool are critical. The result is providing a comprehensive data source that helps local, county, RDC's, MPO's and other regional entities and state governments to better prepare for the consideration of financial and funding strategies for infrastructure for their constituencies.



NEH PRUECTS



n 2013, NCTSPM awarded over \$2M to researchers at FIU, Georgia Tech, UAB, and UCF to fund twenty new research projects. These projects were selected based on their potential to improve the productivity and management of the U.S. Transportation System within the limits of likely resource constraints such as funding, transportation workforce capacity, space for infrastructure, and available social and political capital.

Recognizing the significance of these resource constraints, NCTSPM research is focused on making significant contributions to answering three core questions related to transportation planning and management:

- · How do we get most out of existing transportation systems?
- How should we build for the future?

• How should we balance our available resources between the questions above?

More specifically, the new research projects are oriented toward four research themes:

Goods Movement:

Efficient goods movement is essential to the economic competiveness of the U.S., and NCTSPM researchers will be undertaking a variety of new projects aimed at quantifying the economic benefits and other impacts of improvements in freight transportation. These studies will focus on both heavily-trafficked freight corridors as well as smaller urban and rural areas and will include studies of both direct and indirect (e.g. the economic value of travel-time reliability for freight transportation) impacts of goods movements.



Data-driven Operations and Management Decision Making

Planning and operations of transportation systems is often limited by the availability or timeliness of data necessary to support effective decision making. As a consequence, transportation systems either may not fully meet operational objectives or may not achieve these objectives in the most cost effective manner. NCTSPM researchers will be undertaking a range of new projects aimed at providing decision makers with improved tools for more effectively managing transportation systems. From development of tools to aid in the implementation of the Highway Safety Manual; to analyzing the impacts of High Occupancy Vehicle (HOV) to High Occupancy Toll (HOT) conversion; to balancing available resources to maximize return on investment, the NCTSPM projects are focused on providing data driven solutions to the decision making challenges of today.



KEU PROJECTS

(continued)

Next Generation Transportation Infrastructure

In addition to considering what can be done today, NCTSPM researchers have an eye toward future transportation systems. New research projects in 2013 will consider various aspects of the next generation transportation infrastructure from inception to future operations and maintenance. Projects will consider ways in which future infrastructure and operations can be improved through enhanced risk assessment, advanced design procedures, innovative materials and construction methods, and new technologies.

Human Factors and Social Networks in Transportation:

Finally, several new projects are focusing on human interactions with the transportation system. With projects exploring the impacts of real-time information, the amount of information transmitted, and the method of communication for various transportation settings (e.g. driver information, real-time transit information, etc.), NCTSPM projects are making strides in understanding the changing behavior and impact of the individual in the ever-changing transportation information environment.



The full list of 2013 NCTSPM projects is provided below:

Managing Transportation System Health: Setting Performance Targets and Policies in Non-Uniform Regions and Jurisdictions to Achieve Uniform Statewide and National Objectives Principal Investigator: Adjo Amekudzi, Georgia Tech

Evaluation of Signage Alternatives for Express Lane Facilities Principal Investigator: Albert Gan, Florida International University

Innovative Modular High Performance Lightweight Decks for Accelerated Bridge Construction (FIU, UCF, UAB) Principal Investigator: Amir Mirmiran, Florida International University

Evaluation of the Cost Effectiveness of Illumination as a Safety Treatment at Rural Intersections (GT, MGSC) Principal Investigator: Angshuman Guin, Georgia Tech

HOV to HOT Conversion Impacts on Carpooling Principal Investigator: Yanzhi "Ann" Xu, Georgia Tech

Freight Impacts on Small Urban and Rural Areas Principal Investigator: Catherine Ross, Georgia Tech

Bridge Rail Design Procedures Principal Investigator: Dean Sicking, University of Alabama at Birmingham

Estimating the Monetary Benefits of Reducing Delays on Heavily Trafficked Truck Freight Corridors in Georgia Principal Investigator: Frank Southworth, Georgia Tech

Evaluation of Anchor Bolt Clearance Discrepancies Principal Investigator: Ian Hosch, University of Alabama at Birmingham

Next Generation Crack Sealing Planning Tool for Pavement Preservation (GT, UCF) Principal Investigator: James Tsai, Georgia Tech

Evaluating the Impact of Real-Time Transit Passenger Information on Ridership and Mode Share Principal Investigator: Kari Watkins, Georgia Tech Assessment of High Early Strength Limestone Blended Cement for Next Generation Transportation Structures Principal Investigator: Kimberly Kurtis, Georgia Tech

Extending HYRISK to Predict Scour Risk as a Function of Soil Erodibility Characteristics Principal Investigator: Laurie Garrow, Georgia Tech

Cooperative Vehicle-Highway Automation Technology: Simulation of Benefits and Operational Issues Principal Investigator: Michael Rodgers, Georgia Tech

A Comprehensive Investigation of Visibility Problems on Highways: Developing Real Time Monitoring and Prediction Systems for Reduced Visibility and Understanding Traffic and Human Factors Implications (UCF, GT) Principal Investigator: Mohamed Abdel-Aty, University of Central Florida

Development of a Web-based Decision Making Tool for the Highway Safety Manual Implementation Principal Investigator: Priyanka Alluri, Florida International University

Consumer Response to Road Pricing: Macro and Micro Modeling Tools for Socioeconomic Evaluation and Pricing of Managed Lanes Principal Investigator: Randall Guensler, Georgia Tech

A Data Driven Approach to State Transportation Investment Decisions: A Transportation Project Investment and Evaluation Resource Principal Investigator: Timothy F. Welch, Georgia Tech

Examining the Value of Travel Time Reliability for Freight Transportation to Support Freight Planning and Decision-Making

Principal Investigator: Xia Jin, Florida International University

Field Validation of a Drive-By Bridge Inspection System with Wireless BWIM + NDE Devices (GT, UAB) Principal Investigator: Yang Wang, Georgia Tech

TRAINIG AND OUTREACH

NCTSPM reception at the 92nd Annual Transportation Research Board Meeting (Washington, DC, January 2013)

NCTSPM Tech kicked off 2013 with a reception at the Transportation Research Board Annual Meeting. Researchers and students from a number of universities attended the reception.

CATSS-NCTSPM Symposium on Traffic Safety and Simulation (Orlando, FL, February 2013)

UCF hosted this symposium, which provided researchers and students from all four participating NCTSPM universities and a number of outside organizations with an opportunity to share and discuss their research. Graduate and undergraduate student research contributions were showcased in a special poster presentation. Research spanned the areas of safety, economic competiveness, intelligent transportation systems, traffic demand management, and other critical topics.

TransportationCamp South (Atlanta, GA, February 2013)

Georgia Tech hosted TransportationCamp South, an "unconference" attracting nearly 250 technologists, planning students, transportation professionals and others involved in transportation from across the region for a day of discussions, demos, and education related to transportation in the South.

UTC Conference for Southeastern Region (Orlando, FL, April 2013)

The University Transportation Centers (UTC) Conference for the Southeastern Region was the first event of its kind, aiming to bring together faculty, students, practitioners, and public agencies in the Southeast, disseminate information about ongoing activities at all partner universities, and further enhance collaboration among the academic community as well as the private and public sector agencies in the region. Faculty, staff and graduate students, as well as federal and state agency representatives, MPOs, transit managers, and consultants in the region and around the country were invited to attend and participate in this conference. More than 20 universities in the Southeast, from 4 UTCs, were represented.







Photo courtesy Kari Watkins



Photo courtesy Kari Watkins

UAB Sustainable Smart Cities Symposium (Birmingham, AL, April 2013)

UAB hosted its annual Sustainable Smart Cities Symposium, to foster cross-disciplinary research, training, and outreach that integrates health, socio-economic impacts, and infrastructure design for the purpose of developing innovative solutions for sustainable smart cities and communities. Specifically, the symposium brought together individuals with diverse expertise representing academics, corporations, organizations, policy makers on green construction materials; sustainable building and design concepts; social impacts of technology; modeling and simulation; medical sociology, health informatics, and social psychology; public health, emergency preparedness and response, and community resiliency; and government and public policy.

2nd International Symposium on Traffic Safety at Tongji (Shanghai, China, May 2013)

Under the leadership of Dr. Mohamed Abdel-Aty (UCF), the second International Symposium on Traffic Safety was held at Tongji University in Shanghai, China. The Symposium included the top safety researchers in Australia, Canada, Germany, Japan, Sweden, and the US.

Distracted Driving Community Workshop (Birmingham, AL, June, 2013)

UAB organized a community workshop on distracted driving. Alabama Attorney General Luther Strange, UAB Department of Psychology Assistant Professor and Translational Research for Injury Prevention Laboratory Director Despina Stavrinos, Ph.D., and U-Haul Executive Vice President Stuart Shoen addressed the importance of this topic through the event "Arrive Alive: Stop the Texts, Stop the Wrecks!"



Photo courtesy James Wong



Photo courtesy UAB

TRAINING AND UUTREACH

(continued)

Professional Development Short Courses at University of Alabama at Birmingham (Birmingham, AL, Summer 2013)

UAB developed 2 professional development short courses for transportation professionals. "Transportation Infrastructure and Low Impact Development" was designed to enhance understanding of Low Impact Development (LID) alternatives for use within State Department of Transportation infrastructure projects. The ultimate aim is to examine and detail how the utilization of innovative technologies / techniques could minimize adverse environmental impacts. "Load and Resistance Factor Design (LRFD) Bridge Design" was presented at the Alabama Department of Transportation, in coordination with the Alabama DOT Bridge Bureau. The seminar covered pre-stressed and reinforced concrete design in LRFD, with an emphasis on shear design and the various methods for shear analysis included in the AASHTO LRFD specifications.

Atlanta Regional Roundtable on Transportation and Infrastructure Development (Atlanta, GA, September 2013)

NCTSPM Director Michael Hunter, Ph.D., spoke at the Atlanta Regional Roundtable on Transportation and Infrastructure Development, hosted by Georgia Tech, the Perimeter Community Improvement District, and the Georgia Transportation Alliance. The roundtable featured Congressman Jack Kingston, Chairman of the House Subcommittee on Labor, Health and Human Services, Education, and Related Agencies and Congressman Bill Shuster, Chairman of the House Committee on Transportation and Infrastructure. Participants addressed transportation collaboration successes as well as transportation needs, including funding and policy changes and enhancements for improved regional quality of life.



Photo courtesy James Wong



Photo courtesy STRIDE

Georgia Department of Transportation/ Georgia Transportation Institute Research Symposium (Atlanta, GA, September 2013)

This event featured over 90 posters highlighting results from GDOT-sponsored research projects and was conducted at the headquarters of the Georgia Department of Transportation.

"Connected Places: Freight Movements and Megaregions" Peer Exchange (Atlanta, GA, November 2013)

Georgia Tech, the Federal Highway Administration, the Atlanta Regional Commission, and the Metro Atlanta Chamber of Commerce co-sponsored a peer exchange on transportation planning and freight movement by metropolitan planning organizations for megaregions.



Photo courtesy UAB



Photo courtesy STRIDE



Photo courtesy STRIDE





Ricardo A. Daziano, Ph.D., Cornell University, "On the gap between the willingness to pay for and the marginal cost of battery electric vehicles with improved driving range." (Atlanta, Georgia, November 2013).

Patricia L. Mohkhtarian, Ph.D., Georgia Institute of Technology, "It's all about the People: What Insights Can Travel Behavior Research Bring to Transportation Policy and Planning?" (Atlanta, Georgia, November 2013).

Georgia Tech's School of Civil & Environmental Engineering Graduating Student Showcase (Atlanta, Georgia, October 2013).

Jesus Martinez, P.E., Southwest Research Institute, "Autonomous Vehicles: State of Practice and Applications." (Miami, Florida, October 2013).

Julie Price, Ph.D., UAB Sustainability Facilities Management, "Sustainability Initiatives by UAB Facilities." (Birmingham, Alabama, October 2013).

Natalie Kelly, Kelly Green Marketing, "Sustainability Efforts of the City of Birmingham." (Birmingham, Alabama, October 2013).

Catherine Owens, P.E., LEED AP, Atlanta Beltline (Atlanta, Georgia, October 2013).

Catherine Ross, Ph.D., and Peter Hylton, Georgia Institute of Technology, "Multi-Jurisdictional Transportation Efforts in the Megaregion." (Atlanta, Georgia, September 2013).

Sarah Peek, Shelley Lamar, Kathy Masters, Jaimi Tapp, Hartsfield-Jackson International Airport, "Panel: Hartsfield-Jackson Atlanta International Airport." (Atlanta, Georgia, September 2013).

Butch Wlaschin, P.E., Federal Highway Administration "Transportation Asset Management: Beyond MAP-21 – A Business Approach." (Atlanta, Georgia, August 2013).

Kris Milster, Federal Highway Administration, "The First 5 Years of a Career in Transportation." (Miami, FL, July 2013).

Tomáš Zelinka, Ph.D., Czech Technical University, "Communications Solutions for Cooperative ITS." (Miami, Florida, July 2013). **Bob Murphy, Florida Department of Transportation**, "Opportunities in ITS." (Miami, Florida, June 2013).

Dominique Lord, Ph.D., P.E., Texas A&M University, "Before-After Studies: Characteristics and Site Selection Bias." (Orlando, Florida, June 2013).

Doug McLeod, Florida Department of Transportation, "Design Aspects of Standard K Factors." (Miami, Florida, May 2013).

Anita Vandervalk-Ostrander, Cambridge Systematics, Inc., "Florida's Mobility Performance Measures Program - A Review of the Process and Research." (Miami, Florida, May 2013).

Sharyn Gaston and Mark Burns, Juice Plus+ and Mark Burns Architects, "The Vertical Farm – Social Benefits." (Birmingham, Alabama, April 2013).

Vukan R. Vuchic, Ph.D., University of Pennsylvania, "Urban Transportation: Developments and Progress toward Livable Cities." (Atlanta, Georgia, April 2013).

Rafiq A. Alqasem, Atkins Global, "Transportation in South Florida." (Miami, Florida, April 2013).

Ann August Dawson, Birmingham-Jefferson County Transit Authority, "Leadership and Management of a Public Transit Agency." (Birmingham, Alabama, April 2013).

Joe Gomez, P.E., "I-395 Reconstruction Project." (Miami, Florida, March 2013).

Ram M. Pendyala, Ph.D., University of South Florida, "What We Can't Observe: Accounting for Latency in Joint Models of Activity-Travel and Location Choice Behavior." (Atlanta, Georgia, March 2013).

Hani S. Mahmassani, Ph.D., Northwestern University, "Travel Time Reliability: Network-level Characterization and System Management Implications." (Miami, Florida, March 2013).

Daniel Albuquerque, Ph.D., University of Nebraska at Lincoln, "Roadway Design and Application – Overview and Application." (Miami, Florida, March 2013).

Hani S. Mahmassani, Ph.D., Northwestern University, "Travel Time Reliability: Network-Level Characterization and System Management Implications." (Atlanta, Georgia, March 2013). Alan Shih, Ph.D., INDUS TechInnovations, LLP, "From ideas to intellectual properties – What do we engineers miss in the process?" (Birmingham, Alabama, March 2013).

John E. Abraham, Ph.D, P.E., University of California at Davis, "The PECAS Model of Atlanta." (Atlanta, Georgia, March 2013).

John Fisher, Ph.D., Lehigh University, "Durability of Existing & Future Steel Bridges." (Miami, Florida, February 2013).

Alexandre M. Bayen, Ph.D., University of California at Berkeley, "Nash-Stackelberg Games in Transportation Networks: Leveraging the Power of Smartphones for Traffic Monitoring and Management." (Atlanta, Georgia, February 2013).

Keechoo Choi, Ph.D., Ajou University, "GTX (Great Train eXpress) and Public Transportation Reform in Korean TOD Environment." (Orlando, Florida, January 2013).



Photo courtesy STRIDE

STUDENT INTERNSHIPS

NCTSPM supported student interns at Florida International University and the University of Alabama-Birmingham. These internships provided a valuable opportunity for these students to gain realworld experience. The students gained insights into the skills and abilities necessary to be successful in today's workforce, as well as insight and experience to take back to the classroom to improve the educational experience for all NCTSPM students and faculty.

FLORIDA INTERNATIONAL UNIVERSITY

Trang Phan Transportation Engineering, Florida Department of Transportation (District 4)
 Nicholas Junqueira Hevia Transportation Engineering, Miami-Dade County
 Department of Public Works
 Maria Guevara Transportation Engineering, Florida Department of Transportation (District 6)

UNIVERSITY OF ALABAMA-BIRMINGHAM

Preston Marshall Regional Planning Commission of Greater Birmingham
Jamieson Matthews Regional Planning Commission of Greater Birmingham
James T. Graves Alabama Department of Transportation
Paisley M. Marotta Alabama Department of Transportation
Daniel O. Brown Alabama Department of Transportation
Allen M. Khatib Birmingham-Jefferson County Transit Authority

Ceorgia Institute of Technology, Florida International

University, the University of Central Florida, and the University of Alabama, Birmingham have put forth significant effort towards their goal of connecting education with transportation engineering and have made an appreciable difference in both K-12 education and education at the college level.

At UCF, K-12 and STEM initiatives are coordinated by the Department of Civil, Environmental, and Construction Engineering in cooperation with the College of Engineering and Computer Science Diversity Office. In February, elementary school students spent time at UCF learning about transportation engineering through Project CREATE, a dedicated elementary school outreach program which gives children in the fourth and fifth grades an understanding of what engineering is and what engineers do, in an accessible and tangible way.

Camp Connect is a summer engineering exploration program at UCF for eighth through tenth grade students, typically come from underrepresented communities. The program exposes them to many different disciplines within civil and environmental engineering. Camp Connect works to provide a method of exploration and preparation advice for beginning students' college careers through networking with students and faculty at UCF as well as with their peers. Camp Connect students participated in presentations and activities, toured laboratories, and gained insight into the lives of engineering students and professionals.

UCF integrated a game called Reservation Road Planner into their summer engineering program in 2012 and 2013. The game takes students step by step through the obstacles associated with the transportation planning process, after first being presented with the basics of transportation engineering and the role of transportation engineers in the community.



Georgia Tech partnered with Chamblee Middle School and the Center for Education Integrating Science, Math, and Computing (CEISMC) to host the Georgia Tech Summer 2013 STEM Program, to integrate innovative, transportation-related, and standards-aligned curricula in classrooms.

Through the program, the teachers (Art Williams, a mathematics teacher at Forest Park High School; Cindee de Veaux, a mathematics teacher at Chamblee Middle School; and Richard Tierney, a physical science teacher at Chamblee Middle School) were provided with paid summer STEM internships and had the opportunity to interact with researchers and graduate students in the transportation engineering program at Georgia Tech. They developed curricula and acted as facilitators and leaders of two summer camps:

Advanced App Development with Transportation Systems Engineering - combined transportation engineering and smartphone application development to allow students firsthand experience with traffic safety.

LEGO Robotics Camp: Transportation Systems Engineering allowed students to competitively design robots and test them against one another. Teachers were able to develop lessons plans during the summer that they could incorporate during the school year.



The University of Alabama-Birmingham developed a K-12 Transportation Program (in conjunction with the City of Birmingham) and a university-level Summer Enrichment Program.

The Sustainable Smart Cities Youth Champions program, a program of the Sustainable Smart Cities Research Center at the University of Alabama at Birmingham (UAB SSC), is starting with middle school students (between the ages of 12-14) attending inner-city Birmingham City Schools. It provides inner-city youth with hands-on learning opportunities. Lessons are taught by UAB faculty, graduate students, and staff.

The UAB Summer Enrichment Program hosted six freshmanlevel minority and female students on the university's campus for one month. Through the program, these students studied topics related to technical writing, research methods, transportation infrastructure, transportation operations, congestion management, and environmental issues, while exposing them to contemporary transportation issues. The Summer Enrichment Program paired students with faculty mentors in related fields, and for the duration of their stay, students performed research work in their chosen field. At the end of the program, each student created a poster and presented the results of their research to their contemporaries and mentors. Florida International University developed a college-level summer course co-taught by four adjunct instructors who work at the Florida Department of Transportation; Miami-Dade Public Works; Miami Seaport; AASTHO; and Kimley-Horn. This course, which focuses on real world applications, introduced students to advanced strategies and technologies for planning and operations of transportation systems. Additionally, this FIU course provided students with opportunities to interact with academic faculty and leading professionals in the industry while collaborating with them to solve real world problems.





Photo courtesy UAB



Margaret-Avis Akofio-Sowah Advisor: Dr. Adjo A. Amekudzi Eno Leadership Development Conference

Margaret-Avis Akofio-Sowah is a fourth-year Ph.D. student in the School of Civil and Environmental Engineering at Georgia Tech. She earned her bachelor's degree in Engineering Science with a concentration in Civil Engineering from Smith College, and then received a master's degree in Civil Engineering from Georgia Tech. Her research focuses on transportation infrastructure (asset) management, with an emphasis on effective ways of implementing asset management programs.

Candace Brakewood

Advisor: Dr. Kari Edison Watkins, P.E. \$35,500 Dwight David Eisenhower Transportation Fellowship NCTSPM 2013 Student of the Year

Candace Brakewood is a Ph.D. candidate in the School of Civil and Environmental Engineering at Georgia Tech. She received two master's degrees, in Transportation and Technology and Policy, from MIT, along with a bachelor's degree in Mechanical Engineering from Johns Hopkins University in 2006. Her research focuses on improving public transportation systems using new technologies, especially information and communication technologies. She is currently working with Dr. Kari Watkins on the OneBusAway project.

Ehsan Doustmohammadi

Advisor: Dr. Virginia P. Sisiopiku \$10,400 University of Alabama, Birmingham's GAFP Scholarship

Ehsan Doustmohammadi is a Ph.D. student in the Department of Civil, Construction and Environmental Engineering at University of Alabama at Birmingham (UAB). His research interests lie in the area of transportation engineering, with a focus on transportation economics, planning, and traffic safety. He currently holds a graduate research assistantship funded through NCTSPM.

Tewari Edmonson

Advisors: Dr. Sylvan Jolibois and Dr. Berrin Tansel, P.E. \$5,000 Dwight David Eisenhower Hispanic-Serving Institutions Fellowship

Tewari Edmonson is a graduate student pursuing a master's degree in civil engineering at Florida International University. Originally from the island of Jamaica, Edmonson came to the United States when he was fifteen years old. During his junior year as an undergraduate at FIU, he interned with the Florida Department of Transportation as a data research specialist. During his senior year, he was accepted into the Executive Internship Program for the Miami-Dade County area, and worked with the Metropolitan Planning Organization and the Miami-Dade Corrections and Rehabilitation Department

Somaye Fakharian

Advisor: Dr. Mohammed Hadi, P.E. \$3,000 Dwight David Eisenhower Hispanic-Serving Institutions Fellowship

Somaye Fakharian is a first year doctoral student at Florida International University (FIU). She received her master's degree in civil engineering from the Iran University of Science and Technology and is working with Dr. Mohammed Hadi on an NCTSPM-sponsored project on applying AVI and AVL data for performance measurements of transportation systems. She is currently the Vice President of the FIU Student Chapter of Women's Transportation Seminar.

Alice Grossman

Advisor: Dr. Randall L. Guensler \$11,000 Dwight David Eisenhower Transportation Fellowship \$2,500 Dorothy Evans Fellowship

Alice Grossman completed bachelor's degrees in physics and astronomy at Vassar College in 2010, and began her Ph.D. studies at Georgia Tech in 2012. She is interested in how infrastructure shapes urban communities, and her research focuses on sidewalk database development and quality analysis. Before graduate school, Grossman spend two and a half years in Catalonia, Spain working for the Spanish Ministry of Education and interning at architecture firms BOPBAA and RCR Arguitectes.

David Johnson Advisor: Dr. Berrin Tansel, P.E. \$7,500 Dwight David Eisenhower Hispanic-Serving Institutions Fellowship

David Johnson is an undergraduate student pursuing a bachelor's degree in civil engineering at Florida International University (FIU). He currently serves at the Vice President of Student Affairs for the FIU Chapter of the American Society of Civil Engineers. He is a member of the Delta Epsilon lota Honors Society. His focus of study is in transportation engineering, and his interests include the sustainable development of efficient transportation systems and other green initiatives in transportation engineering.

Sara Khoeini

Advisor: Dr. Randall L. Guensler \$750 2013 Freeway and Managed Lane Operations Meeting and Conference Best Student Paper Scholarship

Sara Khoeini began her Ph.D. studies in January of 2011 at Georgia Tech, and her Ph.D. research focuses on developing a modeling framework for socioeconomic analysis of managed lanes. She uses advanced statistical and spatial analysis to discover the relationship between user's travel behavior toward congestion pricing and their socio-spatial attributes. Khoeni's dissertation is entitled "Modeling framework for socioeconomic analysis of managed lanes; Case study: Atlanta I-85 HOV-to-HOT corridor". She received her master's degree in Transportation and Highway Engineering from Clemson University, and her bachelor's in Civil Engineering-Surveying from K. N. Toosi University of Technology in Tehran, Iran.



Photo courtesy STRIDE

Josie Kressner

Advisor: Dr. Laurie A. Garrow \$10,000 Cameron Rian Hays Outside the Box Competition Grand Prize Winner \$5,000 Society of Women Engineers Ada I. Pressman Memorial Scholarship \$44,000 National Science Foundation Graduate Research Fellowship Program

Josie is a fifth-year graduate student in the School of Civil and Environmental Engineering. Previously, she attended Washington University in St. Louis where she received a B.S. in Civil Engineering and B.A. in Architecture. In August 2011, she completed a M.S. in Civil Engineering from Georgia Tech, and she now continues to work towards a Ph.D. Josie's research interests are in the area of transportation engineering, programming, modeling, statistics, and urban planning. Broadly, her goal is to improve cities through their transportation systems and to plan better for the future of cities through their economic, environmental, and social health.





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Jamieson Matthews

Advisors: Dr. Virginia P. Sisiopiku and Mr. Andrew Sullivan \$9,200 2013 Alabama Section of the Institute of Transportation Engineers Charles E. Alexander Memorial Transportation Engineering Scholarship

A civil engineering senior at the University of Alabama, Birmingham (UAB), Matthews received the award at the 41st ALSITE Annual Meeting, which was held in Gulf Shores, Alabama, from June 5 through 7, 2013. He is enrolled in a dual-degree program between civil engineering and physics and is Vice President of UAB's chapter of ASCE and treasurer of UAB's Institute of Transportation Engineers chapter. Matthews is currently a structural engineering intern at Almon and Associates.

Evangelos Palinginis Advisor: Dr. Randall L. Guensler \$69,500 Two-year Dwight David Eisenhower Transportation Fellowship

A native of Athens, Greece, Evangelos Palinginis is a member of the Ph.D. program at Georgia Tech. He has received two master's degrees, in Transportation Systems from Georgia Tech, and in Transportation from the National Technical University of Athens (NTUA). Additionally, he received his bachelor's from NTUA. Palinginis' research interests are focused on decision making under uncertainty in constructional complexity, including dimensioning comparison and selection of large scale construction configurations. He currently serves as a research assistant with the School of Civil and Environmental Engineering-based Construction Information Technology Group.

Photo courtesy STRIDE



Anne Marie Pereira

Advisor: Dr. William Thompson \$1,000 Harvey L. Gaines Memorial Expressway Authority Endowed Scholarship

Anne Marie Pereira is currently an undergraduate industrial engineering student at the University of Central Florida, after previously receiving her associate's degree in Engineering from Valencia College. She was born in Rio de Janeiro, Brazil, and moved to the United States at a young age, and she is currently working with Lockheed Martin as an industrial engineering intern. Pereira is a member of Alpha Pi Mu Industrial Engineering Honor Society and the Delta Epsilon lota Academic Honor Society, as well as UCF's chapters of the Society of Hispanic Professional Engineers, the Institute of Industrial Engineers, and the Society of Women Engineers.

Adnan Sheikh

Advisor: Dr. Randall L. Guensler \$750 2013 Freeway and Managed Lane Operations Meeting and Conference Best Student Paper Scholarship

Adnan Sheikh is a third year graduate student in the doctoral program for Transportation Systems Engineering at the Georgia Institute of Technology. Adnan received his B.S. in Electrical Engineering from the University of Maryland, College Park, in 2006. After graduating, Adnan spent three years working in I.T. consulting for Accenture in Washington, D.C. His federal clients included the Department of Education and the Office of Personnel Management. Adnan's graduate research is focused on congestion pricing, specifically the I-85 Express Lanes in the Atlanta metropolitan area. His research examines value of time and price sensitivity, and involves discrete choice modeling of lane type decisions.



Janille Smith-Colin

Advisor: Dr. Adjo A. Amekudzi \$5,000 Women's Transportation Seminar-Atlanta Chapter 2013 Leadership Legacy Scholarship for Graduate Studies

Janille Smith-Colin is a Ph.D. student and graduate research assistant at Georgia Tech under the supervision of Adjo Amekudzi. Her current research projects include evidencebased practices in transportation, and her research interests include transportation policy implementation, organizational management, and civil infrastructure systems decisionmaking frameworks. She received her master's degree in Civil Engineering from the University of Wisconsin-Madison, and her bachelor's in Engineering Studies from Lafayette College. Her master's thesis focused on performance measures and their use in transportation asset management. She is currently involved with the Infrastructure Research Group at Georgia Tech as a researcher.

Sarah Windmiller

Advisor: Dr. Kari Edison Watkins, P.E. \$4,000 American Public Transportation Foundation Parsons Brinckerhoff – Jim Lammie Scholarship

Sarah Windmiller is pursuing a Master's degree in Civil Engineering with an emphasis in transportation systems engineering at Georgia Tech. Her interests are focused on the design and planning of public transportation and ways this service can be better utilized by the public. She is currently researching how equitable and accessible mobile real-time information is among transit riders through the Urban Transportation Information Lab at Georgia Tech. Prior to attending Georgia Tech, she studied at Ball State University, where she received a Bachelor of Urban Planning and Development.



James Wong Advisor: Dr. Kari Edison Watkins, P.E. \$1,350 Frederick K. Bell Memorial Fellowship \$1,250 Cameron Rian Hays "Outside the Box" Competition (Second place) Eno Leadership Development Conference

James is an avid transportation enthusiast with interests in public transportation, traveler information, transit data and civic engagement. Before starting the program in Civil Engineering and City & Regional Planning at Georgia Tech, James studied transit systems engineering at the University of Pennsylvania. Following his undergraduate degree, he worked with consulting firms on transportation planning and traffic engineering projects throughout the Mid-Atlantic and South Africa. His favorite projects included transit corridor planning studies, roundabout designs and university transportation master plans. James has served as the president of the Georgia Tech chapter of the Institute of Transportation Engineers and the vice chair of the Atlanta chapter of Young Professionals in Transportation.

Cheng Zhong

Advisor: Dr. Virginia P. Sisiopiku \$10,400 University of Alabama, Birmingham's GAFP Scholarship

Cheng Zhong is a Ph.D. student in Transportation at the University of Alabama at Birmingham (UAB). He holds a bachelor's degree in computer science from Nanjing University of Technology and a master's degree in transportation engineering from the University of Wyoming. Since he joined UAB in 2010, he participated in variety of externally transportation projects focusing on traffic simulation modeling, congestion management, and transportation data management.





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