Semiannual Program Progress Performance Report for

Southeastern Transportation Center (STC)

US DOT Regional University Transportation Center

Submitted to: US Department of Transportation

Office of the Secretary of Transportation

Grant period: 1 October 2013—30 September 2017

Reporting period: 1 October 2014—30 March 2015

Submitted: 30 April 2015

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Grant: DTRT13-G-UTC34
DUNS: 00-338-7891
EIN: 62-6001636

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STC Semiannual Program Progress Performance Report #1

1. Accomplishments

1A. What are the major goals of the program?

Under the theme of Comprehensive Transportation Safety, the Southeastern Transportation Center (STC) is expanding our research, education, work force development and technology transfer activities, focusing resources in this same thematic area, to address existing and emerging transportation challenges in the Southeast.

To achieve comprehensive transportation safety in our region, STC strives to understand its sociology and safety cultures; gather and curate relevant data; integrate human factors with infrastructure use; implement and enrich the Highway Safety Manual and similar tools; and apply these to all operations related to moving people and goods.

We help the transportation sector improve its existing workforce while we develop the next generations of educators, professionals, technical specialists, and practitioners who will create and sustain our nation's safe transportation systems.

We are developing and implementing a comprehensive T2 program that is designed to implement the outcomes of our research program, and disseminate research results as well as their implications and significance to a broad range of constituents (practitioners, decision makers, students, educators and other transportation researcher).

1B. What was accomplished under these goals? What opportunities for training and professional development has the program provided?

Research Accomplishsed Under Program Goals

The STC Research Program consists of two major components: (1) Major Research Initiatives (MRIs); and (2) Opportunity and Exploratory (O&E) Grants. During this reporting period, both of these activities continued. Details of the research components, as well as specific research activities by STC consortium members, are presented in the following research performance summary.

Major Research Initiatives

In the previous reporting period, we conducted a targeted safety research needs assessment in our region to generate the MRI component of our program. This was completed with the assistance of TDOT and the SASHTO research subcommittee. To recap, seven DOTs of the 12 SASHTO states responded and reported their priority safety research needs. We supplemented these data with input from our university partners in the states from which no survey responses were received. Based on this input, we selected and designed projects to address common and high-priority needs within Region 4. We also coordinated our MR Initiatives with specific research topics identified by the USDOT modal administrators. This process generated four MR Initiatives, which are strategically focused research efforts with multiple sources of matching funds, and collaborations with other UTCs and/or research entities. These initiatives are continually coordinated and progress is reviewed quarterly. With the completion of the first program year each initiative area is reexamined and further focused to ensure future progress and project success. The four MRIs underway for this funding period are:

MRI 1. Crash Modification Factors and the Highway Safety Manual

Co-Coordinators: Raghavan Srinivasan, Highway Safety Research Center, Jennifer Ogle, Clemson University
Research Facilitator: Lee D. Han, University of Tennessee

With the publication of the Highway Safety Manual (HSM), there is a now a formal document that can be used to link roadway design with safety consequences. Part C of the HSM provides prediction models that can be used for project level analysis to assess the safety impacts of alternative designs. Crash modification factors (CMFs), which provide an estimate of the safety effectiveness of specific treatments, are available for selected treatments from Part D of the HSM. However, there are many treatments for which reliable CMFs are not available. One of the principal thrusts of MRI 1 is developing CMFs for high priority engineering treatments (stop to signal conversion and two-way to multiway stop conversion). This thrust complements NCHRP Project 17-63 (also being conducted by STC team members) that is developing guidelines for the development of crash modification functions. In addition, research is focusing on work zone procedures in the HSM, verification of previously developed Safety Performance Functions, and performance comparison of four calibration methodologies for SPFs focused on two-lane rural roads.

MRI 2. Integrated Simulation and Safety

Co-Coordinators: Essam Radwan, University of Central Florida, Nikiforos Stamatiadis, University of Kentucky
Research Facilitator: Lee D. Han, University of Tennessee

Simulation has evolved into a productive tool for predicting and evaluating safety on roadways and street networks. Simulation aptly defines human actions, addresses the effectiveness of roadway design and traffic operations on transportation safety, and helps to develop surrogate safety measures. Judicious and creative implementation of simulation tools holds great promise for enhancing HSM methodologies and approaches. Projects within this initiative evaluate the use of simulation in assessing and possibly predicting safety levels for roadway environments for pedestrian and bicycle conflicts with vehicular traffic; review of commonly used simulation tools and their capability to model incidents, accidents, and traffic operation under large-scale incidents requiring evacuations; and are developing vehicle-to-vehicle crash prediction models for intersections. Projects have resulted in an interim draft report being completed, papers and abstracts have been submitted and student theses have been initiated and one completed. TransCAD and TransModeler software has been purchased from Caliper Corporation for simulations.

MRI 3. Exploring Socio-Demographic Characteristics and Culture Factors in Differential Safety Performance across Geography

Co-Coordinators: Shashi Nambisan, University of Tennessee, Steve Polzin, University of South Florida
Research Facilitator: Lee D. Han, University of Tennessee

The southeastern US has the highest roadway incident and injury rates in the country. While this disparity in roadway safety has been explored numerous times, these studies most often investigate the physical design characteristics of the transportation infrastructure. Some studies focus on the weather, government policies (e.g., speed limits, seat belt law), and the role of human factors in designing the infrastructure or vehicles. When socio-demographic characteristics are considered, they are typically limited to gender, age, and race or ethnicity. The results have not provided a comprehensive picture or convincing explanation for regional safety performance differences. The research effort underway with this initiative expands this limited set of characteristics to include socio-demographic characteristics, risk-taking and health characteristics, land use patterns, and other measures that consider the culture and values of the population as

potential explanatory factors. Specific projects now underway include the determination of the extent to which population characteristics might explain differential safety performance (dataset development and comprehensive analysis). Research work includes a special focus on motorcycles and heavy vehicle safety. Multiple papers are in various stages of submission and review that includes publication in a major peer reviewed journal.

MRI 4. Big Data for Safety Monitoring, Assessment, and Improvement

Coordinator: Asad Khattak, University of Tennessee
Research Facilitator: Lee D. Han, University of Tennessee

Emerging sensor and communication technologies have made traffic, mobility, safety, and other information available ubiquitously and in real-time with appreciable temporal resolution and spatial accuracy. Some of the real time and dynamic data come from infrastructural investments by government agencies for traditional traffic monitoring (e.g., in-road loops and RTMS sensors), some come from private enterprises for logistical operations (e.g., RFID), and still other data come from crowd-sourced personal electronics (e.g., smartphone and Bluetooth equipped units). All these and other increasingly available data can be collected, fused, and mined to help monitor, assess, and improve transportation safety in real-time as well as after the fact. Along with the potential benefits of big data come issues related to large data volumes, high data velocities, varied data types and formats, and the veracity of the data's accuracy and reliability, thus making big data and the proactive applications that rely upon it vulnerable to interruption, overload, and misuse. Projects within this initiative are: assessing/ investigating data sources and scenarios for how different data types can contribute to improving safety; macroscopic safety analysis and real-time crash risk analysis (including pedestrians); analyzed real-time travel time data quality collected from license plate readers, Bluetooth readers, probe vehicles, INRIX database, NAVTEQ, Remote Traffic Microwave Sensors (RTMS). Projects have already resulted in several research papers and presentations at the Transportation Research Board Annual meeting in Washington, D.C.

Opportunity & Exploratory Grants

STC Opportunity and Exploratory (O&E) Grants provide individuals or small groups of faculty and students the opportunity to engage in relevant safety-related research within their areas of interest and expertise. O&E Grants are designed to provide seed-funding to explore new and emerging concepts, technologies, and methods with promising safety enhancement applications. All O&E Grants are competitively awarded, and typically each grant will be performed at one university with single-source or in-kind matching funds.

During this reporting period, there were seven O&E Grants underway. A brief overview/description of each of these projects follows, and the participating STC member universities and faculty researchers are identified.

New Technologies and Bicycle Safety

Chris Cherry, University of Tennessee

The primary goals of this O&E Grant are threefold: 1) assess the travel behavior of select populations of bicycle users; 2) identify the physical characteristics of those routes chosen by the bicycle user groups; and 3) evaluate the behavioral and route characteristic data to assess overall bicycle safety. Innovative GPS and smart phone applications are being tested and integrated into the data collection. The travel behavior data collected for the assessment include travel speeds, route selection, and stopping behavior at intersections. The route characteristics data include roadway speed limit, traffic volume, and type of bicycle facilities. An additional goal of the Grant is to adapt "The Cycle Atlanta" App for use in the Knoxville area,

which will provide a large array of data from bicycle users about their travel characteristics. A special emphasis will be given to evaluating the difference in the behavior of two bicycle user subgroups: regular bicyclists and bike share users.

The results of the research will provide useful data for evaluating and enhancing bicycle travel behavior and safety. The project results will be shared with the Knoxville Transportation Planning Organization, local bicycle program planners, and the City of Knoxville Engineering Department to assist in bicycle planning and design, so that the agencies can more effectively prioritize investments regarding bicycle infrastructures.

Utilizing Assistive Technology to Remove Communication Barriers in the Public Transportation System for Passengers with Disabilities
Rupy Sawhney, University of Tennessee

The objective of this O&E Grant, which was completed during the reporting period, was to survey disabled and/or elderly bus transit users, as well bus drivers, to identify and assess communication barriers which adversely impact this particular segment of transit users during any part of their transit trip. The survey input was then used to build a technological communication aid targeted for elderly/disabled transit users. In the survey task, input was gathered from a total of 579 elderly/disadvantaged transit users through 31 group sessions, as well as interactive on-line passenger surveys. In addition, a total of 38 drivers from three bus transit agencies were surveyed.

The most effective communication aid developed was a "tablet-based" application. The app was tested on three subgroups:

- Transit users who had no previous computer technological experience
- Transit users who utilized a regular computer
- Transit users with tablet experience

Most users found that using tablet-based technology was much simpler for them, depending on the muscle tone or dexterity of the participant. Adaptive technology, e.g., a pencil eraser or stylus, proved helpful. In conclusion, those who had never used computer technology of any kind previously, adapted quickly to the ease of the tablet application with a few quick lessons or instructions from one of the facilitators from a hands-on approach. This was particularly noticeable with the agencies hosting senior populations who may not be as tech savvy or may be more fearful of newer electronic technologies.

Automated Traffic Surveillance from an Aerial Camera Array
Wayne Sarasua, Clemson University

The overall goal of this O&E Grant is to design and develop an automated aerial network monitoring system concept that can identify and track individual vehicles through a network of 16 square miles in near real-time. The research includes the development of algorithms to map the locations of the vehicles and to extract traffic parameters for data mining purposes.

Three experimental vehicle tracking systems have been conceptualized and are being evaluated:

- Vehicle Tracking using a raw pixel appearance model/OpenStreetMap
- Surf feature tracking
- Deep learning using the Caffe library (UC Berkeley)

Based on results to date, the research team has selected a machine learning approach to detect and track vehicles in an aerial camera array video. The third system identified above, deep learning, appears more promising than other approaches—especially with challenging video sequences with seams and variation in luminance.

Intervention Strategies for Unsafe Cell Phone Usage Among Teen Drivers
Maranda McBride, North Carolina A&T State University

In this O&E Grant, the research team is: 1) identifying individual personality traits that are believed to influence teenage drivers' Texting While Driving (TWD) behavior; and 2) developing and assessing intervention strategies for reducing TWD behavior, which are based on the personality trait findings. The initial research model consists of constructs found in Protection Motivation Theory (PMT) and General Deterrence Theory (GDT,) as well as the Big Five Personality Traits. For the first phase of the research, i.e., identifying and assessing personality traits, a survey instrument has been developed and is being administered to a large sample of teen drivers.

Evaluating the Wrong-Way Driving Incidents Problem on the Florida's Turnpike Enterprise Roadway System
Haitham Al-Deek, University of Central Florida

The goals of this O&E Grant are to evaluate Wrong Way Driving (WWD) crashes and incidents on Florida's Turnpike Enterprise Roadway System, and to develop potential countermeasures for reducing/eliminating WWD crashes and incidents throughout the System. The research activities include: 1) an assessment of crash/incident report data; 2) analyses of WWD trends; 3) a survey of roadway users regarding their knowledge and experience on WWD; 4) identification of typical problem areas on the Florida turnpike system; and 5) development of recommendations to mitigate WWD incidents.

Intermediate results from this O&S Grant were presented in two papers at the January 2015 Transportation Research Board Annual Meeting, Both papers are accepted for publication, and both now competing for the best paper award in freeway operations.

Development & Evaluation of Coordinated Traffic Signal Emergency Preemption System
Adam Kirk, University of Kentucky

The objective is to quantify the operational benefits of preempting an entire corridor for emergency vehicle operations, rather than preempting each individual intersection as the emergency vehicle arrives. Arterial test segments will be selected and characterized for evaluation purposes. A micro-simulation model (in VISSIM) will be the primary evaluation tool.

Activites during the reporting period include: 1) data collection and micros-simulation model development and calibration; 2) priority rules used to model yielding behavior of general traffic to emergency vehicles achieved in simulation; 3) volume calibration in simulation model completed; 4) controller transition types and measures of effectiveness identified for evaluation; 5) travel time data of emergency vehicles on typical arterials gathered from the fire department database; and 6) hardware in the loop system established, updated and tested for preemption call.

Promoting Safe Transportation Among Older Drivers: Risk Assessment via Driving Simulator Technology
Jerri D. Edwards, University of South Florida

The primary objective is to conceptualize, develop and validate driving simulator scenarios to assess older driver safety in a clinical-setting. A group of 50 older drivers will participate in the study, which will include: driving simulators performance, on-road driving performance, state-recorded driving citations and crash involvement, and in-clinic assessments. Metrics of driving simulator performance indicative of older driver risk will be determined, and incorporated into a clinical tool for assessing older driver risk.

Education Accomplished Under Program Goals

University of Tennessee

Substantial educational efforts were undertaken at University of Tennessee to leverage STC funding.

- Transportation Systems STEM Summer Academy for Teachers, a paper by Dr. Nambisan (CEE), and Dr. Jennifer Richards, Department of Food Science and Technology, was selected as the best paper in the STEM and Community Engagement section at the Engineering Leaders for Grand Challenges conference held in November 2014 at Texas A&M University at Qatar. The paper summarized efforts related to and outcomes from the development and implementation of a three day, transportation-systems-based summer academy for teachers. They have been invited to submit the paper for publication in the inaugural issue of the Engineering Education Letters.
- Also, "Transportation Systems Based Summer Academy for Teachers" was accepted for presentation in a session sponsored by the K-12 and Precollege Engineering Division at the Annual Conference of the American Society for Engineering Education in Seattle, WA in June 2015, and for publication in the conference proceedings.
- Dr. Khattak offered a revised and updated transportation safety course (in-class and distance education) during Fall 2014, which enrolled 15 graduate students. Six courses were offered in Fall 2014 and five were offered in Spring 2015 as part of the transportation curriculum in Civil & Environmental Engineering.
- STC and Civil & Environmental Engineering jointly sponsored a speaker series and webinars, coordinated by Dr. Chris Cherry. (http://tinyurl.com/mfogcg5.) The Spring 2015 series included:
    - Shannon Fain, PE, Business Development Consultant, AirSage, Nationwide Population Analytics Through Big Data-The Power of Where and When.
    - Andy Alden, Virginia Tech, Overview of VTTI and ETAT
    - Kari Watkins, Ph.D. Assistant Professor, Georgia Tech, Real-Time Traveler Information.
    - Ram Pendyala, Ph.D. Dickerson Professor, Georgia Tech, TBD.
- Dr. Lee Han gave two invited talks at Southwest Jiaotong University in Chengdu and at Chang'an University in Xi'an, China in October 2014. Both talks were about massive real-time data collection, filtering, imputation, analysis, and fusion challenges and research activities at UT. Faster-than-real-time simulation is a key issue for incident/emergency operations to maintain and attain safety and security.
- Six UT students received STC scholarships to work on safety issues during the year. Recruitment of a new group of six to eight students is underway for Fall 2015.
- Dr. Nambisan is partnering with the UT's Office of Diversity Programs and College of Engineering to conduct eVol9, a weeklong program for 9th grade students, as part of the 2015 Summer Pre-College Program. The program is titled "Experiments in Transportation: Speed, Distance, Volume, Mass, Acceleration, Braking - So What?" and is expected to have 32 student participants. Kwaku Boakye and Ebony Lemons, graduate students in transportation engineering, and eight undergraduate peer-mentors from the Office of Diversity Programs will support Dr. Nambisan.
- Dr. Cherry gave an invited talk at Stanford University about the role of low speed, electric two wheelers (e.g., E-bikes) in multi-modal transportation systems, focusing on sustainability and safety. Dr. Cherry gave a related talk at the conference on transportation planning and implementation methodologies for developing areas in India.
- STC sponsored travel for several UT students to attend the TRB annual meeting. Several students presented papers at the 2015 TRB Annual Meeting.

Awards won by UT's Transportation Engineering students:

Time	Award	Entity	Recipient
Spring 2014	Graduate Student Senate Travel Award	University of Tennessee, Knoxville	J. Liu
Spring 2015	Graduate Student Senate Travel Award	University of Tennessee, Knoxville	Z. Ling, J.J. Yang, H. Lim
Spring 2015	2015 Intelligent Transportation Society of Tennessee Scholarship Award	Intelligent Transportation Society of Tennessee (ITSTN)	B. Bae
Spring 2015	1st Place of Graduate Student Paper	2015 Transportation Research Forum	J.J. Yang
Spring 2015	First Place in 2015 TSITE Traffic Bowl Competition	Tennessee Section Institute of Transportation Engineers (TSITE)	H. McCracken, L. Taboada, K. King, E. Lemons
Spring 2015	Student Paper Competition First Place	Tennessee Institute of Transportation Engineers	J.J. Yang
Spring 2015	Annual Scholarship Award	ITS Tennessee	B. Bae, L. Netherton

North Carolina A&T State University

Eleven STC Education Award recipients attended the TRB Annual Meeting in January 2015. The highlight of the meeting was the STC Student Spotlight session. Two students, Daniel Oldham and Ahmed Lamarre, made oral presentations on their research during the activity. Several other students were recognized for their academic accomplishments.

Eight STC Education Award recipients travelled to Birmingham, Alabama to participate in the 2015 UTC Conference for the Southeastern Region. Students heard from a variety of transportation professionals engaged in transportation related research. Drs. McBride and Carter presented their O/E grant research at this conference.

University of Alabama

One PhD student is supported with STC funding, working on projects related to the Highway Safety Manual. We continue planning for Advanced Transportation Institute (ATI) 2015, a three-day introduction to transportation and the transportation career opportunities for underrepresented high school students. ATI 2015 will be conducted in June 2015 in cooperation with the Alabama Department of Transportation. Two Alabama towns, Fayette and Hubbertville, will be represented for the first time at ATI 2015.

University of Alabama Birmingham

Fellowships have been awarded to graduate students at UAB to pursue transportation related fields.

University of Central Florida

The research conducted at UCF in fulfillment of MRIs 2 & 4 includes: two Ph.D. students (one female), two M.S. students (one female and one African American), and one undergraduate student.

University of Kentucky

To engage and support graduate students in safety research, we have selected and assigned three graduate students to STC research projects. To support outreach to undergraduate and high school teachers and students, we have selected high school student to participate in a mentoring program.

University of North Carolina Highway Safety Research Center

HSRC continued development of the Road Safety Academy 101. Initial collaborative efforts were started with LEARN NC, a UNC-based education organization, to update course materials and course platform/delivery method. Unfortunately, the working relationship could not continue due to a change in LEARN NC's mission and budget.

The project team is continuing to update the course content and structure, and is now working with a consulting company (Reify Media) to evaluate best next steps for the course regarding delivery. Moodle is the most likely candidate for this project need and will likely be built by HSRC. A full evaluation of Road Safety 101 is expected by the end of this quarter, and plans for when to offer the first, updated course offering to the public will follow quickly thereafter.

University of South Florida

Two USF students attended the STC activities at TRB. One student completed her MSCE thesis requirements with her thesis "Risk-Taking Characteristics as Explanatory Variables in Variations of Fatality Rates in the Southeastern United States." These findings were presented at the STC Student Spotlight event at TRB, and will be used in subsequent project deliverables.

Technology Transfer Accomplished Under Program Goals

University of Tennessee

- Dr. Cherry has developed a bicycle data application, "I Bike KNX," that gathers probe data from smartphones. This app resulted from collaboration with the "Cycle Atlanta" app developed by faculty at Georgia Tech under the Stride UTC. This app is being deployed to gather probe bike safety data. Probe data safety behavior study gathers route choice and cyclist driving behavior.
- Dr. Cherry has also submitted a patent application on a product that could improve transportation safety of bicyclists at railroad crossings. The continued evaluation of that product is partially supported by the STC, and applications in California are being explored with Alta Planning and Design.
- Dr. Khattak served as Special Adviser to the Journal of Safety and Security, and worked to increase the citation rate. He continued as Editor-in-Chief of SCI-Indexed Journal of Intelligent Transportation Systems and Associate Editor of SCI-Indexed International Journal of Sustainable Transportation.
- Dr. Han continued on the editorial board of International Journal of Transportation Science and Technology in 2015; and editorial board of Journal of Traffic and Transportation Engineering in 2015; and on the editorial board of the Scientific World Journal.
- Dr. Cherry served on the editorial board of International Journal of Sustainable Transportation. He also served on the Editorial board of a new journal titled "Traffic and Transport Theory & Practice."
- Faculty, staff, and students wrote and submitted several papers for presentations at the TRB annual meeting in January. The papers provide significant results related to safety.
- Faculty, staff, and student served on various Transportation Research Board committees.
    - Dr. Nambisan continued his work as president of the Council of University Transportation Centers. Dr. Nambisan continued as co-chair the TRB National Data Requirements and Programs committee, as a member of the TRB Education and Training Committee, and as a member of the Conduct of Research Committee.
    - Dr. Khattak served as co-chair of Advanced Traveler Information Systems sub-committee organizing and speaking at a workshop on the topic during 2015 TRB Annual Meeting in Washington, D.C.

- Dr. Cherry served as a member of ANF20, bicycle transportation. He also chaired the joint (bike, ped, motorcycle, law enforcement committees) subcommittee on emerging technologies for low speed vehicles. He serves on the Knoxville Greenway Commission.
- Dr. Han served on the TRB Managed Lane committee, which is a standing committee that deals with the operational and safety aspects of lane management policies and technologies. Dr. Han continues to be a full member of TRB Emergency Evacuation Task Force, which was elevated to a full committee status. Several STC MRI efforts can benefit and can influence the efforts at this committee. Dr. Han continues to serve as the University of Tennessee's Representative to TRB.
- Lissa Gay serves on the Technology Transfer Standing Committee as a member of the Research task group.

Notably, all research, education and outreach/technology transfer goals were met for the period. Substantial activity was directed toward gaining momentum on major research initiatives, coordinating teams, working with and recruiting new STC students, and presenting research papers at the Transportation Research Board annual meeting in 2015.

North Carolina A&T State University

The application period opened in February for the 2015 Summer High School Transportation Institute (STI) for rising high school juniors and seniors. Application packages have been distributed to high schools in a four-county area. The STI program exposes high school students to careers and academic choices in the field of transportation.

During this reporting period, undergraduate and graduate students have been submitting applications to the 2015-2016 STC Education Award competition. This award is offered to transportation and supply chain, and civil engineering students. The students will receive research mentorship, internship experiences as well as participate in experiential learning activities.

University of Alabama Birmingham

Roadside hardware training was conducted in Jacksonville, MO, and the UAB team attended and recorded the sessions. An outreach program was completed that engaged local seventh through ninth grade students in the Girls Inc. Eureka! Program.

University of Central Florida

For the 2015 Roadside Safety & Simulation Conference, abstracts were reviewed and selected. Full papers are due on May 1, 2015.

University of Kentucky

As part of MRI 2, the draft interim report was completed; an abstract was submitted to the 2015 Roadside Safety & Simulation Conference; one paper was submitted to Transportation Research Part C; and a master's report (safety-based model development) and a master's thesis (capacity-based model development) were completed.

As part of MRI 4, we identified areas where big data can contribute to planning and analysis; a poster presentation on big data was accepted for 2015 TRB annual meeting; and a Big Data applications presentation was given at KY/FHWA Partnering Conference.

University of South Florida

During this period, progress continued on our research as well as student support activities. Two USF stu-

dents attended the STC activities at TRB. One student completed her MSCE thesis requirements completing her thesis titled, “Risk-Taking Characteristics as Explanatory Variables in Variations of Fatality Rates in the Southeastern United States”. This effort was carried out in conjunction with MRI 3 and these efforts will contribute to the descriptive analysis as well as become a component of the analysis for USF MRI 3 activities. These findings have been presented at the student seminar and will be used in subsequent project deliverables.

1C. Have the results been disseminated? If so, in what ways?

University of Tennessee

UT faculty and Center for Transportation Research (CTR) staff have disseminated STC related results through the Internet and presentations at conferences, especially the 2015 TRB Annual Meeting. The faculty involved in TRB paper efforts includes Drs. Han, Khattak, Cherry, Nambisan, Baoshan Huang, Stephen Richards (STC Director), David Clarke (CTR Director), and several graduate students. Their efforts produced more than 20 research papers and posters, reflecting collaborations between various UT entities and other universities. Representative papers from TRB 2015 are highlighted below, and a list of relevant TRB papers is available at: http://tesp.engr.utk.edu/news.php.

Fair Representation of Transportation Research Record’s Impacts: A Case Study on Journal Citation Reports’ Impact Factor - 15-2242. Han, Lee D.; Nambisan, Shashi S.; Lemons, Ebony Latrice; Cherry, Christopher R.

B16 - Pedestrian Level of Service at Signalized Intersections in China Using an Intercept Survey Method - 15-1259. Ling, Ziwen; Cherry, Christopher R.; Ni, Ying; Li, Keping

C02 - What Are the Differences in Driver Injury Outcomes at Highway-Rail Grade Crossings? Role of Passive and Active Controls - 15-0959. Liu, Jun; Khattak, Asad J.; Richards, Stephen; Nambisan, Shashi S.

C25 - Global System for Transportation Simulation and Visualization in Emergency Evacuation Scenarios - 15-2483. Lu, Wei; Liu, Cheng; Thomas, Neil; Bhaduri, Budhendra L.; Han, Lee D.

D01 - Creating Indices for How People Drive in a Region: A Comparative Study of Driving Performance - 15-0966. Liu, Jun; Khattak, Asad J.; Wang, Xin,

D04 - Alternative Approach to Parking Demand Forecast Modeling: Case Study of Downtown Knoxville, Tennessee - 15-3429. Lim, Hyeonsup; Williams, Grant T.; Abdelqader, Dua; Amagliani, Joseph; Ling, Ziwen; Priester, Davis William; Cherry, Christopher R.

E25 - How much information is lost when sampling driving behavior data? - 15-0968. Liu, Jun; Khattak, Asad J.; Han, Lee D.

H20 - Supporting Instantaneous Driving Decisions through Trajectory Data - 15-1345. Khattak, Asad J.; Liu, Jun; Wang, Xin

Evaluation Of Confirmation Light Systems to Reduce Red Light Running and Time Into Red at Signalized Intersections - 15-4843. Boakye, Kwaku F.; Fitzsimmons, Eric J.; Schrock, Steven D.; Lindheimer, Tomas E.

e-HM: Demonstration of a HazMat Shipment Tracking Prototype System, Invited Presentation, Session 836, Richard, Bob; Nambisan, Shashi; Starr, Randy.

In December 2014, Drs. Cherry and Nambisan presented at the Transportation Planning and Modeling for Developing Countries conference in Mumbai, India. Nambisan was an invited Keynote speaker and Cherry was an invited session lead speaker.

North Carolina A&T State University

Drs. McBride and Carter presented their to-date research findings on their O/E research project at the UTC Conference for the Southeastern Region in Birmingham, AL, March 26-27, 2015. Student Research Assistant: Aleesa Carrington

Ahmed Lamarre presented research, Investigating the Effects of Water Conditioning on the Adhesion Properties of Crack Sealant, at TRB Minority Student Research Fellow Session and STC Student Spotlight session. Faculty Research Mentor: Dr. Elli Fini

Daniel Oldham presented research, Investigating the Feasibility of Rejuvenating Aged Asphalt with Bio-oil, TRB 94th Annual Meeting and the STC Student Spotlight session. Faculty Research Mentor: Dr. Ellie Fini

University of Alabama

Nothing to report.

University of Alabama Birmingham

The recorded roadside hardware training session was edited and converted into DVDs and distributed to the Missouri Department of Transportation and the Federal Highway Administration. It is now available to anyone upon request. The outreach program with Girls Inc. Eureka! was summarized by Dr. Hassan Moore, who spearheaded the project.

University of Central Florida

As a result of MRI 2 work:

- A poster has been generated from the substantiation task scheduled for the 2015 UTC Conference for the Southeast Region held in Birmingham, AL.
- A podium paper is also scheduled at this conference from the match project sponsored by the Florida Department of Transportation and related to pedestrian safety and estimating crash rates for the state of Florida.
- A paper titled “Studying the Effect of Sidewalk/Bicycle-Lane Gaps on Pedestrian Safety” has been accepted for presentation and publication at the 5th International Symposium on Highway Geometric Design, to be held in Vancouver, Canada June 22-24, 2015
- An abstract related to this work was accepted in the RSS2015 conference scheduled for October 6-8 in Orlando, FL.

As a result of MRI 4 work:

- Four papers related to the program were presented at the Transportation Research Board Annual Meeting in Washington D.C., in order to disseminate the results from the program in January 2015.
- One peer-reviewed paper was published in Accident Analysis & Prevention, and 1 peer-reviewed paper has been accepted in the Transportation Research Record.
- Also, one additional paper will be presented at 2015 UTC conference for the Southeastern Region in March 26-27, 2015.

The UCF research team made two presentations at TRB 2015 Annual Meeting; both were accepted for presentation and publication in TRR. The papers are “Wrong Way Driving Multifactor Risk-Based Analysis for Florida Limited Access and Toll Facilities” and “Wrong Way Driving Prevention: Incident Survey & Current Practiced Solutions.”

Working with Texas A&M Transportation Institute, Professor Al-Deek coordinated a podium session at TRB that addressed the topic of wrong way driving. Besides members of academia, this session was

well attended by FHWA and government and industry officials from Florida, Texas, Illinois, and Arizona, among others. In all, more than 100 professionals attended the session.

In addition, Al-Deek and TTI issued a joint call for papers on wrong-way driving. Ten papers were received, seven of which were presented in poster sessions. One paper has been accepted for presentation at the 2015 Road Safety and Simulation International Conference, to be held in Orlando, Florida in October 2015.

University of Kentucky

Nothing to report.

University of North Carolina Highway Safety Research Center

Nothing to report.

University of South Florida

Results of the descriptive analysis have been shared with project team members and graduate students at USF via a comprehensive PowerPoint. These materials will also be used in subsequent project deliverables.

1D. What do you plan to do during the next reporting period to accomplish the goals and objectives?

There have been no changes to the agency-approved application or plan for this effort.

University of Tennessee

Research:

We will continue to work on the four major research initiatives that relate to the Highway Safety Manual, safety simulations, the role of socio-demographics in safety, and big data applications in safety. Dr. Cherry will continue work on his new technologies and bicycle safety O&E grant.

Education:

- CEE Faculty will work with STC to recruit capable students with interest in safety to the UT program; we will continue the transportation seminar series, with speaker presentations available online. Safety courses including accident reconstruction will be offered.
- Dr. Nambisan will lead a program titled “Experiments in Transportation: Speed, Distance, Volume, Mass, Acceleration, Braking - So What?” for thirty-two 9th graders from June 14 to 19, 2015. This is in partnership with the Office of Diversity Programs, College of Engineering at the University of Tennessee. It is called eVol9, a part of their 2015 Summer Pre-College Program. Mr. Kwaku Boakye and Ms. Ebony Lemons, Graduate Students in Transportation Engineering will work with the students and eight undergraduate peer-mentors from the Office of Diversity Programs will assist them.
- Dr. Nambisan, in partnership with Dr. Jennifer Richards (Education and Curriculum Development specialist) is continuing to build on the 2014 Transportation Summer Academy for teachers to host a similar Academy in June 2015. This year’s Academy will focus on high School teachers. The Academy will offer hands-on, experiential learning opportunities for the participants so as to enable them to develop, implement, and assess transportation based lesson plans in their classes. Ms. Wenshu Li, a PhD student in Educational Psychology and Research, continues to support these efforts as a research assistant.

- Dr. Stephen Richards may offer a safety course on accident reconstruction in Summer 2015.

Outreach:

- In line with USDOT priorities, we will work to establish a pedestrian and bicycle transportation website, focusing on technical aspect of safety issues. It will be populated with information and studies related to pedestrian and bicycle safety. We will coordinate our efforts with consortium partners, especially University of North Carolina Pedestrian and Bicycle Information Center.
- International links will be further strengthened with various universities in Asia, Europe and Australia. Specifically, collaborations with Beijing Jiatong and Southeast Jiaotong universities will be explored, especially during the upcoming conference in June 2015. A recent graduate, Dr. Hongtai Yang, is working as Assistant Professor at Southwest Jiaotong University; Dr. Cherry has ongoing collaborations with Kunming University of Science and Technology and Tsinghua University in China, Utrecht University in Netherlands, and Monash University in Australia. Dr. Han and Dr. Huang are working closely with Changsha University.
- The faculty will work to further strengthen the Journal of Transportation Safety & Security. It has seen excellent growth in paper submissions and a special issue on railroad grade crossing safety is in the works. Our aim is to have the journal listed in the Science Citation Index within the next two or three years.

North Carolina A&T State University

Drs. McBride and Carter will continue to move forward on the research activities that will complete their O/E research project. Several conference paper presentations are planned.

Preparation for the 2015 Summer High School Transportation Institute will continue from this reporting period through the next. Application packages will be received and applicants meeting the program requirements will be selected. The daily program schedule will be completed for the five-week program. The program will run from June 24 – July 31, 2015.

STC Education Award recipients will be selected for the 2015-2016 academic year.

University of Alabama

The University of Alabama will continue to participate in MRIs 1 and 3, perform research in those areas and, in later reporting periods, disseminate results of the research.

University of Alabama Birmingham

The recorded roadside hardware DVDs will continue to be distributed upon request.

University of Central Florida

The City of Orlando, in cooperation with the research team, has agreed to videotape eight locations in central Florida where high pedestrian volumes exist, and crashes that involved pedestrian were reported. Data extracted from these videos will be used to validate and calibrate VISSIM and SSAM models. This will support the work of MRI 2.

During the next reporting period, the research team will continue to work on macroscopic safety analysis focusing on the development of safety performance functions at the macroscopic level. Moreover, the research team will keep working on the real-time safety assessment using data from multiple sources. This will support the work of MRI 4.

On the OE Project on Wrong Way Driving, Dr. Al-Deek will continue data analysis and modeling. Also, to complete design of the wrong way driving survey and implement it online. We also plan to continue

communication with the Florida Turnpike Enterprise (FTE) about their pilot project sites to make sure data is properly reported to the UCF Research Team. Submit the full manuscript on wrong way driving to RSS conference by the deadline of May 1, 2015.

University of Kentucky

As part of research management, STC Research Director Reg Souleyrette will work with MRI Coordinators to review, assess, and initiate specific research projects for all MRIs. He will assist in critique and reassessment of the MRI research program structure, and assist STC Directors with MRI project funding determinations for the year two program. The following items are expected during the coming reporting period:

MRI-1 Crash Modification Factors (Jerry Pigman)

- Draft final Report

MRI-2 Simulation (Nick Stamatiadis)

- Complete model development and evaluation
- Draft final report

MRI-4 Big Data (Mei Chen)

- Complete inventory and assessment of data sources
- Complete identification of safety enhancing data needs for various users
- Develop methods to integrate big data with traditional data
- Develop method to identify vulnerable/hotspots

O&E-Coordinated Emergency Vehicle Pre-emption (Adam Kirk)

- Finalize the literature review
- Complete development and evaluation of micro simulation model to emulate real world conditions
- Complete the final report

For the Education efforts, Dr. Souleyrette will identify and select graduate students for support with partial funding to work on safety research projects (for second year of STC funding); assign students to STC research projects; and continue to provide mentoring to graduate and high school students interested in highway safety issues

University of North Carolina Highway Safety Research Center

Nothing to report.

University of South Florida

During the next reporting period, we will continue with the data assembly and analysis as well as production of research results in technical paper formats. In addition, project deliverables will be developed.

2. Products: What has the program produced?

2A. Publications, conference papers, and presentations

University of Tennessee

Taking advantage of the STC momentum, the UT CEE faculty has continued to produce research publications in Transportation Research Record, Journal of Transportation Safety & Security, and Journal of Intelligent Transportation Systems, as well as other journals. Additionally, the UT faculty continues to edit the Journal of Transportation Safety and Security (Dr. Richards) and Journal of Intelligent Transportation Systems (Dr. Khattak).

The UTC regional center award has directly resulted in research publications: The faculty, staff and students presented papers at the conferences listed below and they presented over 20 research papers at the 2015 Transportation Research Board Annual Meeting. The work reflects collaborations between various UT entities and other universities. STC related papers are as follows:

Papers presented at conferences during reporting period

Richard, Bob; Nambisan, Shashi; Starr, Randy. e-HM: Demonstration of a HazMat Shipment Tracking Prototype System, Invited Presentation, Session 836, The 94th Annual Meeting of the Transportation Research Board. Washington D.C., 2015.

Nambisan, Shashi and Jennifer Richards, Transportation Systems STEM Summer Academy for Teachers, Engineering Leaders 2014 Conference on Engineering Education, Doha, Qatar. Hosted by Texas A&M University, November 9-11, 2015.

Lu, W., C. Liu, N. Thomas, B.L. Bhaduri, and L.D. Han, Global System for Transportation Simulation and Visualization in Emergency Evacuation Scenarios. The 94th Annual Meeting of the Transportation Research Board. Washington D.C., 2015.

Han, L.D., S. Nambisan, E. Lemons, and C. Cherry, Fair Representation of Transportation Research Record's Impacts: A Case Study on Journal Citation Reports' Impact Factor. The 94th Annual Meeting of the Transportation Research Board. Washington D.C., 2015.

Langford, B.C., C. Cherry, E. Fitzhugh, Energy demand of walkers and riders of electric-assist bicycles and traditional bicycles. Moving Active Transportation to Higher Ground. Washington D.C., 2015.

Yang, H., C. Cherry, R. Zaretzki, M. Ryerson, Rural-to-urban intercity deviated fixed-route design: application in Tennessee. The 94th Annual Meeting of the Transportation Research Board. Washington D.C., 2015.

Langford, B., J. Chen, C. Cherry, Comparing safety-related riding behaviors on bicycles and electric bicycles. The 94th Annual Meeting of the Transportation Research Board. Washington D.C., 2015.

Yoon, T., C. Cherry, EV (Electric Vehicle) Fleet Size and Composition Optimization based on demand satisfaction and total costs minimization. EVS 28. Goyang Korea, 2015.

Lim, H., G. Williams, D. Abdelqader, J. Amagliani, Z. Ling, D. Priester, C. Cherry, An alternative approach to parking demand forecast modeling: a case study of downtown Knoxville. The 94th Annual Meeting of the Transportation Research Board. Washington D.C., 2015.

Nambisan, Shashi. Some Reflections on Developing Broad Based Strategies to Enhance Road Safety, Invited Keynote Presentation, Transportation Planning and Modeling for Developing Countries conference in Mumbai, India, December 2014.

Papers presented at the Transportation Research Board

Liu J., A. Khattak, & L. Han, What is the Magnitude of Information Loss When Sampling Driving Performance Data? Transportation Research Board Annual Meeting, 2015.

Liu J., A. Khattak, S. Richards, & S. Nambisan, What are the Differences in Driver Injury Outcomes at Highway-Rail Grade Crossings? The Role of Passive and Active Controls, Transportation Research Board Annual Meeting, 2015.

Khattak A. & J. Liu, Generating Real-Time Volatility Information to Support Instantaneous Driving Decisions, Transportation Research Board Annual Meeting, 2015.

Langford, B., J. Chen, C. Cherry, Comparing safety-related riding behaviors on bicycles and electric bicycles. Transportation Research Board Annual Meeting, 2015.

Richard, Bob; Nambisan, Shashi; Starr, Randy. e-HM: Demonstration of a HazMat Shipment Tracking

Prototype System, Invited Presentation, Session 836, Transportation Research Board Annual Meeting, 2015.

Ling, Z., C. Cherry, Y. Ni, Pedestrian Level of Service at Signalized Intersections in China: Comparison of the Intercept Survey Method, Contingent Field Survey Method and Crossing Video Simulation Method. Transportation Research Board Annual Meeting, 2015.

Han, L, S. Nambisan, E. Lemons, and C. Cherry, Fair Representation of Transportation Research Record's Impacts: A Case Study on Journal Citation Reports' Impact Factor. Transportation Research Board Annual Meeting, 2015. Forthcoming in Transportation Research Record.

Lu W., L.D. Han, C. Liu, and B.L. Bhaduri, "Effect of Zoning and Network Resolutions on Microscopic Traffic Simulation," Transportation Research Record, National Research Council, 2015.

University of Central Florida

Two publications and five conference papers related to the program were produced.

2B. Journal publications

University of Tennessee

STC related publications by CEE faculty at UT: Published or forthcoming

Zhang, H., M. Cetin, and A. Khattak, Queuing delays associated with secondary incidents, Forthcoming, Journal of Intelligent Transportation Systems, 2015 (federal support acknowledged).

Wang X., A. Khattak, J. Liu, G. Amoli, & S. Son, What is the level of volatility in instantaneous driving decisions? Forthcoming in Transportation Research Part C, 2015. DOI:10.1016/j.trc.2014.12.014 (federal support acknowledged).

Liu J., A. Khattak, X. Wang, The role of alternative fuel vehicles: Using behavioral and sensor data to model hierarchies in travel, Forthcoming in Transportation Research Part C, 2015. DOI:10.1016/j.trc.2015.01.028. (federal support acknowledged).

Han, L, S. Nambisan, E. Lemons, and C. Cherry, Fair Representation of Transportation Research Record's Impacts: A Case Study on Journal Citation Reports' Impact Factor. Forthcoming in Transportation Research Record, Journal of Transportation research Board, 2015.

Ling, Z., C. Cherry, Y. Ni, K. Li, Pedestrian Level of Service at Signalized Intersections in China Using an Intercept Survey Method, Forthcoming in Transportation Research Record: Journal of the Transportation Research Board, 2015.

Chunjiao Dong, Shashi S. Nambisan, Stephen H. Richards, Zhuanglin Ma, Assessment of the effects of highway geometric design features on the frequency of truck involved crashes using bivariate regression" accepted for publication on Transportation Research Part A: Policy and Practice, doi:10.1016/j.tra.2015.03.007;

Ji, S., C. Cherry, L. Han, D. Jordan, Electric Bike Sharing: Simulation of User Demand and System Availability. Forthcoming in Journal of Cleaner Production. 10.1016/j.jclepro.2013.09.024. 2014.

STC related publications by CEE faculty at UT: Submitted for review

Bartnick, B., J. Liu, S. Richards, & A. Khattak, Driver behavior at railway-highway grade crossings with passive traffic controls: A driving simulator study, Journal of Safety & Security. (in review).

Pannell, Z., C. Cherry, H. Yang, O. Grembek, Road user vulnerability in China – Impacts of the new e-bike mode. Injury Prevention (in review), 2014.

Cherry, C., H. Yang, L. Jones, M. He, Dynamics of E-bike Use in China. Transport Policy (in review), 2014.

Campbell, A., C. Cherry, M. Ryerson, L. Jones, X. Yang (2014) Factors Influencing the Choice of Public

Shared Bicycles and Electric Bicycles in Beijing. Transportation Research Part C (in review).

Langford, B.C., Chen, J. C. Cherry, Risky riding: naturalistic methods comparing safety behavior from conventional bicycle riders and electric bike riders. Accident Analysis and Prevention, 2015. (in review).

Yang, H., C. Cherry, Z. Ling, Z. Pannell, L. Han (2015) Multimodal Crash Severity, Fault, and Frequency Analysis of Road Users in China—Based on Self- reported Surveys. Accident Analysis and Prevention, 2015. (in review)

Fishman, E., C. Cherry E-bikes in the mainstream: Reviewing a decade of research. Transport Reviews, 2015. (in review)

Yang, H., C. Cherry, R. Zaretzki, M. Ryerson Rural to Urban Intercity Deviated Fixed Route Transit Network Design–An Application in Tennessee. Transportation, 2015 .(in review)

Ling Z. C. Cherry. H. Yang, L. Jones (2015) From e-bike to car: A study on factors influencing motorization of e-bike users across China. Transportation Research Part D, 2015. (in review)

Chunjiao Dong, Mark Burton, Zhuanglin Ma, Shashi S. Nambisan. Effects of car-truck mix on the frequency of large truck involved crashes, Submitted for Publication in Traffic Injury Prevention, Manuscript ID GCPI-2014-0219.R1

Chunjiao Dong, S. Nambisan, Kwaku Boakye, Ebony Lemons - we continue to work on a paper based on data from Tennessee to investigate the role of alcohol sales (wet vs. dry counties), socio-demographic variables (age, gender, income levels, rural/urban characteristics) on crash rates and developed a "preliminary" (negative binomial) model. To be submitted in 2015 Q2.

University of Alabama

Mehta, G., Li, J., Fields, R., Lou, Y., Jones, S. Safety Performance Function Development for Analysis for Bridges. Accepted by the ASCE Journal of Transportation (in press).

University of Central Florida

Lee, J., Abdel-Aty, M., Choi, K., & Huang, H. (2015). Multi-level hot zone identification for pedestrian safety. Accident Analysis & Prevention, 76, 64-73.

Wang, L., Shi, Q., & Abdel-Aty, M. (2015). Predicting crashes on expressway ramps with real-time traffic and weather data. Accepted and soon to be published in the Transportation Research Record.

Rogers, John H., Adrian Sandt, Haitham Al-Deek, Ahmad Alomari, Nizam Uddin, Eric Gordin, Cristina Dos Santos, Grady Carrick. Wrong Way Driving Multifactor Risk-Based Analysis for Florida Limited Access and Toll Facilities. Accepted for publication in the Transportation Research Record: Journal of the Transportation Research Board, February 2015.

Wrong Way Driving Prevention: Incident Survey and Current Practiced Solutions. Authors: Adrian Sandt, Haitham Al-Deek, Ph.D., P.E.,, John H. Rogers, P.E., and Ahmad Alomari, accepted for publication in the Transportation Research Record: Journal of the Transportation Research Board, February 2015.

Rogers, John H., Haitham Al-Deek, Ahmad Alomari, Frank A. Consoli, Adrian Sandt. Wrong-Way Driving on Florida Toll Roads: An Investigation into Multiple Incident Parameters and Targeted Countermeasures for Reductions. Accepted in the Inderscience journal for Engineering Management Transport.

2C. Books or other non-periodical, one-time publications

University of Tennessee

Liu, Jun, Driving Volatility in Instantaneous Driving Behaviors: Studies Using Large-Scale Trajectory Data, PhD Dissertation (supervisor: Dr. Khattak), Federal (STC) support acknowledged.

Hargrove, Stephanie R., Self-Learning License Plate Matching Algorithm – Some Enhancements and its Role in Travel Time Ground Truth Measurement, PhD Dissertation (Supervisor: Dr. Han), Federal (STC) support acknowledged.

Yang, Jianjiang, Spatio-Temporal Dynamics of Short-Term Traffic, PhD Dissertation (Supervisor: Dr. Han), Federal (STC) support acknowledged.

Lu, W. and L.D. Han (2015) "Impacts of Vehicular Communication Networks on Traffic Dynamics and Fuel Efficiency," Chapter 7 of ICT for Transport Opportunities and Threats, 161-178, ISBN 978-1-78347-129-4, Edward Elgar Publishing (Forthcoming).

2D. Other publications, conference papers and presentations:

University of Tennessee

Khattak A., J. Liu & X. Wang. Supporting Instantaneous Driving Decisions through Vehicle Trajectory Data, TRB paper # 15-1345. Presented at the Transportation Research Board Annual Meeting, National Academies, Washington, D.C., 2015.

Liu J., A. Khattak & X. Wang. Creating Indices for How People Drive in a Region: A Comparative Study of Driving Performance, TRB paper # 15-0966. Presented at the Transportation Research Board Annual Meeting, National Academies, Washington, D.C., 2015.

Liu J., A. Khattak & L.D. Han. How Much Information is Lost When Sampling Driving Behavior Data? TRB paper # 15-0968. Presented at the Transportation Research Board Annual Meeting, National Academies, Washington, D.C., 2015.

Liu J. & A. Khattak. Improved warning and assistance information from connected vehicle basic safety messages, Accepted for presentation at 2015 Intelligent Transportation Systems World Congress, Bordeaux, France, 2015.

Liu J. & A. Khattak, Using large-scale behavioral and sensor data to explore the link between driving volatility and safety outcomes. Accepted for presentation at 2015 Road Safety & Simulation International Conference, Orlando, FL 2015.

Liu J. & A. Khattak, Using large-scale behavioral and sensor data to explore the link between driving volatility and safety outcomes. Accepted for presentation at 2015 Road Safety & Simulation International Conference, Orlando, FL 2015.

Khattak A., X. Wang & J. Liu, Transportation Data Needs for Making Transportation Decisions, In preparation for presentation.

Ling Z., C. R. Cherry, L.M. Wade, and D. Stone, Study on dynamic factors on single-bicycle crash caused by railway tracks. Accepted for presentation at 2015 Road Safety & Simulation International Conference, Orlando, FL. 2015.

University of Alabama

Lou, Y., Mehta, G., Jones, S. 2015. A Bayesian Analysis of Crash Severities with Multivariate Conway-Maxwell Poisson Distribution. Accepted for presentation at the 95th Transportation Research Board Annual Meeting, Washington DC, January 11-15, 2015.

Mehta, G., Li, J., and Jones, S., Evaluating the Performance of the Negative Binomial and Conway Maxwell Poisson Safety Performance Function for Railway-Highway at Grade Crossing, Poster Presentation, 2015 UTC Conference for the Southeastern Region, March 26-27, 2015, Birmingham, AL.

Simandl, J., GIS-Based Evaluation of the Selective Law Enforcement Campaigns to Develop Crash Modification Factors, Poster Presentation, 2015 UTC Conference for the Southeastern Region, March 26-27, 2015, Birmingham, AL.

University of Central Florida

Lee, J., Abdel-Aty, M., Choi, K., & Huang, H. (2015). Multi-level hot zone identification for pedestrian safety. Presented at the Transportation Research Board Annual Meeting.

Kuo, P. F., Lee, J., & Abdel-Aty, M. (2015). Comparing hotspot identification methods at the macroscopic safety analysis level. Presented at the Transportation Research Board Annual Meeting.

Qi Shi, Abdel-Aty M., How Traffic Crashes Affect Congestion on Urban Expressways, Presented at the Transportation Research Annual Meeting.

Wang, L., Shi, Q., & Abdel-Aty, M. (2015). Predicting crashes on expressway ramps with real-time traffic and weather data. Presented at the Transportation Research Board Annual Meeting.

Qi Shi, Mohamed Abdel-Aty, Applications of Intelligent Transportation Systems Data for Safety and Mobility Improvement on Urban Expressways, would be presented at 2015 UTC Conference for the Southeastern Region.

2E. Website(s) or other Internet site(s)

University of Tennessee

- Transportation Engineering & Science Program (TESP) website disseminates results of research and/or program activities at http://tesp.engr.utk.edu/. The website provides information about key research, education, and outreach activities underway. It is linked to the Southeastern Transportation Center website.
- STC helps fund Dr. Cherry's "bikeshare" program and website at: http://www.cycleushare.com

University of Central Florida

Working with UT-CTR staff, we have refined and maintained the website for the 2015 International Roadside Safety & Simulation Conference http://stc.utk.edu/STCevents/rss2015/index.html.

2F. Technologies or techniques

University of Tennessee

Development of the "I Bike KNX" smartphone application for bicycle probe data tracking.
"I Bike KNX" smart phone app for iOS and Dr. Cherry and several other researchers have developed Android. It uses smart phone's GPS to record routes and allows users to report problems along their route such as potholes and so on. It will contribute to the safety improvement and route choice optimization for cyclists. This app was developed for the OE grant but its data can be used for the Big Data MRI 4 in this grant as well, focusing on behavior analysis from big datasets.

2G. Inventions, patent applications and/or licenses

University of Tennessee

Dr. Cherry has a patent application under review: "Device for level bicycle at-grade crossing of rail tracks."

2H. Other products

All products from this reporting period have been described above.

3. Participants and Other Collaborating Organizations

3A. Table of Collaborators

Organization Name	Location of the Organization	Partner's Contribution to the Project	Name (First and Last)
University of Tennessee			
Tennessee DOT	Nashville TN	Matching request & data	
ORNL	Oak Ridge TN	Collaborative support	
INRIX	Kirkland WA	Collaborative support	
US Dept. of Energy	Washington DC	Collaborative support	
Knoxville Regional Trans Planning Org	Knoxville TN	Collaborative support & personnel time	
Social Bicycles (SoBi)	New York	Collaborative support & data match	
Georgia Tech	Atlanta GA	Collaborative support	
Various Jiaotong Universities in China	Beijing, Nanjing, Guangzhou, Shenzhen, Changsha, China	Collaborative support & personnel exchanges	Dr. Xuedong Yang
Social Bicycles	New York	Data match, personnel time, collaboration	Ryan Rzepeki
Community Action Committee	Knoxville TN	In-Kind Support, collaborative support	Karen Estes
East Tennessee Human Resource Agency	Knoxville TN	personnel exchanges	Aaron Bradley
Knoxville Area Transit	Knoxville TN	personnel exchanges	Melissa Roberson
University of Alabama			
Center for Advanced Public Safety	Tuscaloosa AL	Crash data, programming	Randy Smith
Alabama DOT (5th Division)	Tuscaloosa AL	Collaborative support and facilities	
University of Alabama Birmingham			
Girls Inc. Eureka!	New York NY	In-kind support	
University of Central Florida			
FL DOT		data	
Central FL Expy		data	
City Of Orlando		data	Charles Ramdatt
Metroplan Orlando		data	Mighk Wilson
Kentucky Transportation Center at UK	University of Kentucky	Joint MRI	Nick Stamatiadis
Florida's Turnpike Enterprise (FTE)	Ocoee FL	Provided direct match for this project in the amount of $80,000; co-authored a paper submitted to TRB	Eric Gordin, PE
Enforcement Engineering, Inc.	Jacksonville FL	Provided citation and 911 call data for analysis	Grady Carrick, Ph.D.
Texas A&M Transportation Institute (TTI)	College Station TX	Worked as one team to compete for NCHRP 03-117 on wrong way driving and won it	Melisa Finley
University of Kentucky			
KY Trans. Cabinet-DOH	Frankfort KY	In-Kind support, Collaborative support, Financial support	Jason Siwula
AAA Foundation for Traffic Safety	Washington DC	Collaborative support	Peter Kissinger
Center for Transportation Research	University of Tennessee	Collaborative support	Airton Kohls
UNC-Highway Safety Research Center	Chapel Hill NC	Collaborative support	David Harkey
University of Alabama Research	Tuscaloosa AL	Collaborative Support	Gaurav Mehta
NURail--UTC	University of Illinois	Collaborative Support	Ahmed Shabana
University of North Carolina Highway Safety Research Center			
National Cooperative Highway Research Program	Washington, D.C.	Collaborative match using funds from NCHRP Project 17-63: development and application guidance for Crash Modification Factors	Raghavan Srinivasan
University of South Florida			
FDOT	Tallahassee Florida	Provide financial support for match project	

3B. Additional collaborators

University of Tennessee

Significant collaborations are continuing with others within UT (in safety), nationally and internationally.

- Collaborations are underway between UT Civil & Environmental Engineering, UT Industrial and Systems Engineering, UT Mechanical Aerospace and Biomedical Engineering, Electrical Engineering and Computer Science, & UT Department of Geography.
- Collaborations are underway between all UT Civil & Environmental Engineering faculty and 8 consortium partner schools in the context of four STC major research initiatives. Additional collaborations are underway with staff from the Center for Transportation Analysis, Oak Ridge National Lab, TN
- International collaborations in safety during the reporting period include 1) Beijing Jiaotong University, Southeast University, Tongji University, Southwest Jiaotong University, Kunming University of Science and Technology, Tsinghua University, Shenzheng University, and Changsha University of Science and Technology; and COTA-Chinese Overseas Transportation Association. Utrecht University, Monash University, TU Delft, and University of Novi Sad.
- e-HM Initiative Consortium. Label Master, Blue Dot Solutions, American Trucking Associations, CHEMTREC, Commercial Vehicle Safety Alliance, Eastman Chemical Company, FedEx, International Association of Fire Chiefs, Pilot Flying J, National Tank Truck Carriers, OmniTracs, ORNL, UPS. The goal of this consortium is to develop and demonstrate a proof-of-the-concept for an e-HM system. We

have started with developing mock-ups of the envisioned system. The next step is to develop a prototype systems, and eventually to conduct pilot tests to demonstrate how software, cloud computing and communications hardware. Members of the consortium have so far made in-kind contributions in the form of personnel time, travel, hardware, software, and communications resources.

Clemson University
Nothing to report.

North Carolina A&T State University
Nothing to report.

University of Alabama
Nothing to report.

University of Alabama Birmingham
For the collaboration with Girls Inc. Eureka!, Drs. Hassan Moore, Mohammed Haider, Abidin Yildirim, and Arie Nakhmani (UAB Department of Electrical Engineering) participated.

University of Central Florida
A major accomplishment this past period is winning the national NCHRP 03-117 on wrong way driving along with Texas A&M Transportation Institute (TTI) team. This national project is 28 months and will use data from the STC project. UCF Professor Al-Deek is the lead on this collaboration effort.

University of Kentucky
Nothing to report.

University of North Carolina Highway Safety Research Center
As part of the MRI1 research area, we have collaborated with the NCHRP Project 17-63 team that includes: Dr. Bhagwant Persaud, Ryerson University; Dr. James Bonneson, Kittelson and Associates; and Dr. Ezra Hauer, University of Toronto, Retired.

University of South Florida
Nothing to report.

4. Impact

4A. What is the impact on the development of the principal discipline(s) of the program?

University of Tennessee
The work undertaken by UT enhances safety through research on Highway Safety Manual, safety simulations, big data applications, and the role of socio-demographics in safety. The multi-disciplinary research activity underway with diverse consortium partners is creating the knowledge base and foundation needed for innovations in safety countermeasures and making methodological advances in safety modeling, simulation, and visualization. Multiple stakeholders will feel the impact of safety research in multiple

modes of transportation.

As an example, findings from the STC Big Data major research initiative are creating new metrics of driving volatility. These can be used in real-time to support instantaneous driving decisions. This work is providing new analytics (driving volatility) using big data coming in from sensors to enhance safety. The information on driving volatility can be used, for example, in high schools to reward students who show "calm" driving patterns rather than volatile driving patterns.

The e-HM Initiative Consortium led by the University of Tennessee and STC aims to develop and demonstrate a proof-of-the-concept for an electronic Hazardous Materials (e-HM) system. Our partners in the consortium include Label Master, Blue Dot Solutions, American Trucking Associations, CHEMTREC, Commercial Vehicle Safety Alliance, Eastman Chemical Company, FedEx, International Association of Fire Chiefs, Pilot Flying J, National Tank Truck Carriers, OmniTracs, ORNL, UPS. We have started with developing mock-ups of the envisioned system. The next step is to develop a prototype systems, and eventually to conduct pilot tests to demonstrate how software, cloud computing and communications hardware. We have been invited to present our efforts and their outcomes at the 2015 TRB Annual Meeting and also at a US DOT OHMS Research and Development Forum.

North Carolina A&T State University
The infusion of Transportation and Supply Chain Management information technology software into the coursework provides an approximation of reality into problem solving activities. This better prepares student as they prepare themselves for future employment in the field.

University of Alabama
The development of the Safety Performance Function Development for Bridges (journal publication listed above) is a contribution to the suite of safety predictions capabilities being established the rough the implementation of the Highway Safety Manual.

Crash severity modeling using Multivariate Conway-Maxwell Poisson Distribution (conference presentation listed above) allows for improvement in crash prediction in the event of under-dispersed characteristics in the crash data.

University of Alabama Birmingham
The training DVDs produced at UAB will assist State DOTs and contractors with providing consistent and correct installation of roadside hardware devices, which in turn will reduce the number of injurious and fatal crashes associated with faulty installations in the field of roadside safety engineering.

University of Central Florida
MRI 2 Progress

This research provides an added dimension for using microscopic simulation and traffic conflicts as safety tool and surrogate measure, respectively. The lack of pedestrian safety data has been a major hurdle for researchers to better quantify pedestrian crash rates. This research will assist with this goal.

MRI 4 Progress

This research proves the potential of using big data in safety research. It also shows that multiple sources of data are available and can be used in either microscopic or macroscopic level applications.

OE Project Progress

New technology is being tested as part of the pilot study to combat wrong-way driving in Florida and beyond. One of the technology concepts, known as Rectangular Rapid Flashing Beacon (RRFB) and LED, has never been applied before to combat WWD problem (and was only known to help pedestrian cross-

walks until this time). This is a sole UCF totally new concept. Channel 9 news conducted an interview with Professor Al-Deek on this technology on February 10, 2015, which was aired five times over two days (different sound bites and videos).

University of North Carolina Highway Safety Research Center

Most of the crash modification factors in the Highway Safety Manual, the CMF Clearinghouse, and other sources are just single factors implying that the safety effect of a treatment does not depend on the characteristics of a site. The MRI1 effort from HSRC will develop crash modification functions that will provide insight into how the safety effect of a treatment may vary depending on the characteristics of a site.

4B. What is the impact on other disciplines?

University of Tennessee

The transportation field is multi-disciplinary and applied. As such, transportation research produces domain knowledge that helps improve mobility and safety. The comprehensive view of safety taken by the CEE faculty at UT is relevant to social sciences, e.g., the findings from the study of socio-demographics have the potential to create new social science-based knowledge. Analysis of spatial/geographical aspects of safety has the potential to impact the field of geography. Another example is the application of modeling, simulation, and visualization techniques to safety. These can in turn improve transportation operations (e.g., incident/accident management), transportation planning and sustainability (e.g., by taking into account the costs of injuries and death and potential improvements in facility design) and also link with epidemiology and health.

North Carolina A&T State University

Technology has assumed a larger role in transportation operations and safety research. Information technology plays a prominent role in the ability of Transportation and Supply Chain Management graduates to meet industry performance expectations.

University of Alabama Birmingham

The successful recruitment efforts in the Girls Inc. Eureka! Partnership will benefit the field of electrical engineering in years to come. Specifically, the researchers and participants explored remote-controlled autonomous cars, which could impact the field of autonomous vehicles in the future.

University of Central Florida

The use of new technology developed by electrical and ITS engineers, to make driving safe on public roads, are a great benefit to all disciplines not just civil engineering.

4C. What is the impact on the development of transportation workforce development?

University of Tennessee

The following work force development activities at UT are relevant and underway:

- The Civil & Environmental Engineering faculty at UT offered these transportation courses during Spring 2015:
  - CE 550 - Transportation Seminar - Dr. Cherry
  - CE 553 - Geometric Design (DE section included) - Dr. Nambisan
  - CE 558 - Planning and Transportation - Dr. Khattak
  - CE 595/IE 591 - 3-D Simulation Modeling of Transportation Systems - Dr. Clarke
  - CE 652 - Analysis Techniques for Transportation Systems II - Dr. Han
- The Accident Reconstruction course is being revised for delivery in Summer 2015. We have purchased accident reconstruction software (ARAS) to help students understand new tools available for accident reconstruction.
- Undergraduate and graduate students are being exposed to transportation safety through their courses. This should motivate them to seek careers in transportation safety.

North Carolina A&T State University

The educational and workforce development activities have a two-pronged focus. At the high school level, students are introduced to the Transportation and Supply Chain Management and the Engineering aspects of the Transportation profession. The objective is to encourage them to enter college and choose majors in these fields. At the university level, students receive financial support as they pursue their choice of Transportation and Supply Chain Management or Engineering majors. Assistance is based on grade-point average, effectively motivating students to maintain high educational standards.

The end result of these efforts is to increase the number of students majoring in Transportation and Supply Chain Management or Engineering who will become the new professionals in these fields.

University of Alabama

The work has allowed for considerable intellectual development of graduate students (and one postdoctoral researcher) in the field of transportation safety research – particularly in the sense of exploring non-conventional statistical modeling techniques.

University of Alabama Birmingham

Training DVDs on the proper use and installation of roadside hardware will influence State DOT engineers and contractors, who have been or will be provided with the training material.

Three fellowships have been awarded, with one additional fellowship pending, to students at UAB who are pursuing a degree in Mechanical or Civil Engineering with an emphasis on transportation safety.

University of North Carolina Highway Safety Research Center

We expect that the Road Safety 101 course that we plan to offer later this year will provide basic skills to practitioners in the traffic safety area, and encourage them to make better holistic decisions.

University of South Florida

USF has an impact on the development of the transportation workforce by providing an opportunity for research for future transportation professionals.

4D. What is the impact on physical, institutional and information resources at the university or other partner institutions?

University of Tennessee

Generally, UT offers excellent physical, institutional, and information resources that have a positive impact the mission of STC, as mentioned below:

- The Civil & Environmental Engineering Department at University of Tennessee is in a newly constructed facility, the John D. Tickle building. (A construction video is available at: https://www.you-

tube.com/watch?v=84py8lbDMgM). The facility has ample space for transportation labs, and houses the UT driving simulator used for safety studies.
- The CEE Department has four full-time faculty members, Dr. Cherry (Associate Professor), Dr. Han (Professor), Dr. Khattak (Beaman Professor), and Dr. Nambisan (Professor). They are all working on transportation safety issues and are deeply involved in working with STC to enhance its research, educational, and technology transfer goals.
- The eight partner universities in the consortium are benefiting from interactions and collaborations with the active Transportation Engineering and Science Program faculty in Civil & Environmental Engineering at UT.

North Carolina A&T State University
The increased numbers of students in the Transportation and Supply Chain major are reflected in the increased membership in the student chapter of Council of Supply Chain Management Professionals. The net result is that more students are exposed to speakers and site visits thus gaining increased knowledge regarding their chosen profession.

University of South Florida
USF is developing a substantial database that will support future transportation research.

4E. What is the impact on technology transfer?

University of Tennessee
The technology transfer activities at UT Civil & Environmental Engineering include:
- STC & Civil Engineering Speaker Series & Webinars, Spring 2015
- Developing a searchable website for STC publications, technical reports, conference papers & presentations
- Editing STC related journals, Journal of Transportation Safety & Security, and Journal of Intelligent Transportation Systems
- Preparation and delivery of safety research presentations at the 2015 Transportation Research Board annual meeting.

UT faculty is assisting with the 2015 Road Safety & Simulation International Conference (October 6—8, 2015), in Orlando, Florida by submitting papers and playing a major role in reviewing submitted papers. The conference is co-hosted by University of Central Florida and The University of Tennessee.

As STC projects progress, we are disseminating the results to various stakeholders in the transportation safety arena. We worked on presenting papers in various forums that impact various stakeholders, including transportation practitioners, researchers, policy makers, and the private sector. Also, STC affiliated faculty at UT have an important impact internationally through collaborations with Asian and European countries.

North Carolina A&T State University
Research being conducted concerning texting and driving is focused on the personality factors of those who text while driving. The intent is to translate the results into guidelines for creating more effecting advertising campaign which is intended to change attitudes regarding the acceptability of texting and driving.

University of Alabama
The bridge Safety Performance Functions (and companion Crash Modification Factors) are currently being adopted and put into use by the Alabama Department of Transportation.

University of Alabama Birmingham
The training DVDs have been provided to state and federal government agencies. These agencies are the primary sources of funding for installation and maintenance of roadside hardware, and as such, providing them with the training material will help improve the state of the industry.

University of Central Florida
The Wrong Way Driving project will allow other governmental agencies see how to address and investigate wrong way driving along with introducing new countermeasures such as the RRFB and enhancing other implemented measures at states like Texas (LEDs).

University of North Carolina Highway Safety Research Center
The crash modification functions resulting from the MRI1 effort is expected to provide valuable information to state agencies as they make decisions about identifying appropriate treatments based on site characteristics.

4F. What is the impact on society beyond science and technology?

University of Tennessee
The Southeastern Transportation Center and UT CEE faculty are well positioned to directly affect transportation safety in many ways.
- Socio-demographic, attitudinal, and behavioral research on safety will improve public knowledge and provide a fundamental understanding of how to improve safety from broad social, economic, spatial, and behavioral perspective.
- Highway Safety Manual improvements (one of the major research initiatives) can lead to reductions in hazards and application of new countermeasures that save lives.
- The Big Data applications in safety provides a means to innovate and consider new ways of approaching safety comprehensively by combining information from diverse databases and in a dynamic context.
- Safety simulations can lead to a better understanding of vehicles' interactions, why collisions occur, how to better respond to them, and their consequences. The simulations advance the knowledge and skills of people who work in the safety field, and facilitate the study of human factors. Modeling, simulation, and visualization help formulate regulatory policies that lead to safety improvements.

These efforts of UT faculty directly contribute to the development of methods and applied knowledge in safety, they are training a skilled workforce, they are forming and expanding social networks that stimulate safety research, and creating new problem solving approaches that enhance safety.

North Carolina A&T State University
Texting While Driving research results will translate into a more safety conscious driving public.

University of Alabama Birmingham
The training DVDs will improve the quality of the roadside safety hardware installation and maintenance,

which in turn will reduce the likelihood of injurious and fatal crashes associated with the malfunction of one of these devices.

University of Central Florida

The OE project has significant impact on society by saving lives and combating a deadly and dangerous behavior that has been on the rise in many states, one of them is Florida. The research is addressing a very serious problem of wrong way driving which is very dangerous to public safety and allows the driving public to understand that new proactive techniques are being applied and new investigations are ongoing to combat this deadly and dangerous behavior.

5. Changes/Problems

5A. Changes in approach and reasons for change

No problems to report.

5B. Actual or anticipated problems or delays and actions or plans to resolve them

None to report.

5C. Changes that have a significant impact on expenditures

None to report.

5D. Significant changes in use or care of human subjects, vertebrate animals and/or biohazards

None to report.

5E. Change of primary performance site location from that originally proposed

None to report.

Additional information regarding Products and Impacts

Outputs

University of Tennessee

Leveraging the STC funding, Drs. Nambisan and Jerry Everett (CTR Research Director) began work on a $1.2 million, three-year research project sponsored by the Centers for Disease Control on improving nighttime seat belt use through education and enforcement strategies with broad stakeholder participation.

North Carolina A&T State University

- Transportation and Supply Chain Management majors are in the process of securing internships for the summer.

- An increased number of students at two-year institutions are choosing to come to NC A&T to finish a four-year degree in Transportation and Supply Chain Management.
- The curriculum for the major has been revised to include Relationship Management, and Enterprise Resource Planning (ERP)

University of Central Florida

Peer-review publications:

Lee, J., Abdel-Aty, M., Choi, K., & Huang, H. (2015). Multi-level hot zone identification for pedestrian safety. Accident Analysis & Prevention, 76, 64-73.

Wang, L., Shi, Q., & Abdel-Aty, M. (2015). Predicting crashes on expressway ramps with real-time traffic and weather data. Accepted and soon to be published in the Transportation Research Record.

Conference paper presentations:

Lee, J., Abdel-Aty, M., Choi, K., & Huang, H. (2015). Multi-level hot zone identification for pedestrian safety. Presented at the Transportation Research Board Annual Meeting.

Kuo, P. F., Lee, J., & Abdel-Aty, M. (2015). Comparing hotspot identification methods at the macroscopic safety analysis level. Presented at the Transportation Research Board Annual Meeting.

Qi Shi, Mohamed Abdel-Aty, How Traffic Crashes Affect Congestion on Urban Expressways, Presented at the Transportation Research Annual Meeting.

Wang, L., Shi, Q., & Abdel-Aty, M. (2015). Predicting crashes on expressway ramps with real-time traffic and weather data. Presented at the Transportation Research Board Annual Meeting.

Qi Shi, Abdel-Aty M., Applications of Intelligent Transportation Systems Data for Safety and Mobility Improvement on Urban Expressways, would be presented at 2015 UTC Conference for the South-eastern Region.

Hatem Abou-Senna and Essam Radwan, Assessment of Sidewalk/Bicycle-Lane Gaps with Pedestrian Safety, Podium paper to be presented at 2015 UTC Conference for the Southeastern Region.

Jiawei Wu, Barry Darius, Hatem Abou-Senna, and Essam Radwan, Integrated Simulation and Safety for Bicycles and Pedestrians, Poster to be presented at 2015 UTC Conference for the Southeastern Region

Other

A major accomplishment this past period is winning the national NCHRP 03-117 on wrong way driving along with Texas A&M Transportation Institute (TTI) team. This national project is 28 months and will use data from the STC project. UCF Professor Al-Deek is the lead on this collaboration effort.

University of North Carolina Highway Safety Research Center

The following journal publications, books, and presentations were published during the last six months. All were related to safety, but they were not based on the STC funded efforts.

Journal publications

McDonald, C.C., Goodwin, A.H., Pradhan, A.K., Romoser, M.R.E., & Williams, A.F. (2015). A review of hazard anticipation programs for young drivers. Journal of Adolescent Heath, in press.

McDonald, N., McGrane, A., Rodgman, E., Steiner, R., Palmer, W., & Lytle, B. (2015). Assessing multimodal school travel safety in North Carolina. Accident Analysis & Prevention, 74, 126-132. doi:10.1016/j.aap.2014.10.006

Pratt, M.P., Bonneson, J.A., & Zegeer, C.V. (2014). Limiting Driveway Access at Intersections Sample Application of Value-of-Research Evaluation. Transportation Research Record, 2432, 110-117. doi: 10.3141/2432-13

Books

Sandt, L., LaJeunesse, S., Cohn, J, Pullen-Seufert, N., & Gallagher, J. (2015). Bicycle and pedestrian safety, education, and enforcement campaign: 2014 Watch for Me NC Program Summary. (NCDOT Report No. 2014-45). Raleigh, N.C.: North Carolina Department of Transportation.

Sandt, L., Thomas, L., Langford, K., & Nabors, D. (2015). A Resident's Guide for Creating Safer Communities for Walking and Biking. (FHWA-SA-14-099). Washington, D.C.: Federal Highway Administration.

Conference papers, presentations, etc.

Council, F.M. (2015, January). SHRP 2 safety legacy. Presented to the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Foss, R.D. (2014, November). Driving after drinking: Problem, prevalence & prevention. Invited presentation to the UNC School of Government DWI Training for Magistrates, Chapel Hill, NC.

Foss, R.D. (2014, October). Teen driver crashes: Can you help? Keynote address to Students Against Violence Everywhere Statewide Conference: Teen Safe Driving: Reckless or Wreckless? Raleigh, NC.

Foss, R.D. (2014, October). Using national licensing data to measure teen driver exposure: Proceed with caution! Presented to the 40th International Forum on Traffic Records & Highway Information Systems, St. Louis, MO.

Foss, R.D. (2014, September). What and how novice drivers learn: Implications for GDL now & driver education in the future. Invited presentation to the Governors Highway Safety Association Annual Meeting, Grand Rapids, MI.

Foss, R.D. (2015, February). Where have all the teen drivers gone: Problems with driver license data in North Carolina and beyond. Presented to the North Carolina Traffic Records Coordinating Committee, Raleigh, NC.

Foss, R.D. (2015, January). Is graduated driver licensing needed for older novice drivers in the United States? Existing evidence and burning research questions! Presented to the 94th Annual Meeting of the Transportation Research Board, Human Factors Workshop, Washington, DC.

Foss, R.D. (2015, January). Learning to drive after a year of supervised driving. Presented to the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Foss, R.D. (2015, March). Are teen drivers really that bad? Presented to the 2015 North Carolina BuckleUpNC Conference, Raleigh, NC.

Foss, R.D. (2015, March). Planning for success: What makes an effective teen driver program? Presented to the 2015 North Carolina BuckleUpNC Conference, Raleigh, NC.

Foss, R.D. (2015, March). The next big leap in teen driver safety: Helping novices know how to do what we do without knowing. Presented to the Distinguished Faculty Seminar, University of Michigan, Ann Arbor, MI.

Goodwin, A. (2015, January). Review of hazard recognition training programs for young drivers. Presented to the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Goodwin, A. (2015, March). Three things parents should do when supervising a teen driver. Presented to the North Carolina Teen Driver Safety Symposium, Raleigh, NC.

Green, J., Guptill, P., Ferrara, G., Shaberg, E., & Rodgman, E. (2014, October). Low cost traffic records data improvements on a tight budget. Presented to the 40th International Forum on Traffic Records & Highway Information Systems, St. Louis, MI.

Harkey, D.L. (2015, January). Safety data and information technology challenges. Presided over invited workshop at the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Sandt, L. (2015, February). A resident's guide for creating safer communities for walking and biking. Presented to Pedestrian and Bicycle Information Center webinar, Chapel Hill, NC.

Sandt, L. (2015, January). Pedestrian and driver behavior influences on pedestrian safety. Presided over session at the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Sandt, L. (2015, January). "Watch for Me NC" pedestrian and bicycle safety program: Developmental framework and process evaluation. Presented to the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Sandt, L. (2015, March). Performance measures matter: Tips and techniques for collecting and leveraging bike/pedestrian data. Presented to the Lifesavers Conference, Chicago, IL.

Srinivasan, R. (2015, January). Engineering and expert methods of setting speed limits. Presented to the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Srinivasan, R., & Carter, D. (2014, October). Crash modification factor development: Data needs and protocols. Presented to the 40th International Forum on Traffic Records & Highway Information Systems, St. Louis, MI.

Thomas, L. (2015, January). The present and future of speed limits in a Toward Zero Deaths (TZD) framework. Presided over session at the 94th Annual Meeting of the Transportation Research Board, Washington, DC.

Outcomes

North Carolina A&T State University

- Increased numbers of qualified graduates entering the workforce.
- Increased use of quantitative analysis for transportation related problem solving.
- Use of live-data case analysis to provide skill development in addressing transportation issues.
- Texting While Driving research will hopefully assist in developing safer teen driver behavior.

University of Alabama Birmingham

The fellowships will serve to increase understanding of transportation issues related to safety performance.

University of Central Florida

- Increased understanding of macroscopic contributing factors for traffic crashes;
- Increased understanding of real-time contributing factors for traffic flow and crashes;
- Improved processes of big data related to transportation, traffic, and crash data;
- Enhanced the understanding of how microsimulation can be used for evaluating safety of pedestrian and bicycle flows; and
- Provided new measures for estimating pedestrian crash rates

University of South Florida

Even the descriptive analysis is reaffirming the importance of social cultural factors as important contributors to safety performance.

Impacts

North Carolina A&T State University

- Increased numbers of professionally educated and train transportation workforce.
- Increased number of transportation professionals with quantitative and technology skillsets.

- Texting While Driving research will assist in developing safer driver behavior in society.

University of Alabama Birmingham

As they adhere to the training DVDs, contractors and State DOTs will improve overall safety of the motoring public.

University of Central Florida

- More effective long-term strategic plans to reduce traffic crashes
- Improved real-time safety risk management using various data
- Application of various data for traffic safety from multiple sources
- Better utilization of simulation to assess pedestrian and bicycle safety
- More accurate methods to estimate pedestrian crash rates

Special Reporting Requirements

Nothing to report.