

National Center for Transportation Systems Productivity and Management

Program Progress Performance Report for University Transportation Centers

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Research and Innovative Technology Administration
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Signature of Submitting Official:



Michael Hunter, Ph.D.

12/10/14

Date

Accomplishments

What are the major goals of the program?

The National Center for Transportation Systems Productivity and Management (NCTSPM), a Tier I University Transportation Center, was founded to facilitate, coordinate and conduct research and educational programs toward the following goals:

- Conduct multi-disciplinary research on topics relevant to the relationship among transportation infrastructure (state-of-good-repair), economic competitiveness and safety
- Disseminate research results and other products of the Center to the transportation community
- Promote transportation education and professional development on topics relating to Center research topics
- Establish a central point of contact and promotion of best practices (e.g., through a web site or list serve) for materials relating to transportation systems performance and management
- Promote diversity in the workforce through active recruitment of women and minority students into degree programs
- Act as a national resource for the debates and discussions that focus on the evolving national transportation program and future directions
- Explore international cooperative activities with research entities in selected countries where similar research interests exist

What was accomplished under these goals?

Accomplishments for the reported period are discussed below and organized by major center goal.

Conduct multi-disciplinary research on topics relevant to the relationship among transportation infrastructure (state-of-good-repair), economic competitiveness and safety

In the fall of 2013, 20 new projects were awarded to researchers at NCTSPM's 4 universities; these new projects bring the total of NCTSPM-supported research projects to 41. This portfolio is highly multi-disciplinary, including: Public Policy, Public Health, Urban Planning, Building Construction, Economics, and Civil Engineering. During the reporting period all of these new projects were finalized and are currently ongoing.

A full listing of NCTSPM-funded research projects can be found at the end of this report.

Disseminate research results and other products of the Center to the transportation community

NCTSPM posts research updates to its website on a regular basis. A Project Information Form is posted on the website for each project, as well as related documents, such as pictures, posters and presentations. Information on NCTSPM's research is also posted to the Georgia Tech Transportation Alumni group on LinkedIn and on the Georgia Tech Civil Engineering website.

NCTSPM's main effort to disseminate research results during the reporting period was the [2014 University Transportation Center \(UTC\) Conference for the Southeastern Region](#), which Georgia Tech hosted on March 24 and 25. The event drew 150+ attendees from over 20 universities, as well as state

DOT and transportation practitioners. Many of the NCTSPM researchers and their students presented their work at this conference.

Many NCTSPM researchers also presented technical papers at the TRB Annual meeting and published or submitted articles to journals.

Researchers at UCF have been coordinating directly with the FDOT Structures Research Center to disseminate results related to their work on a precast, modular bridge deck structural system. Georgia Tech has been working with GDOT to plan a poster session in Fall in 2014 to showcase NCTSPM and other research projects.

Promote transportation education and professional development on topics relating to Center research topics

Georgia Tech hosted a number of professional development opportunities during the reporting period: 3 seminars, the *Southeast UTC conference*, and *TransportationCamp South*. Both students and transportation professional attended these events. Approximately 50 people attended the seminars; 150+ attended the *Southeast UTC conference*; and more than 200 people attended *TransportationCamp South*. A wide range of topics were covered at these events, including but not limited to: connected and autonomous vehicles, land use-transportation interactions, use of mobile technology for parking, transit expansion, economics and freight, and deployment of transportation research. The *Southeast UTC conference* included a student session which drew 30+ students from 5 universities in the southeast; the session provided them with an opportunity to exchange best practices and collaborate on future activities.

Two graduate students from Georgia Tech took part in the inaugural *Transportation Career Expo Fair* at the Garrett A. Morgan Youth Symposium during the *Committee of Minority Transportation Officials (COMTO)*'s Annual Meeting. These graduate students presented attendees with five questions that transportation research could or currently is addressing in Atlanta. They presented the attendees with several approaches towards answering those questions, and potential solutions, as well as coordinating a game of "Transportation Jeopardy" to further spark student interest in the field.

University of Alabama at Birmingham hosted the *2014 Sustainable Smart Cities Symposium*. The Symposium included speakers both international and across the US. Issues addressed in the symposium included: urban transportation, transportation sustainability, and urban design. Over 230 people participated in the symposium, including students from the NCTSPM member universities.

Another NCTSPM institution, the University of Central Florida (UCF), established an undergraduate internship with *MetroPlan Orlando* for research work related to bicycle operations and safety. *MetroPlan Orlando* and UCF have hired a student, Barbara Kelley, for a joint internship between the two organizations. She will work full-time during the summer, and part-time during the fall, on a bicycle safety-related project, from a human factors approach. A faculty member at UCF, Dr. Necati Catbas, integrated concepts from his NCTSPM-funded research project into a course he teaches on bridge engineering.

All of NCTSPM's member universities also conducted summer programs for K-12 students.

- FIU developed and conducted a two-week Summer Transportation Camp for 15 high school students, introducing the students to various transportation engineering topics and transportation careers. The program included a combination of lectures, field trips, hands-on lab exercises, data collection, transportation films, and a group project. Near the end of the program was "Transportation Jeopardy" similar to Traffic Bowl (see example <https://www.youtube.com/watch?v=ohjyvxAYoyU>), during which students were asked questions related to the program materials. Students also worked on a traffic simulation application group project for which they had to prepare and give a PowerPoint presentation.
- UCF held *Camp Connect 2*. The camp featured classes in bridge design, managing college life, career explanation, and other challenging activities. Students worked in teams to complete challenges, and industry leaders such as Earthrise and Siemens also participated. Campers tested the bridges they designed in the bridge design course, visited a stormwater facility, and took part in lab activities, before presenting the results of their teamwork.
- UAB conducted the second annual *Summer Enrichment program* during June 2014. Planning for this program occurred throughout the first half of 2014. Ten minority students participated in the program. UAB also began the *Middle School Youth Champions Program* in 2014, in which students visit the campus on four consecutive Saturdays and performed educational activities related to transportation, energy, and sustainability.
- Georgia Tech held a two-week camp with two sessions during the summer of 2014. Students in grades 6-8 participated, learning how to develop smartphone apps, and applying transportation principles to it. At the end of the week, they developed a smartphone application using Construct 2 software, following the theme of "Snowpocalypse". They also toured the GDOT Traffic Management Center. At the conclusion of the camp, curricula developed for the camp will be taken back to the teachers' schools so that they can apply them to the classroom.

Establish a central point of contact and promotion of best practices (e.g., through a web site or list serve) for materials relating to transportation systems performance and management

The [NCTSPM website](#) remains the main point of contact and promotion of best practices. The website received nearly 6000 page views in the first quarter of 2014, shown in Figure 1 below. Visitors come from all over the world, as seen below in Figure 2.

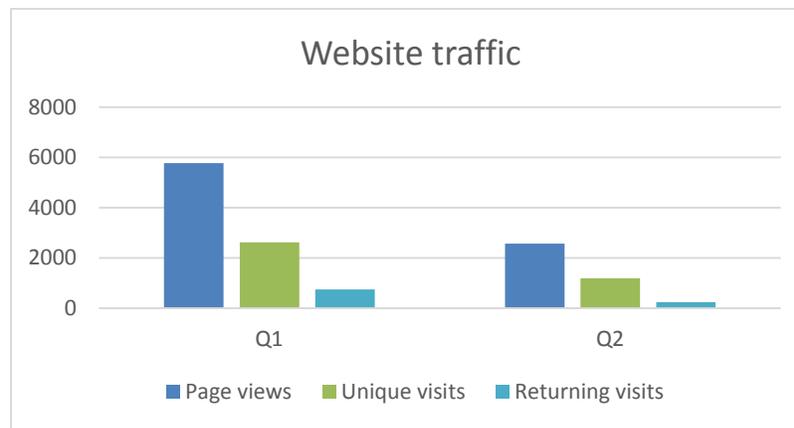


Figure 1. Web traffic in 2014 Q1 and Q2



Figure 2. Website visitors in 2014

Promote diversity in the workforce through active recruitment of women and minority students into degree programs

All of the NCTSPM universities have engaged in recruiting female and minority students.

Georgia Tech admitted 11 female students for the fall 2014 semester, and a total of 22 minority students. 7 of the 11 females, and 9 of the 22 minority applicants, accepted. Also, three female and minority students at Georgia Tech won awards during the reporting period: Prabha (Popa) Pratyaksa, Janille Smith-Colin and Chieh (Ross) Wang.

UCF recruited two female and one Hispanic undergraduate students, as well as 3 female and 1 minority graduate students.

FIU recruited two Hispanic female undergraduates and one Hispanic male undergraduate student.

Ten minority students enrolled in UAB’s Summer Enrichment program, held during June 2014.

Act as a national resource for the debates and discussions that focus on the evolving national transportation program and future directions

Georgia Tech hosted the *Southeast UTC conference* in 2014. More than 150 people attended this event, from 20+ universities, as well as transportation professionals from a number of transportation agencies. Georgia Tech also hosted the 2nd annual *TransportationCamp South*. TransportationCamp has been held in 6 different cities since 2011: New York, San Francisco, Washington D.C., Montreal, Boston, and now Atlanta.

Dr. Catherine Ross (GT), Deputy Director of NCTSPM, produced a number of reports and presentations on relevant local topics. She authored an independent study, “City of Atlanta’s Storm Response Plan,” presented to the City Utilities Committee, a committee consisting of seven members of the Atlanta City Council and chaired by Councilmember Natalyn Archibong. She also published “Coming and Going on the Northside” in the The Atlanta Journal Constitution, in which she called for mobility options in Atlanta's Northwest. Georgia Public Broadcasting Television published her story, “Infrastructure, mixed modes of transportation and sprawl all in the context of 2014 Snow Jam.”

University of Alabama at Birmingham also hosted the 2014 *Sustainable Smart Cities Symposium*. The Symposium included international speakers and speakers from across the US. Issues addressed included urban transportation, transportation sustainability, and urban design. Over 230 people participated in the symposium. UAB and the Alabama Department of Transportation (AL DOT) jointly hosted the ALDOT Meeting Reception and Luncheon at the UAB Alumni House. The event was attended by several AL DOT Bureau Chiefs and top administrators to provide an update on the ongoing NCTSPM projects and the use of the cost share provided by AL DOT.

Explore international cooperative activities with research entities in selected countries where similar research interests exist

Dr. Nasim Uddin at UAB is using UTC funds to leverage an ongoing NSF collaboration on B-WIM with universities in Ireland and the UK.

Dr. Virginia Sisiopiku at UAB is currently exploring a potential research and scholarship collaboration with the Cyprus University of Technology.

Dr. Necati Catbas at UCF is engaging in international collaboration with Japanese collaborators, with the purpose of exploring the condition of aging bridges

Drs. Mohamed Abdel-Aty and Essam Radwan visited the UAE in March to participate in the First International Road Traffic Accident Conference was held in Abu Dhabi in March. This conference aimed to bring together transportation engineers and medical physicians in joint sessions. Both Aty and Radwan delivered keynote speeches. Drs. Aty and Radwan are also working on joint relevant publications with Tongji University in China.

Dr. Aty also visited Korea in June and China in July, 2014 in which he was invited as keynote speaker and explored potential cooperation with different agencies in these countries. He presented at the International Conference on Sustainable Urban Transportation Research and Innovation and the International Seminar on Traffic Safety and Simulation at Hanyang University.

What opportunities for training and professional development has the program provided?

Georgia Tech hosted a number of professional development opportunities during the reporting period: 3 seminars, the *Southeast UTC conference*, and *TransportationCamp South*. The seminars provided students with an opportunity to hear from transportation researchers and practitioners. During the

Southeast UTC conference, students participated in a student session which drew approximately 30 attendees from 5 universities. This session provided the participants with an opportunity to interact with students from different backgrounds at the other member universities and to exchange best practices. They also discussed organizing more social events, especially at TRB.

University of Alabama at Birmingham hosted the 2014 *Sustainable Smart Cities Symposium*. Professional development short courses are being planned for 2014.

Several UCF students obtained jobs as interns in private and public sectors as a result of field experience in data collection gained from working on an NCTSPM-funded project. Materials from Dr. Necati Catbas' research project have been integrated into his Bridge Engineering course; the course materials and final projects are the main outlets for training. *MetroPlan Orlando* and the University of Central Florida have hired a student, Barbara Kelley, for a joint internship between the two organizations. She will work full-time during the summer, and part-time during the fall, on a bicycle safety-related project, from a human factors approach.

NCTSPM's 2013 NCTSPM Student of the Year, Taylor Lochrane, met with president Obama to talk about research. See the full story by clicking on this link: <http://today.ucf.edu/ucf-student-president-obama-talk-highway-safety-innovation/>

How have the results been disseminated?

The [NCTSPM website](#) remains the main point of contact and promotion of best practices. During the reporting period, an updated Project Information was posted for each research project. Related documents, such as presentations, pictures and posters, have been also uploaded when available.

In addition to these outlets, Georgia Tech also hosted the [2014 University Transportation Center \(UTC\) Conference for the Southeastern Region](#) on March 24 and 25. The event drew 150+ attendees from over 20 universities, as well as state DOT and transportation practitioners. A number of NCTSPM researchers presented their work at this conference. UAB and the Alabama Department of Transportation (AL DOT) jointly hosted the ALDOT Meeting Reception and Luncheon at the UAB Alumni House. The event was attended by several AL DOT Bureau Chiefs and top administrators to provide an update on the ongoing NCTSPM projects and the use of the cost share provided by AL DOT.

Researchers have produced a number of technical papers and presentations during the reporting period. 15 papers were published or submitted for publication, and more than 50 presentations delivered, to a variety of venues including:

<u>Publications</u>	<u>Conferences</u>
<ul style="list-style-type: none"> • Accident Analysis & Prevention • ASCE Journal of Bridge Engineering • IEEE Transactions on Intelligent Transportation 	<ul style="list-style-type: none"> • 2nd Transportation and Development Institute, ASCE • 3rd International Conference on Environmental Pollution and Remediation (ICEPR) • 5th International Conference on Applied Human Factors and Ergonomics • AASHTO's Subcommittee on Bridges and Structures-T-7 Technical

<p>Systems</p> <ul style="list-style-type: none"> • International Journal of Sustainable Transportation • Journal of Civil Engineering and Architecture • Journal of Engineering Structures • Journal of Safety and Security • Journal of Safety Science • Journal of the Air and Waste Management Association • Journal of Transportation Research • Traffic Injury Prevention 	<p>Committee Meeting</p> <ul style="list-style-type: none"> • AlaSim Conference • American Society of Engineering Education • Annual Meeting of the Transportation Research Board • Association for Psychological Science • CATSS-UTC Symposium • Georgia/Carolinas Precast Concrete Institute (G/C PCI) • Intermodal Freight Technology Working Group • Proceedings of SPIE, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security • Sixth World Conference on Structural Control and Monitoring (6WCSCM) • University Transportation Center (UTC) Conference for the Southeastern Region
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What do you plan to do during the next reporting period to accomplish the goals?

Final reports are expected for a number of projects.

Georgia Tech will host its second annual research symposium at the Georgia Department of Transportation in September 2014. GT will also host guest speakers for the monthly transportation seminar series, including Drs. Ram Pendyala and Anne Goodchild.

The 2014 annual report will be produced.

UCF will continue the organization of the *Road Safety and Simulation 2015* conference to be held in Orlando, Florida in October 2015.

FIU plans to recruit three minority student interns and host at least 5 guest speakers.

UAB has a number of important initiatives planned for the second half of 2014 that will further advance center goals. The next round of the student internship program will be funded, providing undergraduate students paid internships at local transportation agencies. Funding will again be provided for UAB students to attend the 2015 TRB Annual Meeting in Washington, DC. UAB is also organizing a technical session at the annual Alabama Highway Conference to present the results of NCTSPM research. Finally, UAB is beginning planning for the regional UTC conference to be held in Birmingham in Spring 2015.

Products

The center's website, <http://nctspm.gatech.edu> continues to be updated regularly.

The following research projects reports have been submitted to NCTSPM:

- Final report submitted "Integrating Safety in Developing a Variable Speed Limits System"

- Draft report submitted: “Volume-I- Applications of Transit Signal Priority Technology for Transit Service.”

Researchers have produced a number of papers and presentations during the reporting period. 15 papers were published or submitted for publication, and more than 50 presentations delivered, to a variety of venues.

NCTSPM universities also hosted a number of seminars:

UCF:

- January 2014: Seminar by Prof. Keechoo Choi at UCF about Transit Oriented Development.

FIU:

- February 7, 2014: “FDOT District Six Intelligent Transportation Systems and the Future of Managed Lanes in Southeast Florida” seminar by Mr. Javier Rodriguez, P.E., ITS Operations Engineer, Florida Department of Transportation (FDOT) District 6, at FIU.
- February 28, 2014: “Can ‘Big’ Data Serve as a Foundation for Measuring and Improving Public Transport Operations?” by Dr. Robert Bertini, P.E., Professor, Department of Civil and Environmental Engineering, Portland State University.
- March 7, 2014: “Modeling Recurring and Non-Recurring Congestion Scenarios in Micro-Simulation using VISSIM” by Dr. Soheil Sajjadi, Post-Doctoral Research Scholar and Adjunct Instructor, Florida Atlantic University (FAU).
- March 7, 2014: “Design of a New Mining Railroad in West Africa” by Mr. Bill Hjelholt, Senior Vice President, Americas Director, Freight Rail, AECOM
- Tuesday, July 8: “Developing and Implementing Safety Performance Functions in Virginia” by Dr. Young-Jun Kweon, Senior Research Scientist, Virginia Department of Transportation.

GT

- March 6, 2014: “Can Connected Vehicles “Connect” to the Transportation Infrastructure? How Transportation Agencies Can Improve Service through Connected Vehicles” by Brian L. Smith, PE, University of Virginia
- February 27, 2014: “Performance Analysis and Monitoring,” Kyung-Hwa Kim, Atlanta Regional Commission
- February 6, 2014: “Modeling the interaction of traffic and land use planning in South East Metro Sydney” Peter Campbell, University of South Australia

Participants and Other Collaborating Organizations

NCTPSM Participants at Georgia Institute of Technology

The following individuals from Georgia Tech have worked on the NCTSPM at the programmatic level.

Name	<i>Michael Hunter, Ph.D.</i>
Program/Project Role	<i>NCTSPM Director</i>
Number of hours worked during the reporting period	<i>Approximately 630 hrs.</i>
Contribution to Program/Project	<i>Responsible for oversight and governance of</i>

	<i>NCTSPM</i>
Funding Support	<i>UTC, GDOT</i>
Collaborated with individual in foreign country	<i>N/A</i>
Country(ies) of foreign collaborator	<i>N/A</i>
Travelled to foreign country	<i>N/A</i>
If traveled to foreign country(ies), duration of stay	<i>N/A</i>

Name	<i>Catherine Ross, Ph.D.</i>
Program/Project Role	<i>NCTSPM Deputy Director for Policy, Education and Workforce Development</i>
Number of hours worked during the reporting period	<i>Approximately 60 hrs.</i>
Contribution to Program/Project	<i>Responsible for administrative oversight and faculty coordination; liaison to NCTSPM researchers.</i>
Funding Support	<i>UTC, GDOT</i>
Collaborated with individual in foreign country	<i>N/A</i>
Country(ies) of foreign collaborator	<i>N/A</i>
Travelled to foreign country	<i>N/A</i>
If traveled to foreign country(ies), duration of stay	<i>N/A</i>

Name	<i>Michael O. Rodgers, Ph.D.</i>
Program/Project Role	<i>NCTSPM Deputy Director for Research and Technology Transfer</i>
Number of hours worked during the reporting period	<i>Oversees subcontract reporting requirements and research products and is responsible for coordinating technology transfer activities of the center</i>
Contribution to Program/Project	<i>Approximately 640 hrs.</i>
Funding Support	<i>UTC, GDOT</i>
Collaborated with individual in foreign country	<i>N/A</i>
Country(ies) of foreign collaborator	<i>N/A</i>
Travelled to foreign country	<i>N/A</i>
If traveled to foreign country(ies), duration of stay	<i>N/A</i>

Name	<i>Mr. Kenneth Stewart</i>
Program/Project Role	<i>UTC Board Liaison</i>
Number of hours worked during the reporting period	<i>Approximately 20 hrs.</i>
Contribution to Program/Project	<i>Liaison between UTC management and Board</i>

	<i>of Advisors.</i>
Funding Support	<i>UTC, GT</i>
Collaborated with individual in foreign country	N/A
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A

Name	<i>Ms. Audrey F. Leous</i>
Program/Project Role	<i>Research Program Coordinator</i>
Number of hours worked during the reporting period	<i>Approximately 900 hrs.</i>
Contribution to Program/Project	<i>Provided administrative management and assistance to Center.</i>
Funding Support	<i>UTC</i>
Collaborated with individual in foreign country	N/A
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A

Name	<i>Ms. Marjorie Jorgenson</i>
Program/Project Role	<i>Transportation Faculty Assistant</i>
Number of hours worked during the reporting period	<i>Approximately 30 hrs.</i>
Contribution to Program/Project	<i>Provide assistance to Director and Research Coordinator for UTC management</i>
Funding Support	<i>GT</i>
Collaborated with individual in foreign country	N/A
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A

NCTSPM University Partner Representatives

These individuals have served as liaisons between NCTSPM and their institutions to organize joint efforts related to research, education, technology transfer, and workforce development. These met with the NCTSPM Director and Deputy Director, via teleconference, in an initial kick-off meeting in order to establish governing parameters for the management and coordination of the center's research and activities. They also coordinated submissions of proposals and cost sharing from their respective institutions and were members of the proposal selection committee. Subsequently, these individuals served to facilitate the subcontracting process within their institutions.

University of Alabama, Birmingham

Fouad H. Fouad, Professor and Chair, Department of Civil Construction and Environmental Engineering
Email: ffouad@uab.edu

Name	<i>Fouad H. Fouad, Ph.D.</i>
Program/Project Role	<i>NCTSPM Partner Representative/University of Alabama, Birmingham</i>
Number of hours worked during the reporting period	<i>Approximately 104 hrs.</i>
Contribution to Program/Project	<i>Liaison between UTC and the University of Alabama, Birmingham</i>
Funding Support	<i>UTC, ADOT, UAB</i>
Collaborated with individual in foreign country	N/A
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A

Florida International University

Dr. Albert Gan, Email: gana@fiu.edu

Name	<i>Albert Gan, Ph.D.</i>
Program/Project Role	<i>NCTSPM Partner Representative/Florida International University</i>
Number of hours worked during the reporting period	<i>100 hours on (1) development, coordination, administration, and teaching of a two-week Summer Transportation Camp; (2) recruitment and administration of student internship program.</i>
Contribution to Program/Project	<i>Liaison between UTC and Florida International University</i>
Funding Support	<i>UTC, FDOT, FIU</i>
Collaborated with individual in foreign country	N/A
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A

University of Central Florida

Dr. Essam Radwan, Executive Director, Center for Advanced Transportation Systems Simulation

Email: Ahmed.Radwan@ucf.edu

Name	<i>Essam Radwan, Ph.D.</i>
Program/Project Role	<i>NCTSPM Partner Representative/University of Central Florida</i>
Number of hours worked during the reporting period	<i>Completed close to 120 hours in activities related to research, education, and administration activities.</i>
Contribution to Program/Project	<i>Liaison between UTC and the University of Central Florida</i>
Funding Support	<i>UTC, FDOT, UCF</i>
Collaborated with individual in foreign country	N/A
Country(ies) of foreign collaborator	N/A
Travelled to foreign country	N/A
If traveled to foreign country(ies), duration of stay	N/A

Advisory Board and Other Collaborators

The following are members of the NCTSPM Advisory Board:

Tread Davis – Lawyer and Board Member, Atlanta Regional Commission (Chair)
James Balloun – Financial Investor and Former CEO (Past Chair)
Harry L. Anderson - Senior Vice President, Global Business and Technology Services, The Coca-Cola Company
Harold Barley – Executive Director, MetroPlan Orlando
Mark Bartlett – FHWA Division Administrator, Alabama
Jeffrey W. Brown – Alabama DOT Bureau Chief, Research and Development
Toby Carr - Director of Planning, GDOT
Keith Golden – GDOT Commissioner
Bill Johnson – Director, Port of Miami
Michelle Livingston – Vice President for Supply Chain Distribution, The Home Depot
Todd Long – GDOT Deputy Commissioner
Wick Moorman – CEO, Norfolk Southern Railway
George Overstreet – Executive Board Member of the Alabama Trucking Association, Vice President of Operations
G. P. “Bud” Peterson – President, Georgia Tech, Ex Officio
Daniel L. Rodgers – President, Dunn Investment Company
Randy Stashick – Global Vice President of Engineering, UPS
Yvette Taylor – Regional Administrator, FTA
Dave Williams – Vice President of Infrastructure and Government Affairs, Metro Atlanta Chamber of Commerce

Other Partnering Organizations:

Georgia Department of Transportation (GDOT)

Florida Department of Transportation (FDOT)
Alabama Department of Transportation (ADOT)

Other Collaborators:

Morehead State University
Saint Louis University
Georgia State University
Georgia Southern University
Southern Polytechnic State University

Impact

What is the impact on the development of the principal discipline(s) of the program?

One example of NCTSPM's impact on the principal disciplines of the program is the work being done by Dr. Yang Wang. He received a grant in 2013 to continue the work from his first grant awarded in 2012. He is designing a system for inspecting bridges using wireless weigh-in-motion and non-destructive evaluation (BWIM + NDE) devices, and this second grant will enable him to test it in the field. His work aims to reduce the costs associated with bridge maintenance by producing a cost-effective method for inspecting bridge health, and NCTSPM's support allows him to take the concept from theory to practice.

Another important example is a project by Dr. Frank Southworth. He is investigating the monetary benefits of reducing delays on heavily trafficked truck freight corridors in Georgia. The state's economy depends heavily on the efficiency of its freight transportation network, including its ability to move goods into and out of the state. Dr. Southworth's work will help GDOT get the most out of the limited public funds available. This work is of considerable interest to transportation planners who must assess pavement wear and tear, anticipate safety concerns, and understand the link between economic activity and highway capacity needs.

UCF and partner NCTSPM institutions are becoming recognized as leaders in the use of advanced materials for repair and retrofit of nation's infrastructure. The research sponsorship through the UTC grants, matched by FDOT, has resulted in continued support of the graduate program at UCF and a surge in the scholarly publication record produced by faculty and students. The strong track record of the transportation center CATSS coupled with the selection of Dr. Mohamed Abdel-Aty to head the CECE Department resulted in hiring a new transportation faculty who will join the program in August 2014. This new addition will strengthen graduate courses offerings.

What is the impact on other disciplines?

The multi-disciplinary focus of NCTSPM engages researchers from a variety of disciplines. The research projects "Factors Influencing Visual Search in Complex Driving Environments" and "Digital Advertising Billboards and Driver Distraction" are supporting faculty in the psychology departments at UCF, Morehead State University and UAB. Likewise, the research project "Optimizing EMS Through The Use of Intelligent Transportation Systems (ITS) Technologies" is supporting faculty in the School of Public Health at UAB. "Next Generation Crack Sealing Planning Tool for Pavement Preservation" is supporting

faculty in Electrical and Computer Engineering at GT. “Evaluation of Signage Alternatives for Express Lane Facilities” is supporting faculty in the Department of Occupational Therapy at FIU. “Information Services in Social Networked Transportation” is supporting faculty in Public Policy. A number of projects at GT are supporting faculty in the School of City & Regional Planning.

What is the impact on the development of transportation workforce development?

The program has and will continue to impact the development of transportation workforce development in a variety of ways.

FIU supported student interns in 2013 and 2014. In the reporting period, two interns continued to work at the assigned agency after completion of internship program, and one received a full-time job offer.

At UCF, Dr. Necati Catbas incorporated his research into his teaching. Students were educated in a new area where there is a need for better analysis and design of novel bridges. Also, two PhD students who completed their PhDs at UCF were hired as Research Associates at the university.

Georgia Tech offered a number of events in 2014 to develop the transportation workforce. The Southeast UTC conference had an impact in a number of ways. The conference convened more than 150 individuals, many of whom work at transportation agencies. They were able to learn about a range of transportation topics which they could then apply to their work. The conference also included a session geared towards students. Approximately 30 students attended, from five universities, for the opportunity to interact with students from different backgrounds at the member universities. Students learned how other student chapters operate and exchanged best practices. This was worthwhile for all students, since all of the chapters were working to improve undergraduate recruitment. They also had a chance to collaborate on planning social events, especially at TRB.

Georgia Tech also organized seminars on a variety of topics, such as connected vehicles, performance analysis and monitoring, and modeling land use and transportation interactions. The spring seminar series drew about 50 attendees, from both Georgia Tech and outside transportation agencies.

Georgia Tech offered a summer camp in 2014. Two groups of 20 students in the sixth through eighth grades participated in the camp, learning about app development and applying transportation principles to it. At the end of the week, they developed a smartphone application through the Construct 2 software, following the theme of "Snowpocalypse". Georgia Tech graduate students participated by teaching campers about topics within the field of civil engineering. The campers also took a field trip at the GDOT Traffic Management Center.

FIU held a two-week Summer Transportation Camp for 15 high school students, introducing the students to various transportation engineering topics and transportation careers. The program included a combination of lectures, field trips, hands-on lab exercises, data collection, transportation films, and a group project. Near the end of the program was “Transportation Jeopardy” similar to Traffic Bowl.

Students also worked on a traffic simulation application group project for which they had to prepare and give a PowerPoint presentation.



FIU's Summer Transportation Camp

At UAB, 15 graduate students have been funded to date through this center to perform research in areas related to the NCTSPM goals. The Summer Enrichment Program has provided transportation engineering training to 17 freshman and sophomore minority students. The middle school Youth Champions Program has provided education and learning activities related to transportation for approximately 45 middle school students.



Students from UAB's 2014 Summer Enrichment Program study a green roof



Middle school students build solar cars as part of UAB's Youth Champions Program

What is the impact on physical, institutional and information resources at the university or other partner institutions?

With the help of NCTSPM and matching funds from UCF, UCF is in the process of purchasing the *MiniSim* driving simulator.

At Georgia Tech, the project "Next-Generation Wireless Bridge Weigh-in-Motion (WIM) System Incorporated with Nondestructive Evaluation (NDE) Capability for Transportation Infrastructure Safety" developed the wireless sensing devices. These devices can be used for both classroom demonstrations and other research work. The wireless accelerometers have been used at a CEE undergrad/grad course titled "Introduction to Non-Destructive Testing and Forensic Evaluation in Engineering Materials and Structures." Students were simply asked to "handshake" the wireless accelerometers, and then watch the time history and frequency spectra of the handshaking. In terms of research work, the devices can also be used towards any sponsored research projects that can utilize the wireless sensing devices for experimental data acquisition either in laboratory or in the field.

At UCF, the research sponsorship through the UTC grants, matched by FDOT, has resulted in continued support of the graduate program at UCF and a surge in the scholarly publication record produced by faculty and students. The strong track record of the transportation center CATSS coupled with the selection of Dr. Mohamed Abdel-Aty to head the CECE Department resulted in hiring a new transportation faculty who will join the program in August 2014.

Many of the research projects require collaboration between universities. It can be challenging to collaborate when not being close to researchers from other universities. This is mitigated using technology.

What is the impact on technology transfer?

NCTSPM is actively engaged in technology transfer. Many of the researchers meet regularly with state DOT and other agency representatives, engaging them in their project and addressing broader concerns that may lead to immediate deployment of some of the solutions.

The Southeast UTC Conference in March 2014 had a significant tech transfer component. Representatives from 5 state DOTs participated in a panel discussion, and these representatives as well as others attended conference presentations.

The research project “Information Services in Social Networked Transportation” included a technology transfer component: an event called *TransportationCamp South*. Dr. Kari Watkins has co-organized this event at Georgia Tech in both 2013 and 2014, as well as presenting the TransportationCamp meeting in Washington DC in January 2014. This event brings together thinkers and doer in the transportation and technology fields for a day of learning, debating, connecting, and creating. Attendees included employees of GDOT, the area metropolitan planning agency, local transit agency MARTA, the City of Atlanta, and other local agencies. More than 200 people attended this year’s event. Perhaps most critically to this project, *TransportationCamp South* was co-hosted with *govathon*, resulting in six teams creating unique applications to help facilitate transportation in Atlanta and beyond. More information is available at transportationcamp.org/events/south.

Dr. Kim Kurtis presented in June 2014 to the Georgia/Carolinas Precast Concrete Institute (G/C PCI) at their annual meeting. Roughly 50 members from the precast concrete industry (producers, suppliers, architects, and designers from Georgia and the Carolinas) were present at the talk. Dr. Kurtis gave an overview of her research group's ongoing research evaluating the use of limestone-blended cements, or Type IL cements, for precast applications. These cements have the potential to reduce energy consumption and greenhouse gas emissions associated with concrete construction and have recently been introduced to the market. Her group's research examines their early age strength development, among other properties, in comparison to traditional cement. This project, funded through NCTSPM, also involves Prof. Lawrence Kahn and graduate students Ahmad Shalan and Behnaz Zaribaf.

What is the impact on society beyond science and technology?

Because of the multi-disciplinary nature of NCTSPM’s programming, we expect several projects to have impacts beyond science/engineering professions:

- “Optimizing EMS Through The Use of Intelligent Transportation Systems (ITS) Technologies” could lead to faster EMS response and transport times and better patient outcomes.
- “Bringing Freight Components into Statewide and Regional Travel Demand Forecasting” will have major impacts on urban and regional planning agencies, providing them with a tool to estimate freight movement that they have long been lacking.
- “Impact and Feasibility Study of Solutions for Doubling Heavy Vehicles” will have long-term impacts on truck configurations/capacities
- “Digital Advertising Billboards and Driver Distraction” may ultimately have impacts to the advertising industry

Changes/Problems

Changes in approach and reasons for change: *Nothing to Report*

Actual or anticipated problems or delays and actions or plans to resolve them:

Several research projects started late due to delays in match funding contracting. One research project (Amr Olofua) was delayed because the project required approval to allow field installation of hardware

from both FHWA (Federal Highway Administration) and Florida DOT; moreover, installation costs could not be estimated at onset of project yielding to a design change, which caused some further delays.

Changes that have a significant impact on expenditures: *Nothing to Report*

Significant changes in use or care of human subjects, vertebrate animals and/or biohazards: *Nothing to Report*

Change of primary performance site location from that originally proposed: *Nothing to Report*

Special Reporting Requirements

Specific Requirements

Website: Created and operational in 2013; continues to be updated regularly as new information becomes available

Directory of Key Personnel: Information available on the program website and updated as needed

Financial and Annual Share Reports: The SF425 requirements will be met by separate report.

FFATA Subaward and Executive Compensation Report: Will be met by separate submission

Research Project Descriptions: Available on program website. The projects selected and funded by the center are provided below.

Projects Selected for Funding by NCTSPM

Project Title	Lead Uniy	Principal Investigator
Integrating Safety in Developing a Variable Speed Limit System	UCF	Mohamed Abdel-Aty
Reducing Service Interruptions in Linear Infrastructure Systems (Transportation and Water/Sewer) by Synchronizing Schedules for Selected Maintenance Activities	FIU	Berrin Tansel
Performance Measurements of Transportation Systems based on Fine-Grained Data Collected by AVI and AVL Systems	FIU	Mohammed Hadi
Full-Scale Wall of Wind Testing of Variable Message Signs (VMS) Structures to Develop Drag Coefficients for AASHTO Supports Specifications	FIU	Arindam Chowdhury
Information Services in Social Networked Transportation	GT	Hans Klein
Traffic Management Centers: Challenges, Best Practices, and Future Plans	FIU	Xia Jin
Digital Advertising Billboards and Driver Distraction	UAB	Virginia Sisiopiku
Impact and Feasibility Study of Solutions for Doubling Heavy Vehicles	UAB	Nasim Uddin
Optimizing EMS Through The Use of Intelligent Transportation Systems (ITS) Technologies	UAB	Andrew Sullivan
Efficient Utilization of the Existing Its System and the Viability of a Proactive Traffic Management System for the Orlando-Orange County Expressway Authority System	UCF	Mohamed Abdel-Aty
Development of a Prototype Evidence-Based Database and Planning Tool: Applying Performance Management Principles in Asset Management Program Development	GT	Adjo Amekudzi
Bringing Freight Components into Statewide and Regional Travel Demand Forecasting	GT	David Lee
Development of Risk Management Strategies for State DOTs to Effectively Deal with Volatile Prices of Transportation Construction Materials	GT	Baabak Ashuri

Freight Movement and Economic Competitiveness from the Megaregion Perspective	GT	Catherine Ross
Economic Development and Workforce Impacts of State DOT Expenditures	GT	Danny Boston
Factors Influencing Visual Search in Complex Driving Environments	GT	Mike Hunter
Next-Generation Wireless Bridge Weigh-in-Motion (WIM) System Incorporated with Nondestructive Evaluation (NDE) Capability for Transportation Infrastructure Safety	GT	Yang Wang
Micro-Dynamics of Business Location and Growth and its Effects on the Transportation Network and Congestion in Georgia and the Southeast Region	GT	Frank Southworth
Automated Data Collection for Origin/Destination Studies of Freight Movement	UCF	Amr A. Oloufa
Enhanced Role of Activity Center Transportation Organizations in Regional Mobility	GT	Angshuman Guin
Georgia SPLOST Database and Clearinghouse for Transportation Finance	GT	Catherine Ross
GRTA/GDOT Real-Time Tracking and Choice Data	GT	Randall Guensler
Evaluation of Signage Alternatives for Express Lane Facilities	FIU	Albert Gan
Innovative Modular High Performance Lightweight Decks for Accelerated Bridge Construction	FIU	Amir Mirmiran
Field Validation of a Drive-By Bridge Inspection System with Wireless BWIM + NDE Devices	GT	Yang Wang
Development of a Web-based Decision Making Tool for the Highway Safety Manual Implementation	FIU	Priyanka Alluri
A Data Driven Approach to State Transportation Investment Decisions: a Transportation Project Investment and Evaluation Resource (T-Pier)	GT	Timothy F. Welch
Freight impacts on Small Urban and Rural Areas	GT	Catherine Ross
HOV to HOT Conversion Impacts on Carpooling	GT	Yanzhi "Ann" Xu
Consumer Response to Road Pricing: Macro and Micro Modeling Tools for Socioeconomic Evaluation and Pricing of Managed Lanes	GT	Randall Guensler
Evaluation of the Cost Effectiveness of Illumination as a Safety Treatment at Rural Intersections	GT	Angshuman Guin
Assessment of High Early Strength Limestone Blended Cement for Next Generation Transportation Structures	GT	Kimberly Kurtis
Managing Transportation System Health: Setting Performance Targets and Policies in Non-Uniform Regions and Jurisdictions to Achieve Uniform Statewide and National Objectives	GT	Adjo Amekudzi
Extending HYRISK to Predict Scour Risk as a Function of Soil Erodibility Characteristics	GT	Laurie Garrow
Cooperative Vehicle-Highway Automation (CVHA) Technology: Simulation of Benefits and Operational Issues	GT	Michael Rodgers
Next Generation Crack Sealing Planning Tool for Pavement Preservation	GT	James Tsai
Estimating the Monetary Benefits of Reducing Delays on Heavily Trafficked Truck Freight Corridors in Georgia	GT	Frank Southworth
A Comprehensive Investigation of Visibility Problems on Highways: Developing Real Time Monitoring and Prediction System for Reduced Visibility and Understanding Traffic and Human Factors Implications	UCF	Mohamed Abdel-Aty
Evaluating the Impact of Real-time Transit Passenger Information on Ridership and Mode Share	GT	Kari Watkins
Bridge Rail Design Procedures	UAB	Dean Sicking
Evaluation of Anchor Bolt Clearance Discrepancies	UAB	Ian Hosch
Examining the Value of Travel Time Reliability for Freight Transportation to Support Freight Planning and Decision-Making	FIU	Xia Jin