

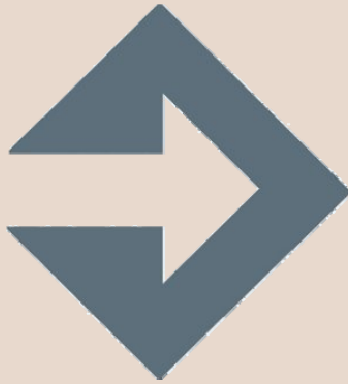


Annual Activity Report

December 2012

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Message from the Director

Yet another year has passed us by! To our friends and partners, it is my pleasure to submit the 2012 edition of the ITRE Annual Activity Report. In retrospect this has been a good year for us as we continue to rebound from the effects of the recession that has slowed our pace a bit in the past few years. This also has been a bittersweet year where we had two senior level retirements in our ranks.

Bob Foyle, a longtime staple of ITRE's presence in North Carolina for over thirty years, and ITRE's Associate Director for the last twelve years, retired on July 1, 2012 to focus on his family business and other interests. Personally I miss Bob's many contributions to the Institute as well as his unmatched insight and advice on many of the issues that face us. Replacing Bob in his new position is another veteran of ITRE, Mr. James Martin. James has also been around at ITRE for as long as Bob has, and a person whose judgment, experience and management skills I highly value. James has been of tremendous help during this transition time.

Dr. Ron Hughes, Director of our VAMS program, and our strategic thinker on all things commercial vehicles and enforcement also retired on the same day as Bob. His contributions to elevating this program in his seven years at ITRE are very much appreciated and recognized. On the positive side of the ledger, this year we also welcomed Mr. Kyle Snyder, our first permanent Director of the Next Generation Air Transportation (NGAT) in Planning Center. Kyle specializes in the Unmanned Aerial Vehicles (UAV's) field, and we look for him to establish and grow this unique field here at ITRE. There has also been some internal reorganization within ITRE to accommodate retirements and new hiring.

In other notable news this year, ITRE has acquired new physical space in our current building to accommodate the growth in our programs and personnel! This space amounts to 2,714 square feet of office and conference space that are adjacent to our current space. So when the space became available towards the end of the year, we could not pass up the opportunity. At this time, the new space is housing NGAT staff and our newly formed Travel Behavior Modeling group.

Financially, we continue to be on a good footing. Our overall research expenditures have rebounded considerably, up 17.8% from last year, to levels not seen in five or more years. Our federal grant and contract support also continues to improve, accounting for 19% of overall expenditures compared to 12% last year. Both these actions have contributed to an overall increase in overhead generated for NC State and ITRE to over \$1 million this year, a 15% increase over last year. Our national visibility is also on the rise, evident by the many national and international presentations and publications our technical staff has been involved in, including a very significant presence at the TRB annual meetings. On the education front, our training programs have also seen a significant rise in participation compared to last year by about 22%. This improvement includes both in-person and online training. And we have yet again established another milestone in graduate student support, with over 30 graduate students involved in our research and technical assistance projects.

A final word of thanks to our administrative staff whose daily support of all our technical activities proceeds without much thanks or fanfare. They are the glue that have kept our programs running, in compliance, on schedule and on budget. On behalf of all of us at ITRE, a sincere thank you.

Nagui Rouphail, PhD



This has been a good year for us as we continue to rebound from the effects of the recession . . .

Annual Activity Report - 2012

Institute for Transportation Research and Education (ITRE)

at NC State University Centennial Campus

This report summarizes ITRE's activities for the year 2012 and provides background information on the Institute's history, mission, goals, and objectives. It also provides an overview of ITRE's finances, personnel, and technical activities during the year. As in years past, the Institute has maintained and in some instances expanded its programmatic activities.

Center Description

The Institute for Transportation Research and Education (ITRE) is an Inter-Institutional Center of the University of North Carolina system. Chartered by the North Carolina General Assembly in 1978, ITRE carries out research, training, and technical support activities in surface and most recently air transportation for a host of national, state, and local clients to address the nation's critical transportation issues. ITRE is committed to leadership in the study of transportation issues through fostering analytical thinking, integrating technology in education and research, serving as a catalyst for problem solving, and cultivating professionals and students dedicated to excellence in transportation.

Due to the retirement of Mr. Bob Foyle, ITRE associate director and director of the Highway Systems Group, as well as Dr. Ron Hughes, VAMS director, and the hiring of a permanent Next Generation Air Transportation director, some internal reorganization within ITRE took place in 2012. We are now reorganized into seven programmatic areas namely 1) CTE/STRIDE the latter being the new southeast regional center in which ITRE is now a member, 2) Highway Systems, 3) Next Generation Air Transportation (NGAT), 4) Travel Behavior Modeling (now as a separate program outside of Highway Systems), 5) Pupil Transportation Group, 6) Geovisual Analytics and Decision Management Group (GADA) and 7) Public Transportation. A high-level organizational chart of our new structure is depicted in Exhibit I. As always our programs are guided and monitored by our ITRE Advisory Council, whose membership is shown in Exhibit II.

Summary of ITRE Goals

ITRE's strategic plan, developed in 2002, has set forth five major institute-wide goals:

- ◆ Increase national visibility
- ◆ Conduct and disseminate research that impacts the transportation community
- ◆ Sustain and enhance educational opportunities to improve the knowledge and skills of transportation professionals
- ◆ Strengthen the relationship with, and gain recognition within, the University system
- ◆ Provide superior technical assistance

These goals are currently being achieved through various objectives, such as increasing national exposure through conference presentations, publishing research, outreach efforts, and increased national project awards. Additionally, the Institute continues its training efforts on a national, regional, and state level, while promoting collaboration with faculty in the department of Civil, Construction, and Environmental Engineering at North Carolina State University and at other UNC system institutions.

This report provides a glimpse of this year's activities and accomplishments in reaching these goals and objectives. More information about ITRE's programs and staff are available through ITRE's website:

<http://www.itre.ncsu.edu>



*ITRE is housed in the Research IV Building
on NCSU's Centennial Campus.*

*ITRE is an inter-institutional center
within the
University of North Carolina system*



Exhibit I
ITRE High-Level Organization Flow Chart:
Primary Program Groups

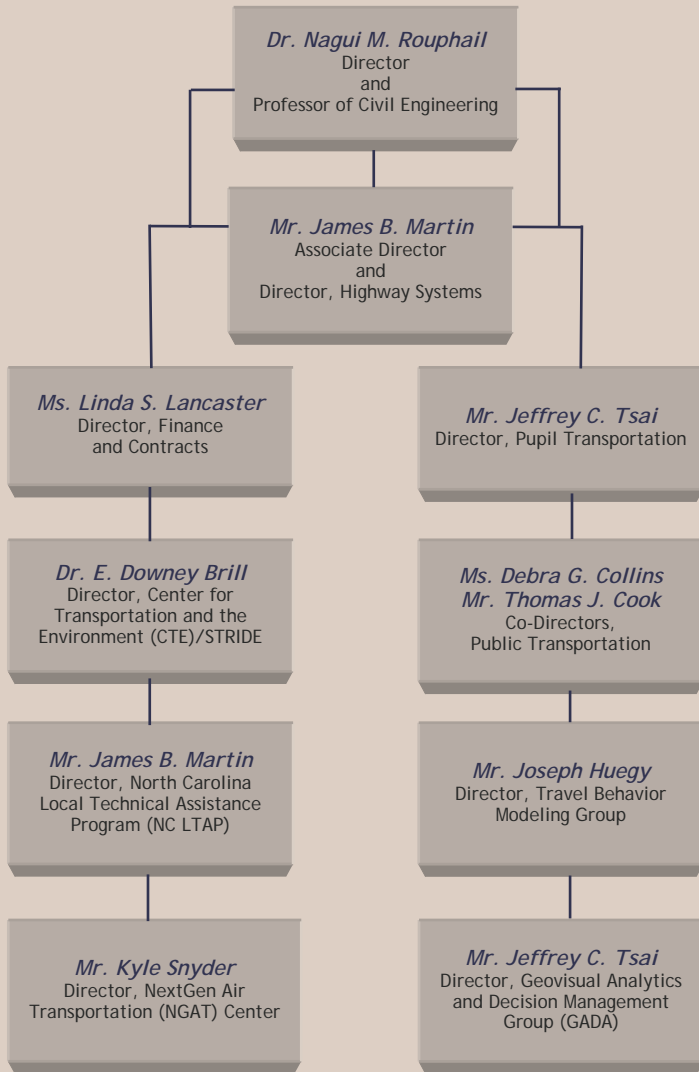
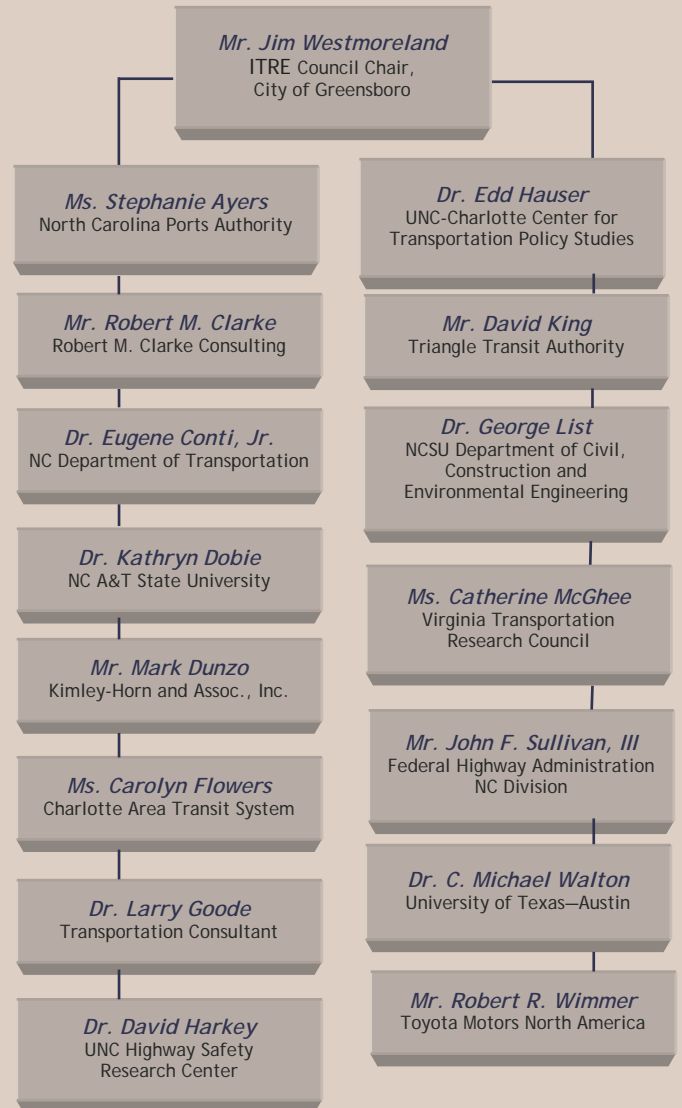


Exhibit II
2012 ITRE Advisory Council



Summary of ITRE's Finances

Exhibit III shows the most recent Fiscal Year, July 1, 2011 through June 30, 2012, for which complete financial information is available. Expenditures are broken down by the funding source.

- ◆ Overall, about 6% of all 2012 ITRE expenditures represent *State Appropriated Funds* related to administration, with additional operations support of 4% coming from *Indirect Cost Return*. The support from State Appropriations decreased by 1% from FY 10/11.
- ◆ *State of North Carolina* and *Federal Contracts* total 74% of all activity. Those figures have increased 9% compared to 65% for the FY 10/11.
- ◆ *Sales and Service* activity (11%) is derived mainly from registration fees for workshops. The Institute no longer has *Pass-through* projects to other departments at NCSU and other UNC universities. NCDOT now has master agreements with all NC universities individually.
- ◆ *Other Contracts* (5%) include project activity primarily for municipalities and may include funding from other states. Their share has not changed from the previous fiscal year.

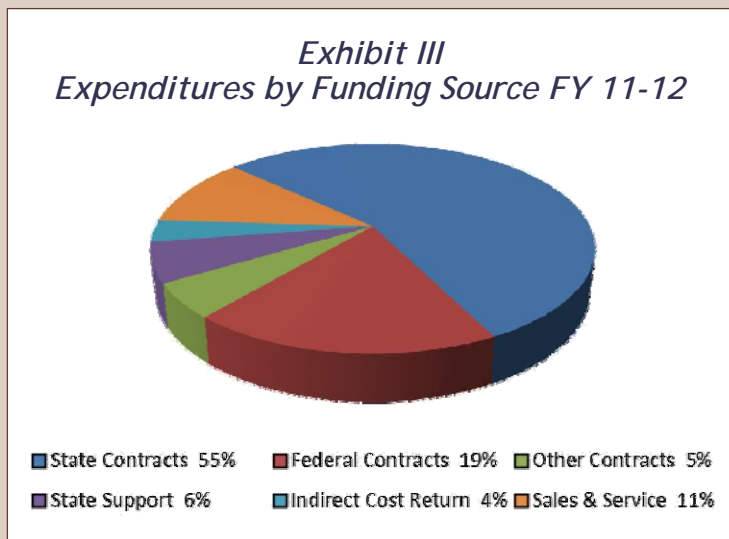


Exhibit IV shows how ITRE's FY11/12 expenditures are allocated by program area. As has been the norm in the past few years, the Highway Systems group is our largest generator of expenditures, accounting for nearly one third of all ITRE expenditures.

This is followed closely by CTE (at 20%) and Public Transportation (at 12%) groups. Other groups and administration contribute at various rates. The "Institute" expenditures include state appropriations, facilities and administrative receipts, professional development and other accounts managed by the Institute as a whole.

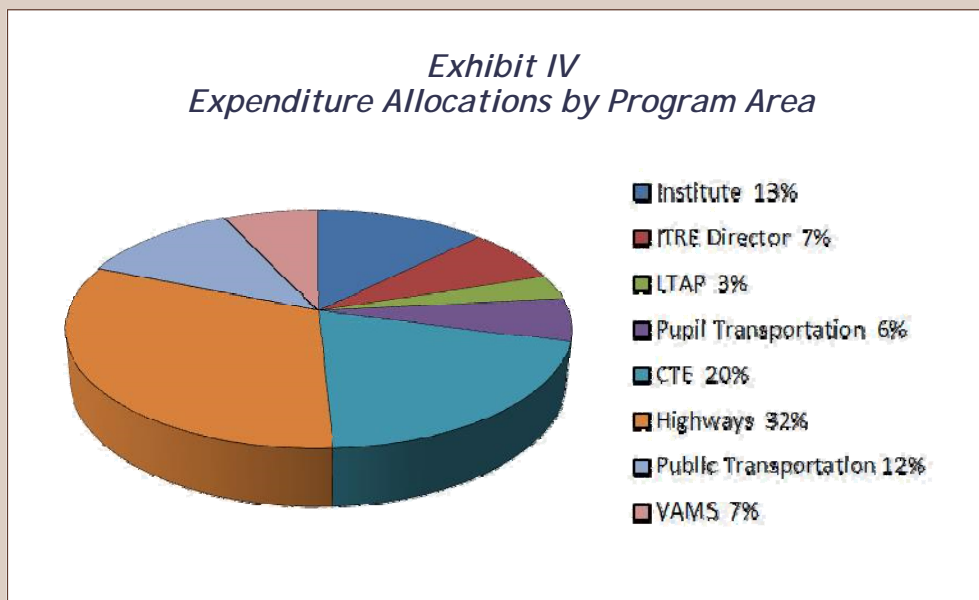


Exhibit V shows the distribution of expenditure sources by program area. This chart serves to highlight where each group expends its primary funds. We have categorized those funds as State, Federal, and Other.

This last category includes expenditures from contracts we have with other states, not-for-profit organizations, the private sector and course registrations. It also highlights the fact that ITRE is still predominantly funded from NC state and local funds, although there are some variations across program areas.

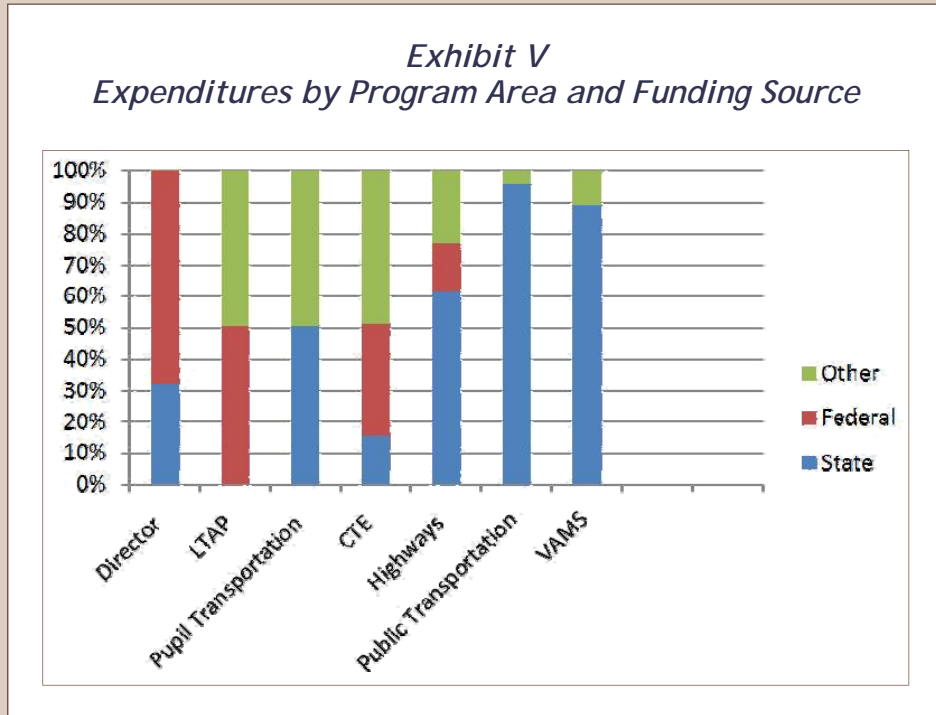


Exhibit VI tracks ITRE’s annual expenditures over the past five years. We no longer report both our in house and pass through funds as this is no longer a valid accounting concept for the Institute. NCDOT has issued master agreements with each campus therefore ITRE no longer acts as the mechanism for handling pass through funds.

ITRE’s total expenditures have increased in FY11/12 compared to the previous cycle which is due to an increase in the number and value of proposals which have been awarded to the institute this year. In a review of all ITRE projects, the increase is 17.8%, or over \$1 million.

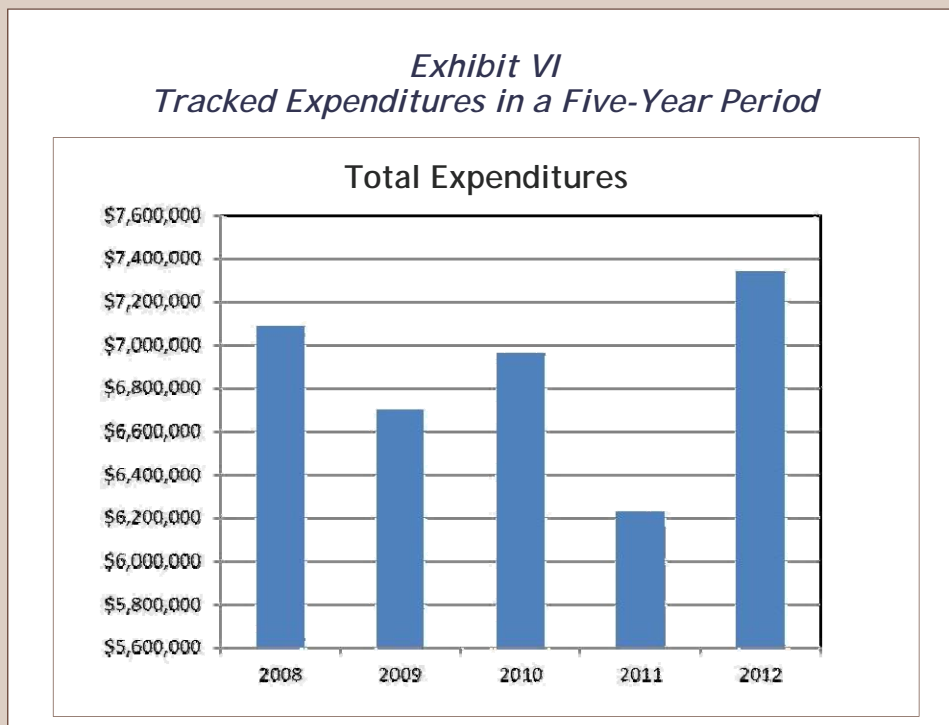


Exhibit VII summarizes ITRE's productivity trends over the past five years. The top line represents the ratio of total annual expenditures divided by ITRE's state appropriation. Total annual expenditures are utilized when calculating the ratio; basically reflecting the value of our research activities. The ratio continues to be well above the indicated 4.0 minimum threshold cited in the UNC Office of the President Report (lower line).

ITRE continues to be a valuable and cost effective asset to the state of North Carolina with a productivity ratio 15:1.

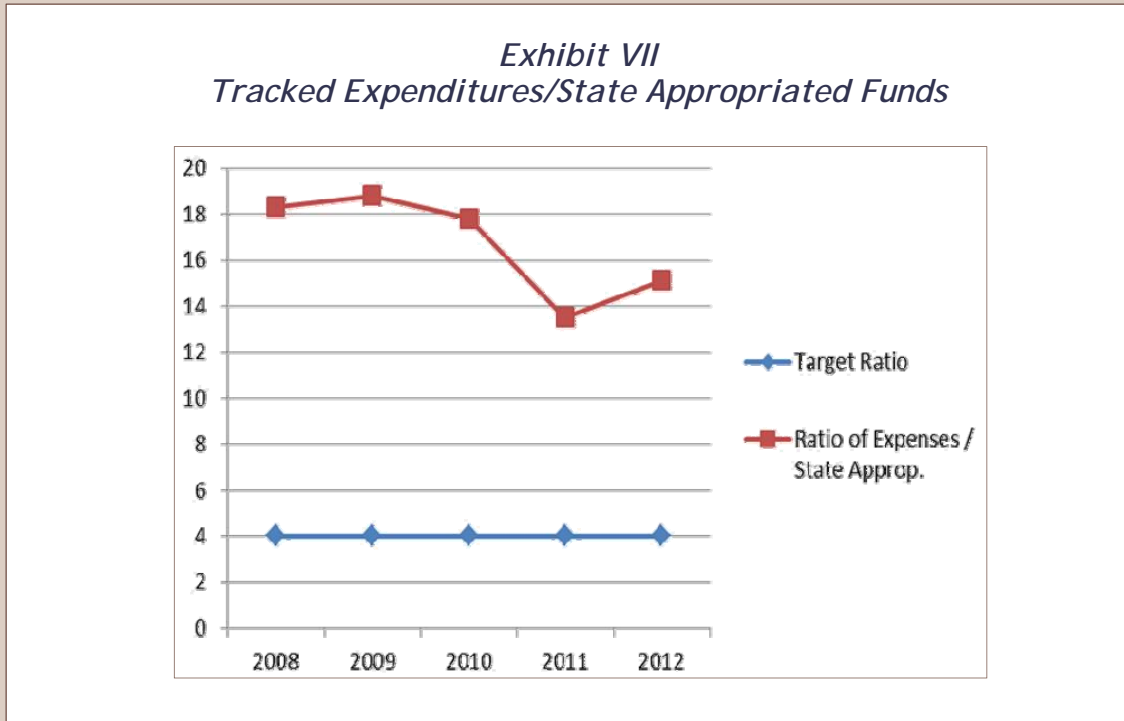
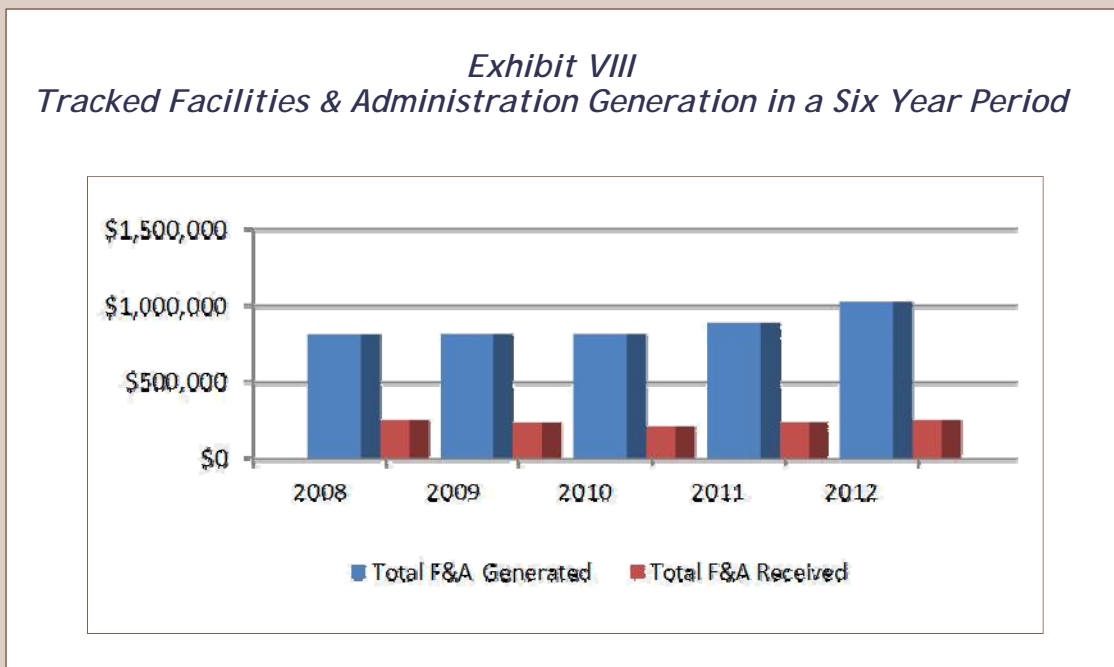


Exhibit VIII shows that ITRE continues to generate Facilities and Administrative (F&A) funds for our operations, as well as for the University. In the last fiscal year we generated over \$1,000,000 of F&A dollars from our local, state, and federal projects, an increase of 15.5% over the previous FY. This is due to a higher submittal and success rate of federally sponsored projects at the full overhead rate.

In the past between 33-35% of the F&A funds were returned to operate the institute and provide incentives for improving our national visibility, but now about 25% is being returned due to a new allocation formula.



Summary of Project Activities

The following list summarizes ITRE's research and education projects at the national, state and local levels for FY 11/12.

National and International Research and Development

National research efforts at ITRE continue to be quite significant in terms of numbers and funding levels.

ACRP 11-05

Sponsor: Project Performance Corporation/TRB (J. Martin)

An Open Source Traffic Assignment Tool for Assessing the Effects of Roadway Pricing and Crash Reduction Strategies on Recurring and Non-Recurring Congestion, 2011-2013

Sponsor: Kittleson & Associates, Inc. and FHWA (N. Roupail)

Blind Pedestrians' Access to Complex Intersections, 2007-2013

Sponsor: Western Michigan University and NIH (N. Roupail)

Center for Transportation and the Environment Tier II UTC, 2005-2013

Sponsor: US Department of Transportation (J. Martin)

Development and Evaluation of Methodological Framework for Real-World Vehicle Energy Use and Emissions Estimation at Multiple Temporal and Vehicular Scales, 2008-2012

Sponsor: National Science Foundation (C. Frey/N. Roupail)

Dissemination of ACRP Research Results: Value and Utility Assessment

Sponsor: Project Performance Corporation/NAS (J. Martin)

Eisenhower Graduate Fellowship for Zachary Bugg, 2011-2012

Sponsor: Federal Highway Administration (N. Roupail)

EN1009 Context Sensitive Solutions- National Dialog 2 Support

Sponsor: Project Performance Corporation/FHWA (J. Martin)

Establishing Monitoring Programs for Travel Time Reliability, 2009-2012

Sponsor: National Academy of Science, SHRP-2, L02

(G. List/B. Williams/N. Roupail)

FHWA Co-Sponsorship of the 2011 International Conference on Ecology and Transportation (ICOET)

Sponsor: Federal Highway Administration (J. Martin)

Field Evaluation of Double Crossover Diamond Interchanges, 2010-2014

Sponsor: US Department of Transportation, FHWA

(J. Hummer/B. Schroeder/C. Cunningham/D. Findley)

Framework for Mobile Source Emission Inventories, 2010-2013

Sponsor: US Environmental Protection Agency (N. Roupail/C. Frey)

ICOET 2011 Conference Sponsorship: USDA Forest Service, 2008-2013

Sponsor: US Department of Agriculture, Forest Service (J. Martin/E. Murray)

Incorporation of Travel Time Reliability into the Highway Capacity Manual, 2011-2013

Sponsor: Kittleson & Associates, Inc. & SHRP-2 L08 (N. Roupail/B Schroeder)

Local Technical Assistance Program (LTAP)

Sponsor: North Carolina Department of Transportation (J. Martin)

Methods for Gauging Livability Improvements, 2011-2012

Sponsor: Louis Berger Group/FHWA (L. Lane)

NCFRP 41, Incorporating Truck Analysis into the Highway Capacity Manual

Sponsor: Dowling & Associates, Inc./TRB (G. List/N. Roupail/B. Schroeder)

NCHRP 20-63B, Performance Measurement Tool Box and Reporting System for Research Programs and Projects

Sponsor: ICF International/NAS (R. Foyle)

NCHRP 25-25 Task 69 Defining Community Context in Transportation Project Planning and Development Process

Sponsor: Louis Berger Group, Inc./NAS (L. Lane)



ITRE's Bicycle and Pedestrian Program was tasked by the Division of Bicycle and Pedestrian Transportation, North Carolina Department of Transportation to gather statewide public input and conduct a series of regional roundtable discussions. The results of these public involvement processes were a series of strategies and actions that address bicycle and pedestrian safety. The full report can be viewed on the NCDOT website at the link below.

<http://www.ncdot.gov/bikeped/researchreports/default.html>



Rectangular Rapid Flashing Beacon (RRFB) is installed and evaluated on its ability to provide more yielding opportunities for pedestrians to cross as part of TOPR No. 34 project.



The Bicycle and Pedestrian Program focuses on improving the walk- and bike-ability of communities through planning assistance, dissemination of current best practices in facilities design, and training. Through contracts with the NC Department of Transportation's Division of Bicycle and Pedestrian Transportation (DBPT), local government agencies benefit from these studies. The Program also provides direct support to DBPT for research; recommendations; policies and procedures manuals; safety education materials and curricula; training initiatives; and grants administration.

NCHRP 25-36 Impacts of Land Use Strategies on Travel Behavior in Small Communities and Rural Areas

Sponsor: University of North Carolina/Chapel Hill (J. Huegy)

NCHRP 3-96 Analysis of Managed Lanes for Freeway Facilities, 2009-2012

Sponsor: University of Washington and NCHRP 3-98 (N. Rouphail)

NCHRP 3-98 Guidelines on the Use of Auxiliary Through Lanes at Signalized Intersections, 2010-2012

Sponsor: Kittelson & Associates, Inc. (N. Rouphail)

NCHRP 3-100: Evaluating the Performance of Corridors with Roundabouts, 2011-2013

Sponsor: Kittelson & Associates, Inc. and NCHRP 3-100 (B. Schroeder)

TOPR No. 34 Accelerating Roundabout Implementation in the US

Sponsor: Virginia Tech Transportation Institute/FHWA (B. Schroeder)

State of North Carolina and Local Research and Development

ITRE administered ongoing, statewide projects mostly in conjunction with the NC Department of Transportation (NCDOT) and local municipalities. See the pages that follow for additional project categories.

Analysis of Truck Load Weight Distribution in North Carolina

Sponsor: North Carolina Department of Transportation (R. Hughes)

Comparison of Data Collection Vehicles to Human Collection Methods

Sponsor: North Carolina Department of Transportation (C. Cunningham/J. Hummer)

Conduct NCDOT Roadway Reviews

Sponsor: North Carolina Department of Transportation (J. Martin)

Development and Packaging of Statewide Curriculum Materials for the Safe Routes to School Program

Sponsor: North Carolina Department of Transportation (S. O'Brien)

Development of Real Time Performance Measurement for Closed Loop Signal Systems Using Existing Loop Detectors, HWY2011-12

Sponsor: North Carolina Department of Transportation (N. Rouphail/B. Schroeder)

Ecosystem Enhancement Program (EEP) 2008-2013

Sponsor: North Carolina Department of Environment and Natural Resources (J. Martin)

Facilitation and Documentation Services for DMV Licensing Demonstration Grant

Sponsor: North Carolina Department of Transportation (A. Hartell)

Facilitation and Documentation Services for DMV License Security Grant

Sponsor: North Carolina Department of Transportation (A. Hartell)

High Speed Rail Technical Assistance

Sponsor: North Carolina Department of Transportation (J. Martin)

Infrastructure Investment Protection with High Density Surveys (HDS)

Sponsor: North Carolina Department of Transportation (D. Findley)

Land Use Forecasting Models for Small Areas in North Carolina

Sponsor: North Carolina Department of Transportation (J. Huegy)

Linking Carrier Descriptive Attributes to Crash Patterns: An Untapped Tool in State Motor Carrier Safety Improvement Programs

Sponsor: North Carolina Department of Transportation (R. Hughes)

MCSAP Program Support

Sponsor: North Carolina Crime Control (R. Hughes)

Migration of NCSHP GIS Decision Support from Motor Carrier Enforcement to Traditional Enforcement

Sponsor: North Carolina Department of Transportation (G. Ferrara)

Mobility and Reliability Performance Measurement, HWY2011-07

Sponsor: North Carolina Department of Transportation (N. Rouphail/B. Williams)

NCDOT Maintenance Technical Assistance Program

Sponsor: North Carolina Department of Transportation (T. Baughman)

NCLOS Program 2010 Update

Sponsor: North Carolina Department of Transportation (R. Foyle)

NGAT Center Technical Assistance to the NCDOT Division of Aviation

Sponsor: North Carolina Department of Transportation (R. Foyle/D. Findley)

Pedestrian and Bicycle Accommodations on Superstreets

Sponsor: North Carolina Department of Transportation
(R. Foyle/C. Cunningham/S. O'Brien/J. Hummer)

Professional Enhancement Program

Sponsor: North Carolina Department of Transportation (D. Findley)

Proof of Concept for Map Enabling the HSRC Crash Query Tool

Sponsor: North Carolina Governor's Highway Safety Program (G. Ferrara)

Rail Intern Program FY 2011-2012

Sponsor: North Carolina Department of Transportation (T. Cook)

Research Administration Facilitation in Transition and Technical Assistance

Sponsor: North Carolina Department of Transportation (R. Foyle)

Seven Portal Study, FY 2010-2011

Sponsor: North Carolina Department of Transportation (G. List/R. Foyle)

Teach Fundamental Engineering Principles (FEP) Program

Sponsor: North Carolina Department of Transportation
(C. Cunningham/T. Brown)

Technical and Technology Assistance, Implementation and Research

Sponsor: North Carolina Department of Transportation (D. Collins)

Technical Assistance Developing and Implementing NCDOT's Sustainability Blueprint

Sponsor: North Carolina Department of Transportation (J. Martin)

Technical Assistance to the State Board of Education in the Support of the Transportation Management System

Sponsor: North Carolina Department of Public Instruction (J. Tsai)

Technical Support of NCSHP Motor Carrier Enforcement Size and Weight Enforcement Program

Sponsor: North Carolina Crime Control (R. Hughes)

Technical Support Services for the NCDOT Division of Bicycle and Pedestrian Transportation

Sponsor: North Carolina Department of Transportation (T. Cook)

Technical Support for the Safe Routes to School Program

Sponsor: North Carolina Department of Transportation (T. Cook)

Triangle Regional Model Service Bureau at ITRE

Sponsor: North Carolina Department of Transportation (J. Huegy)

Unmanned Aircraft Systems Development Initiative

Sponsor: North Carolina Department of Transportation (N. Roupail)

Work Zone Traffic Analysis & Impact Assessment

Sponsor: North Carolina Department of Transportation (B. Schroeder)

Active Pass-through Projects to Other Universities

Monitoring, Prioritization, and Assessment of Ocean Outfalls of Stormwater in Dare Co., North Carolina

Sponsor: North Carolina Department of Environment and Natural Resources
(UNC Chapel Hill, R. Noble) (R. Foyle)

Performance Improvement from Deep Layers of Subgrade Stabilization

Sponsor: North Carolina Department of Transportation
(UNC-Charlotte, Ogunro) (L. Lancaster)



ITRE staff have been busy evaluating the operational and safety performance of Double-Crossover-Diamond (DCD) interchanges in collaboration with civil engineering at NCSU as part of a FHWA project.



On 19 July 2012, the NextGen Air Transportation (NGAT) Center at ITRE hosted the first North Carolina Unmanned Aircraft Systems (UAS) Forum at the NC National Guard Headquarters in Raleigh. In collaboration with the NCDOT Aviation Division, the NC Military Foundation, and the NC Department of Commerce, the NGAT Center provided an opportunity for organizations across the state to discuss their interest in the emerging UAS aviation market.



The ITRE Council Meeting was held on April 12, 2012. It began with highlights of the 2011 Annual Report and an ITRE reorganization discussion presented by ITRE director Nagui Roupail. The upcoming retirements of Bob Foyle, ITRE associate director, and Ron Hughes, VAMS director, were acknowledged with appreciation certificates. (l to r) Jim Westmoreland, ITRE Advisory Council chair, with Ron Hughes and Bob Foyle.

Additional Projects

All-Weather Paint for Work Zones Field Evaluation in North Carolina
Sponsor: 3M Company (C. Cunningham)

Complete Streets Guidelines and Training
Sponsor: PB Americas, Inc. (J. Martin)

Municipal Technical Services
Sponsor: Various cities and counties (J. Oklevitch)

NC State Highway Patrol Communication Centers
Sponsor: ESP Associates (G. Ferrara)

Operations Research and Education Lab (OREd) Program
Sponsor: Various counties and school districts (M. Miller/J. Tsai)

Policy/Procedure Guidebook and Information Technology Assessment Project for Capital Area Metropolitan Planning Organization
Sponsor: City of Raleigh/CAMPO (T. Cook)

Road Commission for Oakland County HAWK and RRFB Study
Sponsor: Western Michigan University /Road Commission for Oakland County (B. Schroeder/C. Cunningham)

Surveys to Generate Data for Updated Rail Ridership Estimates
Sponsor: AECOM (T. Cook)

Triangle Regional Model Scope of Work for Model Development (DCHC-MPO)
Sponsor: City of Durham (J. Huegy)

Triangle Regional Model Service Bureau at ITRE (CAMPO)
Sponsor: City of Raleigh (J. Huegy)

Triangle Regional Model Service Bureau at ITRE (Triangle Transit)
Sponsor: Triangle Transit (J. Huegy)

Staff Honors and Recognitions in 2012

State and National Committee and Panel Participation

TRB Committees

ABG20: Transportation Education and Training (D. Findley, friend)

ABG50: History (D. Findley, member)

ABG50: History Communication Coordinator (D. Findley)

ABJ40: Travel Survey Methods (J. Huegy, friend)

ADB40: Transportation Demand Forecasting (J. Huegy, friend)

ADC10: Environmental Analysis in Transportation (D. Brill, member)

ADC30: Ecology and Transportation (J. Martin, member, D. Brill, friend)

AFB10: Geometric Design (D. Findley, friend)

AFB20: Roadside Safety Design (D. Findley, friend)

AFB30: Low-Volume Roads (D. Findley, friend)

ADC30: Ecology and Transportation (J. Martin, member)

AHB25: Signal Systems (C. Cunningham, friend)

AHB40: Highway Capacity and Quality of Service (B. Schroeder, member)

AHB55: Work Zone Traffic Control (T. Baughman, member)

AHB65: Operational Effects of Geometrics (A. Holsem, friend, D. Findley, C. Cunningham, friend)

AHB70: Access Management (C. Cunningham, member)

AHD15: Maintenance Operation Personnel (J. Martin, member)



James B. Martin has been named associate director of ITRE. Martin replaces Bob Foyle who retired at the end of June.



Kyle Snyder has been hired as the first permanent director of the NGAT Center. Snyder's position is initially being supported through a grant from the NCDOT Division of Aviation (DOA).

- ANB40: Traffic Law Enforcement (C. Cunningham, member)
- ANB75: Roundabout (B. Schroeder, member)
- ANF10: Pedestrian (S. O'Brien, friend)
- ANF20: Bicycle Transportation (S. O'Brien, member)
- APO55: Rural Public and Intercity Bus Transportation (T. Cook, member)
- APO60: Paratransit (K. Monast, member, T. Cook, friend)
- APO85: Ferry (J. Tsai, member, T. Cook, friend)
- ARO20: Passenger Rail Equipment and Systems Integration (D. Robinson, friend)



Two ITRE graduate students were recently named the Outstanding Students of the Year for their respective University Transportation Centers (UTCs). Katy Salamati was honored as the outstanding student for the Center for Transportation and the Environment (CTE), and Zachary Bugg was named the outstanding student for the Southeastern Transportation Center, a regional UTC that includes NC State University, the University of Florida, Georgia Institute of Technology, the University of Kentucky, UNC-Chapel Hill, NCA&T State University, the University of South Florida, the University of Tennessee, and Vanderbilt University.

TRB Subcommittees

- Access Management Research (C. Cunningham)
- ABJ40(1): Household Travel Surveys (J. Huegy, member)
- ABJ40(2): Freight Surveys (J. Huegy, member)
- ABJ40(3): Stated Response Surveys (J. Huegy, member)
- ABJ40(4): New Technologies (J. Huegy, member)
- Joint ADA10 and ADB40: Integrated Transportation and Land Use Modeling (J. Huegy, member)
- AHB40: Freeways (N. Roupail, member)
- AHB40: Research (B. Schroeder, secretary)
- AHB40: Traffic Simulation Applications (B. Schroeder, member)
- AHB40: Freeway and Multilane Highways (B. Schroeder, member)
- ANB10(6): School Transportation (J. Tsai, member, S. O'Brien, friend)
- ANF20(6): Joint Subcommittee on Pedestrian and Bicycle University Education (S. O'Brien, friend)
- Health and Transportation Joint Subcommittee (S. O'Brien, friend)

TRB Task Forces and Panel Participation

- Communication Coordinator Council (D. Findley)
- NCHRP 01-17: Pedestrian and Bicycle Transpiration Along Existing Roads (S. O'Brien, panel member)
- NCHRP 15-49: Geometric Design Guidelines for Managed Lanes (C. Cunningham)
- TCRP G-13: A Transit Manager's Guide to Using ITS Data to Work Smarter and Cheaper: Developing Content for the APTA Tech Portal (D. Collins, panel member)

Special Awards

- Best paper award, TRB Committee AHB40: Highway Capacity and Quality of Service, *Implementing Auxiliary Through Lanes (ATLs) in a Highway Capacity Analysis Context*, Zachary Bugg, Nagui Roupail, Bastian Schroeder, Brandon Nevers
- Co-Authors Bastian Schroeder and Nagui Roupail of the ITE 2012 Daniel B. Fambro Student Paper Award: *An Analytical Framework for Managed Lane Facility Performance Evaluation*, ITE Journal, October 2012, pp. 30-36, Xiaoyue (Cathy) Liu, University of Washington, awardee.
- NEPA Practitioner Certificate from the White House Council for Environmental Quality and the Duke University Nicholas School for the Environment, Steve Gurganus
- Southern District ITE International Traffic Bowl Grand Championship winners: Zachary Bugg, Thomas Chase, Tyler Fowler, Abseen Anya.



Four graduate students at ITRE recently won an international quiz bowl competition involving 55 colleges and universities from across the United States and Canada. (l-r) Tyler Fowler, Abseen Anya, Zachary Bugg, and Thomas Chase won the Traffic Bowl Grand Championship at the Institute of Transportation Engineers (ITE) Annual Meeting in Atlanta, Georgia on August 14, 2012, after defeating Texas A&M University and the University of Toronto in the final round.



Dr. Nagui Roupail, ITRE director, presented the inaugural C.E. "Ed" Vick Jr. Transportation Founders Fund (TFF) Graduate Scholarship award to David Craft, a master's student who arrived in January 2012 after completing his undergraduate degree at LSU, and Elizabeth Hunter, a graduating NCSU senior who will begin her graduate studies at NC State in the fall.

Transatlantic Partnership for Excellence in Engineering Mobility Scholarship. Erasmus Mundus Program of the European Union, Polytechnic University of Valencia. September-October 2012, Daniel Findley.

Outstanding student of the year for the Center for Transportation and the Environment (CTE), Katy Salamati.

Outstanding student of the year for the Southeastern Transportation Center (STC), Zachary Bugg.

Other Organizations

American Planning Association (J. Huegy, member)

American Society of Civil Engineers, Engineers Without Borders, Institute of Transportation Engineers (A. Holzem, member)

Association of Pedestrian and Bicycle Professionals (S. O'Brien, member)

Future City Mentor, Centennial Campus Magnet Middle School, team was 4th in the State in 2012 (D. Findley)

Future City Mentor, Wake-Rolesville Middle School (C. Cunningham)

Institute for Transportation Engineers (D. Collins, member)

National Committee on Uniform Traffic Control Devices (T. Baughman, member)

National LTAP Association 2012 (J. Martin, past president)

NCAPWA President-Elect (J. Martin)

NCDOT Statewide Regionalization Study as requested in Section Law 2011-145, Section 28.21 (D. Collins, member)

NCSITE (D. Collins, member)

NCSITE Traffic Engineering Council (B. Schroeder, C. Cunningham, members)

NCSITE Traffic Planning Council (C. Cunningham, member)

NCSITE Transportation Planning Council (J. Huegy, member)

NCSITE Simulation and Capacity Models Users Group (B. Schroeder, chair, C. Cunningham, friend)

NCSU Campus Mobility Plan, Advisory Committee (K. Jackson, member)

North Carolina Chapter/American Planning Association (J. Huegy, member)

Paper Reviewer for Advances in Automobile Engineering (D. Findley)


Watch for ME NC Task Force (S. O'Brien, K. Jackson, members)

Western Boulevard, Raleigh, NC Corridor Study, Core Technical Team (K. Jackson, member)

TFF is an outreach activity of the Institute for Transportation Research and Education (ITRE) and the Department of Civil, Construction, and Environmental Engineering (CCEE) at North Carolina State University. The annual Speaker Series provides a unique opportunity for transportation students and professionals in North Carolina to interact with top-level transportation executives and academics.


2012 TFF SPEAKER SERIES

Future Transportation Funding Options & Strategies



Thursday, April 12, 2012
 Reception: 5:15 p.m., Room 246
 Speaker Series: 6:00 - 7:30 p.m., Room 136
 Monteith Research Center (MRC)
 NC State University Centennial Campus
 Raleigh, NC 27606

Federal State Private



Panel Discussion:

Gene A. Conti, Jr., NC Secretary of Transportation, Moderator

Robert Poole, Director of Transportation Policy, The Reason Foundation

John Porcari, US Deputy Secretary of Transportation

James R. Richardson, Senior VP, Forest City Real Estate Services

Robert E. Zimmer, Senior Systems Engineer, Battelle



The TFF panel discussion titled "Future Transportation Funding Options & Strategies" was moderated by NC Secretary of Transportation Gene Conti. Other members of the panel included Honorable Jim Porcari, U.S. deputy secretary of Transportation, Bob Poole, director of transportation policy and the Searle Freedom Trust, Jim Richardson, senior vice president of Forest City Real Estate Services, and Rob Zimmer of Battelle.

2013 Annual Transportation Research Board Meeting Participation

Based on research conducted in 2012, ITRE staff made presentations and presided at various meetings of the Transportation Research Board (TRB) at the Annual Meeting in January 2013. Many of the 34 presented papers will also be considered for publication in upcoming issues of the *Transportation Research Record*.

A Blueprint for Sustainability: One Department of Transportation's Pursuit of Performance-Based Accountability, Lindsay Maurer/Ted Mansfield/Leigh Lane/Julie Hunkins

A Destination Choice Model for Commercial Vehicle Movements in the Metropolitan Area, Bing Mei

A Deterministic Framework and Methodology for Evaluating Travel Time Reliability on Freeway Facilities, Bastian Schroeder/Nagui Roupail/Behzad Aghdashi

Agent-Based Approach to Pricing Strategy Evaluation: Incorporation of Drivers' Heterogeneity, Departure Time Shift and Comprehensive Learning Model, Anxi Jai/Xuesong Zhou/Nagui Roupail

An Incremental Delay Methodology for Assessing the Effects of Non-Recurring Congestion on Freeway Facilities, Ali Hajbabaie/Bastian Schroeder/Nagui Roupail

Applying Structured Scheduling to Increase Performance in Rural Demand Response Transportation, Kai Monast

Contrasting Artificial Intelligence Effectiveness: Application to Traffic Signal Optimization, Ali Hajbabaie/Rahim Benekohal

Detailed Time Series Analysis of Travel Time Reliability Performance Measures, Thomas Chase/Billy Williams/Nagui Roupail

Developing Reliability Monitoring Program: Implementing the Findings of SHRP 2 Project L02, George List

Effectiveness of Rectangular Rapid Flashing Beacon Treatments at Multilane Pedestrian Crossings at Roundabouts, Bastian Schroeder

Effects of License Plate Attributes on Automatic License Plate Recognition, Daniel Findley/Chris Cunningham/Jeff Chang/Kyle Hovey/Michael Corwin

Effects of Metered Entry Volume on an Oversaturated Network with Dynamic Signal Timing, Juan Medina/Ali Hajbabaie/Rahim Benekohal

Emission Estimation at Multilane Roundabouts: Effect of Movement and Approach Lane, Katy Salamati/Margarida Coelho/R. Fernandes/Nagui Roupail/J. Bandeira/Chris Frey

Empirical Study and Assessment of the Operational Performance of Double Crossover Diamond Interchanges, Chris Vaughan/Chris Cunningham/Bastian Schroeder/Joe Hummer

Enhancements to Freeway Facilities Method in the HCM to Enable Reliability Analysis, Soheil Sajjadi/Bastian Schroeder/Nagui Roupail

Estimating Incident Propensity for Reliability Analysis in the Highway Capacity Manual, Behzad Aghdashi/Nagui Roupail/Ali Hajbabaie

Event-Based Modeling of Driver Yielding Behavior to Pedestrians at Two-Lane Roundabout Approaches, Katy Salamati/Bastian Schroeder/Duane Gerschak/Nagui Roupail

FHWA Livability Performance Measures: Moving Goals into Action, Leigh Lane

Freeway Facilities Methodology Calibration for Travel Time Reliability Analysis: I-40 Case Study in NC, Soheil Sajjadi/Ali Hajbabaie/Nagui Roupail

Freeway Reliability for the Highway Capacity Manual, Nagui Roupail/Bastian Schroeder/Behzad Aghdashi

Institute for Transportation Research and Education, (ITRE)
at NC State University's Centennial Campus, Raleigh, NC

ITRE Engagement at the 92nd TRB Annual Meeting

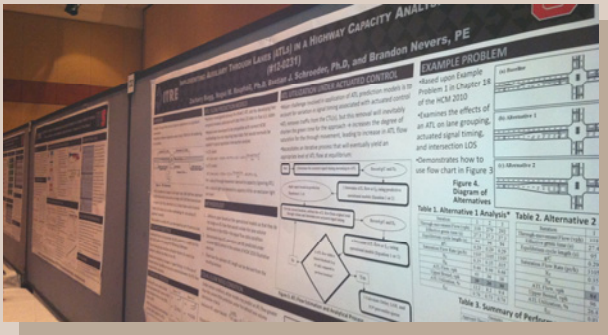
Several ITRE staff, students and affiliates faculty will be presenting their research findings at the 92nd TRB Annual Meeting in Washington, DC, January 13-17, 2013. Information on where and when those presentations will take place is included below. To our friends - please take the time to visit with them if you have plans to attend the Annual TRB Meeting.

POSTER LECTURE/Podium H-Moderator W-Workshop

Presenters / # Co-Authors	Session	Type	Date/Time	Location	Title of Presentation
Bastian Schroeder, presiding	W147a	Wk	Sun Jan 13- 8:00-9:00pm	TBDx	WORKSHOP - HP-09 Innovative Pedestrian and Bicycle Accommodations at Roundabouts: New Ideas and Surprising Barriers to Innovation (Ticket required)
Leigh Lane	224a	Lk	Mon Jan 14- 10:45-12:30pm	Hilton - Cotuitide	Translating Principles of Sustainability into Accountability: Framework for NCOTTE
Anxi Jai/Xuesong Zhou/Nagui Roupail	294a	Pa	Mon Jan 14- 10:45-12:30pm	Hilton - Int'l Ctr. x	13-4126 - Agent Based Approach to Pricing Strategy Evaluation: Incorporation of Drivers' Heterogeneity, Departure Time Shift and Comprehensive Learning Model
Thomas Chase/Ali Hajbabaie/Bastian Schroeder	313a	Lk	Mon Jan 14- 1:00-1:15pm	Marriott - Marriott - North	13-0227 - Incorporating Weather Effects in HCM Reliability Analysis
Ali Hajbabaie/Bastian Schroeder/Nagui Roupail	341a	Pa	Mon Jan 14- 2:00-3:45pm	Marriott - Salon 24	13-0282 - An Incremental Delay Methodology for Assessing the Effects of Non-Recurring Congestion on Freeway Facilities
Soheil Sajjadi/Bastian Schroeder/Nagui Roupail	341a	Pa	Mon Jan 14- 2:00-3:45pm	Marriott - Salon 24	13-0500 - Enhancements to Freeway Facilities Method in the Highway Capacity Manual to Enable Reliability Analysis
Soheil Sajjadi/Ali Hajbabaie/Nagui Roupail	341a	Pa	Mon Jan 14- 2:00-3:45pm	Marriott - Salon 24	13-5199 - Freeway Facilities Methodology Calibration for Travel Time Reliability Analysis: I-40 Case Study in NC
Behzad Aghdashi/Nagui Roupail/Ali Hajbabaie	341a	Pa	Mon Jan 14- 2:00-3:45pm	Marriott - Salon 24	13-5058 - Estimating Incident Propensity for Reliability Analysis in the Highway Capacity Manual
Xijun Jai/Billy Williams/Nagui Roupail/Thomas Chase	341a	Pa	Mon Jan 14- 2:00-3:45pm	Marriott - Salon 24	13-0823 - Methodology for Developing an HCM-based Over-saturated Signalized Freeway Model
Leigh Lane	356a	Pa	Mon Jan 14- 2:00-3:45pm	Hilton - Int'l Ctr. x	13-0249 - FHWA Livability Performance Measures: Moving Goals into Action
Thomas Chase/Billy Williams/Nagui Roupail	360a	Pa	Mon Jan 14- 2:00-3:45pm	Hilton - Int'l Ctr. x	13-0226 - Detailed Time Series Analysis of Travel Time Reliability Performance Measures
Jagan Kumar/Sohail/Sangeetha/George List/Billy Williams/Alan Karni	402a	Pa	Mon Jan 14- 4:15-6:00pm	Marriott - Salon 24	13-4693 - Synthesizing Route Travel Time Distributions from Segment Travel Time Distributions
Bastian Schroeder/Nagui Roupail/Behzad Aghdashi	402a	Pa	Mon Jan 14- 4:15-6:00pm	Marriott - Salon 24	13-4693 - A Deterministic Framework and Methodology for Evaluating Travel Time Reliability on Freeway Facilities
Nagui Roupail/Bastian Schroeder/Behzad Aghdashi	404a	Pa	Mon Jan 14- 4:15-6:00pm	Marriott - Salon 24	13-6810 - Freeway Reliability for the Highway Capacity Manual
Chris Vaughan/Chris Cunningham/Bastian Schroeder/Joe Hummer	405a	Pa	Mon Jan 14- 4:15-6:00pm	Marriott - Salon 24	13-4946 - Empirical Study and Assessment of the Operational Performance of Double Crossover Diamond Interchanges
George List	420a	Pa	Mon Jan 14- 4:15-6:00pm	Hilton - Int'l Ctr. x	13-4500 - I-40 Establishing Monitoring Programs for Mobility and Travel Time Reliability

Presenters / # Co-Authors	Session	Type	Date/Time	Location	Title of Presentation
Joe Hodge, presiding	450a	Lk	Mon Jan 14- 7:00-9:30pm	Hilton - Lincoln West	Mobilizing Land Use and Demographic Models
Chris Cunningham/Jeff Chang/Daniel Findley/Chris Vaughan/Aaron Gokhale/Chris Tappin/James Mottola	495a	Pa	Tue Jan 15- 8:00-10:15am	Marriott - Salon 24	13-4644 - Public Opinions of Roadway Assets Using a New Method - The Roadway Review
Ali Hajbabaie/Rahim Benekohal	541a	Pa	Tue Jan 15- 10:45-12:30pm	Marriott - Salon 24	13-0261 - Traffic Signal Timing Optimization - Choosing the Objective Function
Juan Medina/Ali Hajbabaie/Rahim Benekohal	541a	Pa	Tue Jan 15- 10:45-12:30pm	Marriott - Salon 24	13-4284 - Effects of Metered Entry Volume on an Oversaturated Network with Time Distribution Approaches
Katy Salamati/Bastian Schroeder/Duane Gerschak/Nagui Roupail	542a	Pa	Tue Jan 15- 10:45-12:30pm	Marriott - Salon 24	13-0419 - Event Based Modeling of Driver Yielding Behavior to Pedestrians at Two Lane Roundabout Approaches
Behzad Aghdashi/Nagui Roupail/K. Christopher Frey/Bing Mei	557a	Pa	Tue Jan 15- 10:45-12:30pm	Hilton - Int'l Ctr. x	13-5243 - Method and Case Study for Quantifying the Emissions Impact of a Transportation Improvement Project Involving Roundabout and Multi-Lane Roundabout
Bastian Schroeder	570a	Lk	Tue Jan 15- 1:00-1:15pm	Marriott - Salon 24	13-4714 - Effectiveness of Rectangular Rapid Flashing Beacon Treatments at Multilane Pedestrian Crossings at Roundabouts
Daniel Findley/Chris Cunningham/Jeff Chang/Kyle Hovey/Michael Corwin	572a	Lk	Tue Jan 15- 1:00-1:15pm	Marriott - Maryland Cx	13-0281 - Effects of License Plate Attributes on Automatic License Plate Recognition
Ali Hajbabaie/Rahim Benekohal	609a	Pa	Tue Jan 15- 2:00-3:45pm	Hilton - Int'l Ctr. x	13-0264 - Contrasting Artificial Intelligence Effectiveness: Application to Traffic Signal Optimization
Katy Salamati/Margarida Coelho/R. Fernandes/Nagui Roupail/Chris Frey	626a	Lk	Tue Jan 15- 3:45-5:30pm	Marriott - Salon 3x	13-0420 - Emission Estimation at Multilane Roundabouts: Effect of Movement and Approach Lane
Late Huntsinger/Nagui Roupail/John Sorensen	646a	Lk	Tue Jan 15- 3:45-5:30pm	Hilton - Jefferson West	13-0455 - Implications of Trip Generation Rate Changes on Over Time
Bing Mei	646a	Lk	Tue Jan 15- 3:45-5:30pm	Hilton - Jefferson West	13-4692 - Destination Choice Model for Commercial Vehicle Movements in the Metropolitan Area
George List	667a	Lk	Tue Jan 15- 7:00-9:30pm	Marriott - Maryland Cx	13-4374 - Project L02: Establishing Monitoring Programs for Mobility and Travel Time Reliability
Alexandra Ezzamel/Ruben Cuevas/Ron Hughes/Tammy Tomblin/Jeremy Scott	673a	Pa	Tue Jan 15- 7:00-9:30pm	Marriott - Salon 24	13-5505 - Linking Carrier Descriptive Attributes to Crash Patterns: Unappreciated Role of State Motor Carrier Safety Improvement Programs
Lindsay Maurer/Ted Mansfield/Leigh Lane/Julie Hunkins	685a	Lk	Tue Jan 15- 7:00-9:30pm	Hilton - Int'l West	13-4113 - A Blueprint for Sustainability - One Department of Transportation's Pursuit of Performance-Based Accountability
Late Huntsinger/Nagui Roupail	732a	Pa	Wed Jan 16- 8:30-10:15am	Hilton - Int'l Ctr. x	13-0770 - Temporal Stability of Generation Choice Models
George List	760a	Lk	Wed Jan 16- 10:15-11:00am	Hilton - Georgetown West	13-5595 - Developing Reliability Monitoring Program: Implementing the Findings of SHRP 2 Project L02
Estimate Sajjadi/Leila Fathi/George List/John Sorensen	796a	Lk	Wed Jan 16- 2:00-4:00pm	Hilton - Columbia Hall 5x	13-2853 - Locating Traffic Sensors on a Highway Network: Models and Algorithms
Kai Monast/Joshua Worth	797a	Lk	Wed Jan 16- 2:00-4:00pm	Hilton - Georgetown East	13-1272 - Applying Structured Scheduling to Increase Performance in Rural Demand Response Transportation

Of the 34 papers presented at TRB, 13 were in lecture form and 21 were posters. Many of these will be considered for publication in upcoming issues of the *Transportation Research Record*.



Human Factors Workshop: HF-09 Innovative Pedestrian and Bicycle Accommodations at Roundabouts: New Ideas and Surpassing Barriers to Innovation, Bastian Schroeder, presiding

Implications of Trip Generation Rate Changes Over Time, Leta Huntsinger/Nagui Rouphail/John Stone

Incorporating Weather Effects in HCM Reliability Analysis, Thomas Chase/Ali Hajbabaie/Bastian Schroeder

Linking Carrier Descriptive Attributes to Crash Patterns: Untapped Tool in State Motor Carrier Safety Improvement Programs, Alejandra Flintsch/Robert Clarke/Ron Hughes/Tammy Trimble/Jeremy Scott

L02 Establishing Monitoring Programs for Mobility and Travel Time Reliability, George List

Locating Traffic Sensors on a Highway Network: Models and Algorithms, Fatemeh Sayyady/Yayha Fathi/George List/John Stone

Method and Case Study for Quantifying the Emissions Impact of a Transportation Improvement Project Involving Road Realignment and a Multi-Lane Roundabout, Nagui Rouphail/H. Christopher Frey/Abseen Anya/Bin Liu

Methodology for Developing an HCM-based Oversaturated Speed Flow Model, Yilun Xu/Billy Williams/Nagui Rouphail/Thomas Chase

Microlevel Land Use and Demographic Models, Joe Huegy, presiding

Public Opinions of Roadway Assets Using a New Method-The Roadway Review, Chris Cunningham/Jeff Chang/Daniel Findley/Chris Vaughan/Aaron Hekele/Chris Tatham/James Martin

SHRP 2 Capacity and Reliability - Works in Progress and Emerging Products, George List

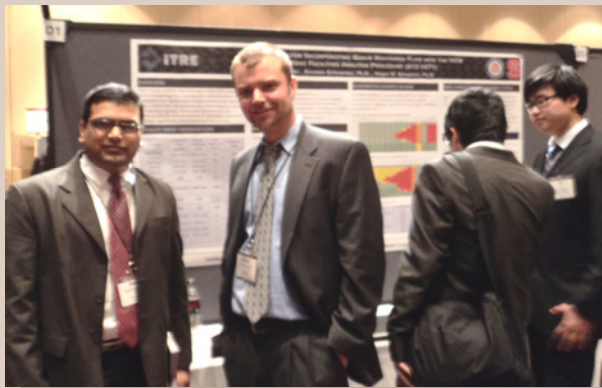
Synthesizing Route Travel Time Distributions From Segment Travel Time Distributions, Issac Kumar Isukapati/George List/Billy Williams/Alan Karr

Temporal Stability of Generation Choice Models, Leta Huntsinger/Nagui Rouphail

Traffic Signal Timing Optimization: Choosing the Objective Function, Ali Hajbabaie/Rahim Benekohal

Translating Principles of Sustainability into Accountability Framework for NCDOT, Leigh Lane

Pictured above are some of the posters presented by ITRE staff at the Transportation Research Board (TRB) Annual Meeting in Washington, DC.



Dr. Bastian Schroeder talks with NCSITE president Radha Swayampakala during the ITRE poster session at TRB while Jia Hu explains his poster to a conference attendee.



The highlight of the annual TRB meeting is the NC State reception for alumni, friends and supporters jointly hosted by ITRE and the Department of Civil, Construction and Environmental Engineering (CCEE). The reception provides an opportunity for faculty, staff and students to say thank you to loyal alumni and supporters, to strengthen ongoing collaborations and make new ones, and more importantly to express gratitude to our loyal reception sponsors who make it possible for this event to happen.

Conference and Workshop Attendance, Participation and Exhibits in 2012 (by program or group)

Center for Transportation and the Environment (CTE)

Context Sensitive Solutions National Dialog 2 Workshop, Springfield, IL, September 2012 (J. Martin, N. Bailey, E. Murray)

Context Sensitive Solutions National Dialog 2 Workshop, Lansing, MI, November 2012 (L. Lane, N. Bailey, E. Murray)

Getting Out the Word as Well as the Trains: Local Business Support for Passenger Rail Stations and Service, Southeastern Rail-Highway Safety Conference, Charlotte, NC, November 2012 (D. Robinson, guest speaker)

North Carolina Title VI & Environmental Justice Interagency/Community Workshop, Durham, NC, September 2012 (S. Gurganus, presenter)

Risk Assessment & Return On Investment for the Customer, National Mitigation & Ecosystem Banking Conference, Sacramento, CA, May 2012, (D. Robinson, presenter)



This image shows a two-lane roundabout in Olympia, WA, which is one of the test sites of an ITRE project for FHWA investigating the Effect of Rectangular Rapid-Flashing Beacons (RRFB) on the accessibility of two-lane roundabouts to pedestrians who are blind.

Highway Systems

2012 International Mobility Conference. *Roundabout Signalization in the US: Opportunities and Challenges for Establishing Accessibility*. February 15, 2012. Palmerston North, New Zealand. (B. Schroeder, presenter)

2012 FHWA Webinar. *Pedestrian Safety and Accessibility Considerations at Modern Roundabouts*. Pedestrian Bicycle Information Center (PBIC), March 2012 (B. Schroeder, presenter)

2012 Innovations in Traffic Flow Theory and Characteristics, and Highway Capacity and Quality of Service Symposium. June 19-22, 2012. Fort Lauderdale, FL. (B. Schroeder, conference co-organizer and session moderator)

2012 Highway Capacity and Quality of Service Symposium. *Freeway Reliability for the Highway Capacity Manual*. June 19-22, 2012. Fort Lauderdale, FL. (B. Schroeder, presenter)

2012 PTV User Group Meeting. *Modeling Double-Crossover Diamond (DCD) Interchanges in VISSIM - Calibration, Challenges, and Lessons Learned*. July 17-19, 2012. Minneapolis, MN (B. Schroeder, presenter)

2012 ITE Annual Meeting and Exhibit. *Early Findings on the Operational Impacts of Double Crossover Diamond Interchanges*. August 13-15, 2012, Atlanta, GA (B. Schroeder, presenter)

2012 NCSITE Technical Retreat and Conference. August 27-28, 2012. Asheboro, NC. (B. Schroeder, conference co-organizer and session moderator)

2012 Southern Orientation Mobility Association Conference. *Modern Roundabouts - A Discussion of Safety, Efficiency, and Accessibility Tradeoffs*. September 30, 2012. Richmond, VA. (B. Schroeder)

2012 Southern Orientation Mobility Association Conference. *How Traffic Signals Work and Why You Should Learn About Them*. September 30, 2012. Richmond, VA. (B. Schroeder, presenter)

2012 ITE/TRB Webinar: *Freeway Facility Method Applications*. October 30, 2012. (B. Schroeder, presenter)

2012 ITE: *Early Findings on the Operational Impacts of Double Crossover Diamond Interchanges*. November 13, 2012. (B. Schroeder, presenter)

Safety Assessment of Auxiliary Through Lanes at Signalized Intersections, Presented at 4th Annual TRB Urban Streets Symposium/ITE Midwestern District Annual Meeting. (Z. Bugg, J. Hummer, B. Schroeder, presenters)



Dr. Daniel Findley, PE, Senior Research Associate in the Highway Systems Group, recently participated in a mobility scholarship through the Transatlantic Partnership for Excellence in Engineering (TEE). The TEE is an Erasmus Mundus-Action 2 Project funded by the European Commission. The objective of the program is to encourage structured cooperation between European, US, and Canadian Higher Education Institutions. Under this arrangement, Dr. Findley spent one month at the Polytechnic University of Valencia (UPV) in Valencia, Spain collaborating with researchers in the Highway Engineering Research Group at UPV.



"Effects of License Plate Attributes on Automatic License Plate Recognition," a presentation at the AAMVA conference in Charlotte, describes an experiment designed to develop a comprehensive and thorough understanding of the readability of North Carolina's license plates with an Automatic License Plate Recognition system. The research focused on law enforcement applications and utilized two infrared camera systems for data collection in a controlled environment involving over 900 license plates. The key finding of this research project is that the current, standard issue, blue ink license plate has the highest capture and read rates among plates tested in the study. Factors which decreased the capture and read rates were personalized syntax, specialty license plates, and the presence of stacked characters on a specialty license plate.

Effects of License Plate Attributes on Automatic License Plate Recognition, American Association of Motor Vehicle Administrators (AAMVA) Annual International Conference, August 21, 2012. Charlotte, NC. (D. Findley, presenter)

91st Transportation Research Board Annual Meeting. *Structural and Safety Investigation of Statewide Weathered Steel Beam Guardrail Performance in North Carolina*. Washington, DC, Jan. 24, 2012. (C. Cunningham, presenter)

TRB Traffic Signal Systems Mid-Year Meeting. *Recommendations for Corridor and Signal Timing Improvements at Diverging Diamond Interchanges*. Irvine, CA, July 23, 2012 (C. Cunningham, presenter)

TRB Access Management Mid-Year Meeting. *Field Evaluation of Restricted Crossing U-Turn Intersections - The Maryland Experience*. Dallas, TX, July 18, 2012 (C. Cunningham, presenter)

TRB Access Management Mid-Year Meeting. *Restricted Crossing U-Turn Intersection Safety Analysis - The North Carolina Experience*. Dallas, TX, July 18, 2012 (C. Cunningham, presenter)

Southern Orientation Mobility Association Conference. *Modern Roundabouts - A Discussion of Safety, Efficiency, and Accessibility Tradeoffs*. Richmond, VA, September 30, 2012 (C. Cunningham, presenter)

Southern Orientation Mobility Association Conference. *How Traffic Signals Work and Why You Should Learn About Them*. Richmond, VA, September 30, 2012 (C. Cunningham, presenter)

ITRE Director

Incorporation of Travel Time Reliability into the Highway Capacity Manual, for SHRP-2, L08 Project at the 91st Annual Meeting of the Transportation Research Board, January 21, 2012 (N. Rouphail, presenter)

Mesosopic Modeling of Vehicle Emissions, University of Aveiro, Aveiro, Portugal, March 6, 2012. (N. Rouphail, presenter)

ITRE @ 34, who we are and what we want to be when we grow up? Student-Led NCSITE Meeting, March 30, 2012 (N. Rouphail, keynote presenter)

Travel Time Reliability on Freeways, SHRP-2, L08 Project Webinar, Baltimore, Md, April 16, 2012 (N. Rouphail, presenter)

Freeway Reliability for the Highway Capacity Manual, TRB Symposium on Innovations in Traffic Flow Theory, and Highway Capacity and Quality of Service, June 19-22, 2012, Ft Lauderdale, FL (N. Rouphail, presenter)

Open Source DTA Tool for Pricing and Safety: Large Network Capabilities and Test Results, Webinar to FHWA and Stakeholders, November 27, 2012 (N. Rouphail, presenter)

Freeway Reliability in the Context of the U.S. Highway Capacity Manual, 5th International Symposium on Transportation Network Reliability, Hong Kong, China, December 18-19, 2012, (N. Rouphail, B. Schroeder and W. Kittelson)

Forging an Understanding of Travel Time Reliability for Freeway and Arterial Networks, 5th International Symposium on Transportation Network Reliability, Hong Kong, China, December 18-19, 2012, (N. Rouphail, G. List, B. Williams)

NC Local Technical Assistant Program (NC LTAP)

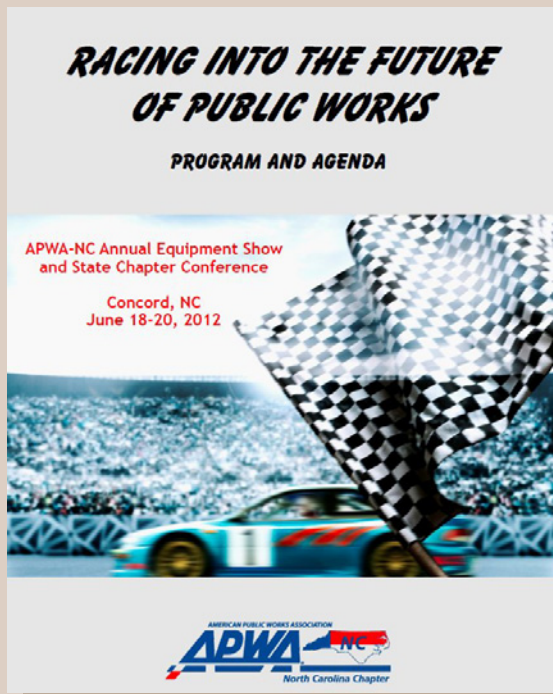
APWA National Congress, Anaheim, CA, August 2012 (J. Martin)

APWA - NC Annual State Chapter Conference & Equipment Show, Concord, NC (facilitated and attended by J. Martin, L. Collier and B. Woods)

APWA-NC Combined Equipment Services and Streets Divisions, Asheville, NC, October 2012-facilitated by NC LTAP (J. Martin, L. Collier, B. Woods participated)

LTAP National Conference, Grapevine, Texas, July 2012 (J. Martin, L. Collier attended)

LTAP Region 4 Meeting, Myrtle Beach, SC, May 2012 - (J. Martin, L. Collier, B. Woods participated)



ITRE provided administrative and technical support to the APWA-NC Annual Equipment Show and State Chapter Conference as part of the NC-LTAP program.

NextGen Air Transportation (NGAT) Center

AUVSI Unmanned Systems North America Conference, Las Vegas, NV, August 2012 (K. Snyder, attended)

Southern Albemarle Association Annual Conference, Plymouth, NC, October 2012 (K. Snyder, presenter)

NC UAS Forum 2012 Conference, Raleigh, NC, July 2012 (K. Snyder, hosted)

Public Transportation

1-Year after the Statewide Bicycle and Pedestrian Safety Summit - Are We Making Progress? 19th Annual NC Association of Metropolitan Planning Organizations Conference, Asheville, NC, May 2012 (S. O'Brien and K. Jackson, co-presenters)

Restructuring Eastern North Carolina Intercity Bus Routes, 20th National Conference for Rural Public & Intercity Bus Transportation, Salt Lake City, UT, October 2012 (T. Cook, presenter)

Americans with Disabilities Act Workshops, Raleigh and Hickory, NC, July 2012 (D. Collins, presenter, K. Monast, attended)

Complete Streets Training Program: Framework Workshop, Raleigh, NC, April 2012 (S. O'Brien, participated)

Navigating NCDOT and Affecting Transportation Decisions, Move More Scholars Institute, Pine Knoll Shores, NC, May 2012 (S. O'Brien, presenter)

NCDOT Public Transportation Conference, Raleigh NC, October 2012 (D. Collins, K. Monast, M. Everhart, presenters)

North Carolina Injury and Violence Prevention Conference, Chapel Hill, NC, May 2012 (S. O'Brien, attended)

North Carolina Bike Summit, Raleigh, NC, October 2012 (K. Jackson, attended)

North Carolina Public Transportation Association Conference, Wilmington, NC, May 2012 (D. Collins, K. Monast, J. Worthy attended)

North Carolina Statewide Bicycle Plan Focus Groups, Transportation Efficiency and Accountability, Transportation Equity, October 2012 (K. Jackson)

Safe Routes to School and the Let's Go NC! Curriculum, NC Healthy Schools Summer Institute, Wilmington, NC, June 2012 (S. O'Brien, presenter)

The Use of 'Your Speed' Changeable Message Signs in School Zones - Experience from the North Carolina Safe Routes to School Program, 19th Annual NC Association of Metropolitan Planning Organizations Conference, Asheville, NC, May 2012 (S. O'Brien, presenter)

Triangle Bicycle and Pedestrian Workshop, March 2012 (K. Jackson, attended)

Pupil Transportation

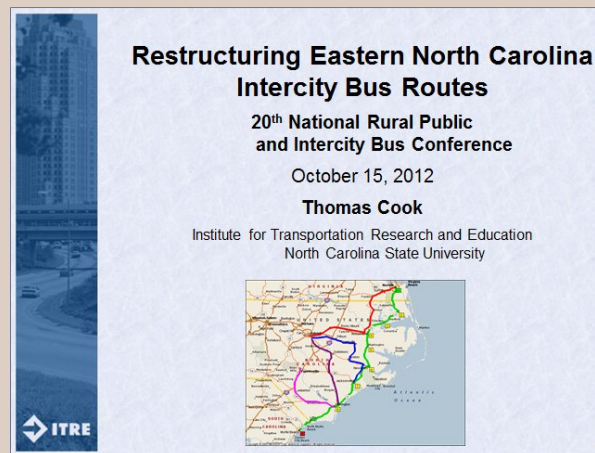
Improving School Transportation Safety in China, International Workshop, Beijing, China, July 2012 (J. Tsai, presenter)

North Carolina Pupil Transportation Association Conference, Kitty Hawk, NC, June 2012 (B. Sluder, presenter 3 sessions, M. Perez, presenter 4 sessions)

North Carolina Pupil Transportation Association District 9 Summer Mini-conference, New Bern, NC, August 2012 (B. Sluder, presenter 2 sessions)

School Bus Stop Arm Violation Video Camera System, North Carolina Pupil Transportation Association Conference, Kitty Hawk, NC, June 2012 (J. Tsai, presenter)

Transportation Efficiency Seminar, North Carolina Pupil Transportation Association Conference, Kitty Hawk, NC, June 2012 (J. Tsai, presenter)



Tom Cook, ITRE program director, presented at the 20th National Rural Public and Intercity Bus Conference.



On May 22, 2012 the World Bank and the Pupil Transportation Safety Education Activities Office (PTSEAO) held a one-day international workshop in Beijing on "Improving School Transport Safety in China" to share international experiences on school transport safety, to highlight the topics of legislation, school bus operation and financing regulations, and to facilitate dialogue amongst various national agencies and local governments in order to discuss the challenges and approaches to a safe and sustainable school transport system in China.

The workshop, supported by the Bloomberg Philanthropies and part of the United Nation's Decade of Action for Road Safety, brought international experts on school transport together with local Chinese experts and various stakeholders from around the country. Along with other international experts, Jeff Tsai, ITRE program director, discussed the 5-E's approach to developing a safe and sustainable multi-modal school transportation system.

Travel Behavior Modeling

Impacts of Land Use Strategies on Travel Behavior in Small Communities and Rural Areas, 2012 Tools of the Trade Conference, Big Sky, Montana, September, 2012 (J. Hueg, presenter)

Visual Analytics, Modeling and Simulation (VAMS)

How Shifting IT Trends are Affecting Geospatial Professional Workforce Development, National Transportation Workforce Summit, Washington, DC, April 2012 (G. Ferrara, panel presenter)

GIS Crash Mapping for the North Carolina State Highway Patrol, Community Policing Symposium, Raleigh, NC, May 2012 (G. Ferrara, presenter)

Tools for Visualizing Enforcement Data as Aids to Improved Operations and Planning, International Association of Law Enforcement Planners, Charlotte, NC, September 2012 (B. Foley, presenter)

Published Refereed Journal Papers

Bugg, Zachary, Nagui Roupail, Bastian Schroeder, (2012) In Press. *Lane Choice Model for Signalized Intersections with an Auxiliary Through Lane*, ASCE Journal of Transportation Engineering.

Bugg, Zachary, Bastian Schroeder, and Nagui Roupail, (2012) In Press. *Guidance for Simulation-Based Modeling of Auxiliary Through Lanes*. Transportation Research Record: Journal of the Transportation Research Board.

Bugg, Zachary, Nagui Roupail, Bastian Schroeder, and Brandon Nevers. (2012) *Implementing Auxiliary Through Lanes in a Highway Capacity Analysis Context*. Transportation Research Record: Journal of the Transportation Research Board, No. 2286. Pp. 21-28.

Chase, Thomas, Billy Williams, Nagui Roupail and SangKey Kim, (2012) In Press. *Comparative Evaluation of Reported Speeds from Corresponding Fixed-Point and Probe-Based Detection Systems*. Transportation Research Record: Journal of the Transportation Research Board.

Cunningham, Chris, Bastian Schroeder, Chris Vaughan, and Ron Hughes, (2012) In Press. *Is TACT Effective in Changing Driver Behavior: Evidence from North Carolina TACT III Effort*. Transportation Research Record: Journal of the Transportation Research Board.

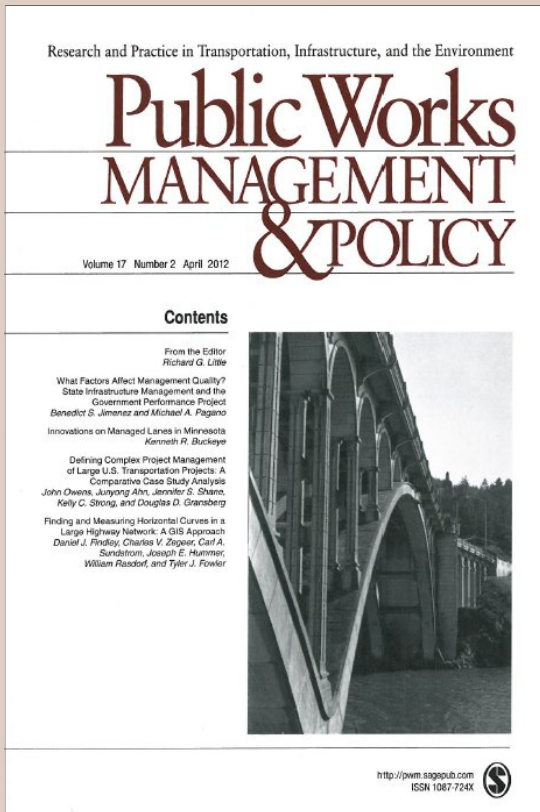
Findley, Daniel, Charles Zegeer, Carl Sundstrom, Joseph Hummer, and William Rasdorf, (2012), *Applying the Highway Safety Manual to Two-Lane Road Curves*. In Press. Transportation Research Record, Journal of the Transportation Research Forum.

Findley, Daniel, Chris Cunningham, William Letchworth, and Michael Corwin, (2012), *Predicting Trip Generation Characteristics of Power Centers*, ITE Journal of Transportation, Vol.4, Issue 1, Pp. 19-28.

Findley, Daniel, Chris Cunningham, Bastian Schroeder, Chris Vaughan, and Tyler Fowler, (2012), *Structural and Safety Investigation of Statewide Weathered Steel Beam Guardrail Performance in North Carolina*. In Press. Transportation Research Record, Journal of the Transportation Research Board.

Findley, Daniel, Joseph Hummer, William Rasdorf, and Brian Laton, (2012), *Collecting Horizontal Curve Data: Mobile Asset Vehicles and Other Techniques*. Journal of Infrastructure Systems. American Society of Civil Engineers.

Findley, Daniel, Charles Zegeer, Carl Sundstrom, Joseph Hummer, William Rasdorf, and Tyler Fowler, (2012), *Finding and Measuring Horizontal Curves in a Large Highway Network: A GIS Approach*. Public Works Management and Policy. American Public Works Association. Volume 17, No. 2. Pages 189-211.



Dr. Daniel Findley et al. published a paper in the Journal of Public Works Management and Policy titled: "Finding and Measuring Horizontal Curves in a Large Highway Network: A GIS Approach." An analysis was undertaken on curves to determine the accuracy of using GIS to identify curves. The safety of horizontal curves from a system perspective was also benchmarked in order to understand curves as a system instead of as isolated roadway features. The policy implications are that the additional curve data will enable a more cost effective distribution of funding for improvements, a more efficient delivery of maintenance operations, and a safer roadway network.

Findley, Daniel, Joseph Hummer, William Rasdorf, Charles Zegeer, and Tyler Fowler, (2012), *Modeling the Impact of Spatial Relationships on Horizontal Curve Safety*. Accident Analysis and Prevention. Elsevier. Volume 45. Pages 296-304.

Hu, Jia, Bastian Schroeder, and Nagui Roupail. (2012) *Rationale for Incorporating Queue Discharge Flow into HCM Freeway Facility Analysis Procedure*. Transportation Research Record: Journal of the Transportation Research Board. No. 2286. Pp. 76-83.

Huntsinger, Leta and Nagui Roupail. (2012) *Value of Life Cycle in Explaining Trip Making Behavior and Improving Temporal Stability of Trip Generation Models*. In Press. Transportation Research Record, Journal of the Transportation Research Board.

Jia, Anxi, Xuesong Zhou, and Nagui Roupail. (2012) *Investigating Traffic Mobility Impact of Mileage-Based User Fees on Traveler Route Choice Behavior and Network Performance: A Planning-Level Traffic Equilibrium-Based Approach*. In Press. Transportation Research Record: Journal of the Transportation Research Board.

Liu, Xiaoyue, Yin Hai Wang, Bastian Schroeder and Nagui Roupail. (2012) *An Analytical Framework for Managed Lane Facility Performance Evaluation*, ITE Journal, Vol 82, Issue 10, pp. 30-36.

Liu, C., Billy Williams and Nagui Roupail. (2012) *Temporal Stability of Freeway Macroscopic Traffic Stream Models*. In Press. Transportation Research Record, Journal of the Transportation Research Board.

Liu, Xiaoyue, Bastian Schroeder and Nagui Roupail. (2012) *Quantifying Cross-Weave Impact on Capacity Reduction for Freeway Facilities with Managed Lanes*. In Press. Transportation Research Record, Journal of Transportation Research Board.

O'Brien, Sarah and Carrie Simpson, (2012), *The Use of "Your Speed" Changeable Message Signs in School Zones - Experience from the North Carolina Safe Routes to School Program*. In Press, Transportation Research Record: Journal of the Transportation Research Board.

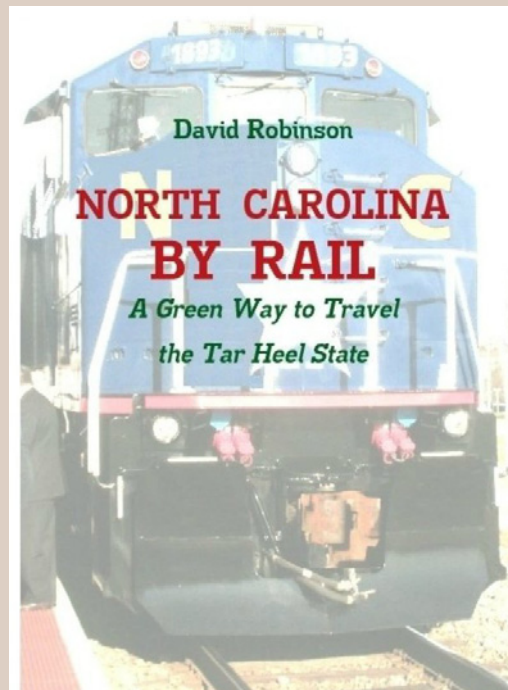
Rasdorf, William, Daniel Findley, Charles, Zegeer, Carl Sundstrom, and Joseph Hummer, (2012), *Evaluation of GIS Applications for Horizontal Curve Data Collection*. Journal of Computing in Civil Engineering. American Society of Civil Engineers. Volume 25, No. 2. Pages 191-203.

Robinson, David. (2012) *North Carolina By Rail; A Green Way to Travel the Tar Heel State*, (ISBN 9781105576102).

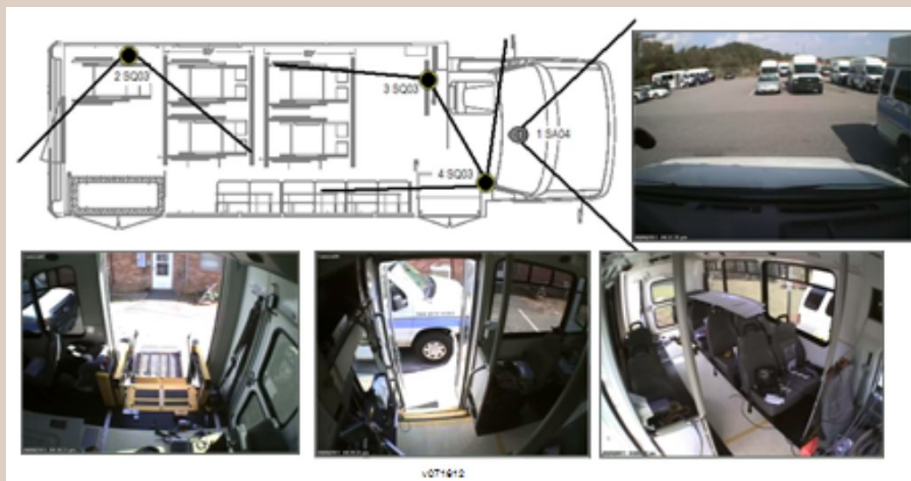
Robinson, David, (2012) *Full Delivery Manual for Mitigation Procurement*, (ISBN 9781105784750)

Salamati, Katy, Bastian Schroeder, Nagui Roupail, Chris Cunningham, Yulin Zang, David Kaber. (2012) In Press. *Simulator Study of Driver Responses to Pedestrian Treatments at Multilane Roundabouts*. Transportation Research Record: Journal of the Transportation Research Board.

Schroeder, Bastian, Nagui Roupail, Katy Salamati, and Zach Bugg. In Press. *Impact of Pedestrian Impedance on Vehicular Capacity at Multilane Roundabouts with Consideration of Crossing Treatments*. Journal of the Transportation Research Board.



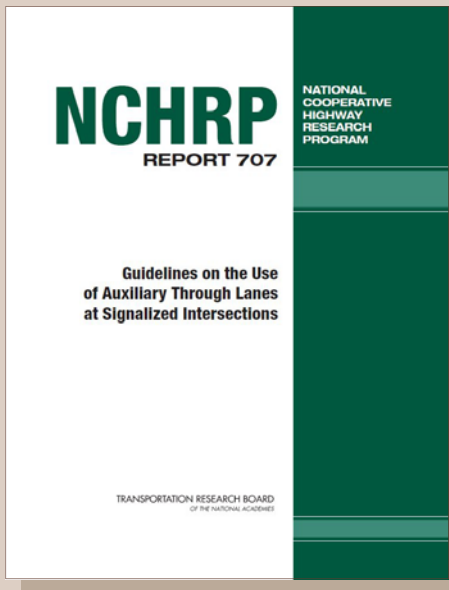
North Carolina By Rail: A Green Way to Travel the Tar Heel State, ISBN 9781105576102, David Robinson, 2012



Through an American Recovery and Reinvestment Act project, NCDOT Public Transportation Division has funded in-vehicle security cameras for the eighty systems serving the community transportation program areas. The configuration is a 2-camera system in mini-vans and a 4-camera system in all other vehicles set up to capture the following events: wheelchair deployment, G-force and operator panic button. Currently, installations have occurred in 2 of 10 groups. We have already experienced assistance with passenger complaints, identified many areas for retraining as well as opportunities to praise the operators for making good decisions. ITRE is grateful for the opportunity to participate in and facilitate activities on this project.



Roads and bridges throughout North Carolina are susceptible to damage by overweight trucks, especially if the roads and bridges were not built to handle the extra weight. An article by Greg Ferrara and Jeremy Scott published in the Winter 2012 issue of "GIS in Transportation: A Newsletter from the Federal Highway Administration (FHWA)," shares information that is assisting the Motor Carrier Enforcement (MCE) section of the North Carolina State Highway Patrol in protecting the state's federally funded roads and bridges by identifying road segments that are susceptible to damage from overweight trucks.



Shown above is "NCHRP Report 707: Guidelines on the Use of Auxiliary Through Lanes (ATLs) at Signalized Intersections." ITRE was a key research partner in this two-year project led by Kittelson and Associates, Inc. ITRE staff was centrally involved throughout all stages of the project and led key efforts on site selection, data collection and extraction, statistical modeling, simulation, and the development of a computational procedure. The guidelines, intended to be used as a decision support tool, document safety characteristics of ATLs and provide recommendations for determining ATL design elements, operations, signing, and safety.

Schroeder, Bastian, Seyedbehzad Aghdashi, Nagui Rouphail, Xiaoyue Liu, and Yinhai Wang. (2012) *Deterministic Approach to Managed Lane Analysis on Freeways in a Highway Capacity Manual Context*. Transportation Research Record: Journal of the Transportation Research Board. No. 2286. Pp. 122-132.

Thomson, Timothy, Xiaoyue Liu, Yinhai Wang, Bastian Schroeder, and Nagui Rouphail. (2012) *Operational Performance and Speed-Flow Relationships for Basic Managed-Lane Segments*. Transportation Research Record: Journal of the Transportation Research Board. No. 2286. Pp. 94-104.

Xiaoyue Liu, Yinhai Wang, Bastian Schroeder, and Nagui Rouphail. In Press. *Quantifying Cross-Weave Impact on Capacity Reduction for Freeway Facilities with Managed Lanes*. Accepted for Publication by the Transportation Research Record: Journal of the Transportation Research Board.

Other Publications and Reports

Chang, Jeffrey, Tsai, M.K., Findley, D.J., and Cunningham, C.M. *Infrastructure Investment Protection with LiDAR*. North Carolina Department of Transportation. Report FHWA/NC 2012-15. October 2012.

Cook, Thomas. *Restructuring Eastern North Carolina Subsidized Routes (Intercity Bus)*. Technical Memorandum produced for the North Carolina Department of Transportation, Public Transportation Division, April 2012.

Cook, Thomas. *Analysis of Intercity Bus Routes Receiving Operating Assistance Through the FTA and NCDOT Section 5311(f) Intercity Bus Program*. Technical Memorandum produced for the North Carolina Department of Transportation, Public Transportation Division, May 2012.

Cook, Thomas, Monast, K., and Collins, D. *A Tool for Assessing Community Transportation System Fleet Size and Mix*. North Carolina Department of Transportation, Public Transportation Division, August 2012.

Cunningham, Chris, Hummer, J.E., Change, J., Katz, D., Vaughan, C., Findley, D.J., Schroeder, B., McAvoy, D. *All-Weather Paint for Work Zones - Field Evaluation in North Carolina and Ohio*. Report submitted to FHWA, Highways for Life Program, March 2012.

Ferrara, Greg. *A Performance Measurement Needs Assessment for NCSHP Operational Planning Decision Support*. GHSP Funded Research, September 2012.

Ferrara, Greg and Scott, J. *A GIS-Based Road Vulnerability Index (RVI)*, Editorial published in GIS in Transportation Newsletter—FHWA, and in The Guardian, Vol 19, Issue 2. Winter 2012.

Findley, Daniel, Cunningham, C.M., Chang, J.C., Hovey, K.A., and Corwin, M.A. *Effects of License Plate Attributes on Automatic License Plate Recognition*. North Carolina Department of Transportation, Division of Motor Vehicles. July 2012.

Findley, Daniel, Cunningham, C.M., Chang, J.C., Hovey, K.A., and Corwin, M.A. *Best Practices Guide for Improving Automated License Plate Reader Effectiveness through Uniform License Plate Design and Manufacture*. American Association of Motor Vehicle Administrators (AAMVA). Appendix F: North Carolina State University Study on Effects of License Plate Attributes on ALPR. September 2012.

Gurganus, Steve. *Consideration of Transportation-Related Health Effects Under NEPA at the North Carolina Department of Transportation*. Capstone paper for NEPA Practitioner Certification, 2012.

Hartell Ann, Murray, E. *The Evolution of the Ecology-Transportation Discipline: An Analysis of Ten Years of ICOET Proceedings*. Invited paper. Infra Eco Network Europe (IENE), International Conference, Potsdam, Germany, October 2012.

Monast, Kai, and Worthy, J. *Applying Structured Scheduling to Increase Performance in Rural Demand-Response Transportation*. Journal of Public Transportation, Vol. 15, No. 3. 2012.

Student Support

Support for Scholars and Students

ITRE research and technical assistance projects continue to engage and support a large number of students from various disciplines and universities. The adjoining tables summarize our record of accomplishments in providing student support, indicating increased graduate student participation in ITRE research. *In 2012, we had the highest number of supported research graduate students in our history (31).* More importantly, much of the graduate student support has come from federal research dollars from agencies such as the National Science Foundation, the National Cooperative Highway Research Program (NCHRP), the Strategic Highway Research Program (SHRP-2), the Federal Highway Administration and the Environmental Protection Agency. Many of the graduate students at ITRE have received full Research Assistantship support. We also provided meaningful research experiences for our undergraduate students, primarily in the areas of transportation systems, rail operations and a variety of other fields. ITRE also recruited two high school students, Kaitlyn Tsai, from the Academy of Information Technology (AOIT) program, Apex High School, Apex, NC. and Edward Foyle from the North Carolina School of Science and Mathematics, Durham, NC.

Post-Doctoral Fellows and Visiting Scholars

ITRE continues to engage both post-doctoral candidates and visiting students and scholars. This past year, we were pleased to hire Dr. Ali Hajbabaie who has completed his doctoral work at the University of Illinois at Urban Champaign (UIUC) in the areas of traffic operations, focused on signal optimization, and safety. Ali is currently engaged in research at the national level including several SHRP-2 and NCHRP projects, and on an NCDOT project on arterial work zones.

PhD student Guillermina (Mina) Torrao at the University of Aveiro, Portugal also spent the spring 2012 semester at ITRE focused on completing her dissertation research on safety versus environmental impacts of the Portuguese vehicle fleet.

We have continued our research partnership with the Instituto Superior Tecnico in Lisbon in the area of transportation and the environment by hosting Professor Tiago Farias and Dr. Goncalo Goncalves from IST for a short visit in October 2012.

2012 Supported Graduate Students	
Seyedbehzad Aghdashi Abseen Anya Shreyas Bharadwat Zachary Bugg Thomas Chase Yi Chen Tabitha Combs David Craft Anne Holzem Jiangchuan Hu Elizabeth Hunter Fnu Chaithra Jagadish Anxi Jia Dwayne Jones Easa Kahn Monisha Khurana	Sangkey Kim Paul Ku Isaac Kumar Ted Mansfield Elizabeth Rosen Soheil Sajjadi Katy Salamati Drew Spiliotis Elam Summey Jaryd Tehini Dale Tiska Guilhermina Torrao Yilun Xu Bo Yang Chunho Yeom
2012 Supported Undergraduate Students	
Lauren Anderson Jamie Bort Michael Corwin Fred Cunningham, III Bobbie Dupuis Anthony Encarnacion Brooks Hester	Dylan Horne Kyle Hovey Anna Jackson Mark Julis Amy Mindick-Walling Kagure Wamunyu
2012 High School Interns	
Edward Foyle, Kaitlyn Tsai	

Academic Year	# of Graduates	# of Under-graduates	# of High School Interns	Total
2001-02	14	9		23
2002-03	11	15		26
2003-04	11	19		30
2004-05	11	23		34
2005-06	15	17		32
2006-07	14	11		25
2007-08	14	10		24
2008-09	9	4		13
2009-10	16	12		28
2010-11	20	18		38
2011-12	31	13	2	46
Totals	166	151	2	319

Exhibit IX

Summary of Continuing Education Activities

More than 10,100 transportation professionals - from flaggers to professional engineers - received the benefit of ITRE's education activities during 2012. This has increased by 22% over last year's totals. The Transportation Founders Fund also offered a well-attended seminar in April 2012 on the future of logistics in North Carolina. Exhibit IX lists training areas, workshops and summary statistics, including a separate listing of ITRE's Distance Learning training.

Program	Training/Workshops in 2012	Instruction Hours per Session	Sessions Offered	Total Hours	Attendees	
CTE	CSS National Dialog Webcast, Expanding the Conversation, April 2012	1.5	1	1.5	400	
	CSS National Dialog Workshop and Webcast, Springfield, IL, September 2012	4	1	4	36 onsite 227 webcast	
	CSS National Dialog Workshop and Webcast, Lansing, MI, November 2012	4	1	4	35 onsite 222 webcast	
ITRE	Transportation Founders Fund Reception at NC State University, Raleigh, NC, April 2012		1		110	
	Transportation Research Board reception at Annual TRB Meeting, Washington, DC, January 2012		1		225	
Highways	Distance Learning					
	FEP Spring Program for NCDOT employees	3	44	132	201	
	FEP Fall Program for NCDOT Employees	3	42	126	175	
	Fundamentals of Engineering (FE) Tues/Fri review course	3	40	120	45	
	Classroom Training					
	PROFESSIONAL ENHANCEMENT COURSES					
	PE Friday/Saturday	14	8	112	30	
	PE Wednesday Night Review Course	3	22	66	75	
	Highway Engineering Concepts (HEC) Raleigh	7	18	126	35	
	DOT MAINTENANCE COURSES					
	Drainage	7	23	161	690	
	Guardrail	7	6	42	180	
	WORK ZONE COURSES					
	Flagger Training	4	25	100	500	
	Flagger Instructor Training	12	8	96	1295	
	Work Zone Safety—Basic	6	37	222	1435	
	Work Zone Safety—Intermediate	7	41	287	805	
	Work Zone Safety Supervisor	20	23	460	690	
	SOFTWARE TRAINING WORKSHOPS					
	SYNCHRO	14	1	14	12	
VISSIM (Introduction, Advanced I & II)	28	2	28	17		
CTE, ITRE and Highways Totals		147.5	345	2101.5	7,440	

Program	Training/Workshops in 2012	Instruction Hours per Session	Sessions Offered	Total Hours	Attendance
LTAP	Advanced Computers: Practical Applications	8	1	8	5
	Advanced Construction Inspection -AWPA-NC	12	1	12	17
	Advanced Work Zone Safety Training	8	1	8	28
	Asphalt Pavement Maintenance	8	4	32	57
	Asphalt Roller Operator Safety Training	8	2	16	21
	Backhoe Operator Safety Training	8	2	16	27
	Basic Work Zone Safety Training	8	13	104	257
	Computers: An Introduction to Reports and Presentations	7	2	14	17
	Concrete: What, When, and How	8	2	16	30
	Confined Space Entry and Lockout/Tagout	8	3	24	39
	Construction Inspection for Public Works Projects APWA-NC	18	1	18	25
	Construction Math for Transportation Personnel	8	5	40	96
	EDC Exchange #2: Geosynthetic Reinforced Soils (GRS)	2	1	2	7
	EDC Exchange #3: Flexibility in ROW	2	1	2	2
	EDC Exchange #4: In Lieu Fees / Mitigation Banking	2	1	2	6
	EDC Exchange #5: Adaptive Signal Control Technologies (ASCT)	2	1	2	5
	Erosion Control	8	1	8	29
	Excavation Safety	8	3	24	27
	Fall Protection	8	2	16	26
	Flagger Instructor Training	12	5	60	50
	Flagger Training	4	13	52	68
	Intermediate Work Zone Safety Training	8	4	32	66
	Low-Cost Safety Improvements	8	4	32	38
	Maintenance and Repair of Utility Cuts	4	4	16	59
	Management Skills for Experienced Supervisors	8	1	8	29
	Management Skills for First -Time Managers	8	2	16	43
	Managing Conflict with Employees and the Public	8	3	8	51
	Motorgrader Operator Safety Training	8	1	8	13
	OSHA 10 Hour Safety Training	10	4	40	77
	Plan Reading for Transportation Personnel	8	2	16	27
	Practical Applications of Spreadsheets, Reports, and Presentations	8	1	8	8
	Road Safety Fundamentals	8	1	8	11
	Soils Fundamentals	8	2	16	25
	Stormwater Hydrology	8	2	16	46
Tort Liability and Risk Management	8	1	8	31	
Traffic Calming	8	2	16	36	
Trenching Competent Person	8	6	48	60	
Work Zone Traffic Control Supervisor	24	5	120	60	
	NC LTAP Totals	307	110	892	1519

Program	Training/Workshops in 2012	Instruction Hours per Session	Sessions Offered	Total Hours	Attendees
Public Transportation	Distance Learning: Webinars				
	Emerging Technologies for Bicycle & Pedestrian Planning	1.25	1	1.25	8
	Land Use Planning and Routine Inclusion of Bicycling and Walking in New Developments	1.5	1	1.5	11
	Best Practices for Maintenance Programs	1	1	1	1
	NTTP Update - A Bold Experiment in Four Communities	1.5	1	1.5	5
	In-Street Bike Parking - What, When, Where & How Much	1	1	1	11
	Resolving Conflicts at Complex Intersections	1	1	1	11
	The Greener Side of Green Streets Reducing Pavement Footprints	1	1	1	16
	Transforming Streets into Inviting Public Spaces	1.25	1	1.25	2
	Liability Understanding and Managing Risk	1	1	1	5
	FHWA Experimentation for Advancing Best Practices	1	1	1	2
	Maps that Guide, Encourage and Inform	1	1	1	TBD
	Wayfinding Options for Cyclists	1	1	1	TBD
	Using Your Data	1.5	3	4.5	28
	Understanding Billing	1.5	2	3	12
	Policies and Practices	1.5	1	1.5	5
	Basics of Scheduling	1.5	2	3	21
	Basics of Dispatching	1.5	1	1.5	19
	Service Delivery Methods	1.5	2	3	9
	AssetWorks Training, Version 12	2	11	22	117
	Assetworks Incident Management	2	4	8	119
	AssetWorks Managers / Overseer Training	2	3	6	62
	Camera Project Webinars	2	10	20	182
	AssetWorks Upgrade and Storekeeper	2	5	10	53
	Classroom Training				
	"Watch for Me - NC" Enforcement for Pedestrian Safety Tactical Training	6.5	3	19.5	53
	Transportation Leadership Development	120	2	240	21
	Americans With Disabilities Act	8	3	24	101
	Building Relationships with Public Officials at all Levels	15	1	15	11
	Building and Maintaining Effective Organizations through Good Employees	15	2	30	16
	Budgeting as a Planning Tool for Additional Funding	15	1	15	8
	AssetWorks Refresher Training	Varies	45	543	124
	User Groups - Technology, APCs, Planning	3	3	9	60
Public Transportation Totals	215	116	991.5	1093	

Program	Training/Workshops in 2012	Instruction Hours per Session	Sessions Offered	Total Hours	Attendees
Pupil Transportation	Distance Learning Training				
	Blackboard—TDTIMS	3	1	3	25
	Blackboard—EMU & System Admin	3	2	6	7
	Blackboard—TIMS Talk	3	1	3	5
	Classroom Training:				
	Open Lab	6	2	12	2
	New User	6	4	48	38
	Reports	6	2	12	11
	Geographic Certification I	6	1	12	10
	Geographic Certification II	6	1	12	10
	EIPlot & GeBndPlan	6	1	6	1
	Run Opt	6	1	6	8
	MS Office & TIMS	6	1	6	7
	Pupil Transportation Totals	57	17	126	124



The Pupil Transportation program group offers both classroom and customized training on the Transportation Information Management System (TIMS) software for school systems across North Carolina. TIMS is a GIS-based school bus routing and scheduling software with optimization algorithms that assist school systems create efficient bus routes while adhering to safety concerns and operating policies. In addition to the traditional computer lab training, the support staff also conducts distance learning training using NCSU's distance learning tools.

Marketing/Public Relations

As ITRE works to position itself as a world-class transportation research center, the Institute continues to focus its efforts on increasing national visibility. Whether making presentations at conferences and seminars - both nationally and abroad, receiving awards and recognition for contributions to the field, establishing collaborations with universities in foreign countries, or working to solve transportation problems and educate transportation professionals, ITRE staff work toward the achievement of this goal.

Sharing the accomplishments and successes brought about by these efforts has been the focus of marketing and public relations for 2012. ITRE staff members provide services to support the goals and objectives of ITRE that relate to marketing and public relations.

◆ On the ITRE Website:

- * Activities, events, programs, and research were featured in ITRE Directions, a quarterly online newsletter available on the "News and Events" page.
- * 19 news items were featured on the home page.
- * Research papers continue to be made available through either source links or PDF files from a searchable database in the "Research" section of the Website.
- * The Transportation Founders Fund Speaker Series for 2012 was promoted through a printed brochure and on the ITRE website prior to the event. Afterwards, a video of the event, including speaker presentations, was made available from the "Transportation Founders Fund" section of the site. A photo gallery for the event was also made available on the website.
- * ITRE recognized staff who presented at the TRB Annual Meeting through a listing of session papers and a photo gallery made available on the website.
- * ITRE worked with its centers and program groups as well as other transportation-related organizations to maintain over 15 websites.
- * ITRE continues to share information on Facebook. It is accessible through the Facebook button on the home page of the website.

◆ Articles in NCSU Bulletin

- * Snyder to Lead NGAT Center (5-8-12)
<http://www.ncsu.edu/faculty-and-staff/bulletin/2012/05/ngat/>
- * Hughes Eyes Retirement (6-19-12)
<http://www.ncsu.edu/faculty-and-staff/bulletin/2012/06/hughes/>
- * Foyle Retires After 32 Years (6-19-12)
<http://www.ncsu.edu/faculty-and-staff/bulletin/2012/06/foyle/>
- * Martin Moves Up at ITRE (7-18-12)
<http://www.ncsu.edu/faculty-and-staff/bulletin/2012/07/martin/>

◆ Articles in TRB Transportation Research E-Newsletter

- * Announcements about ITRE Directions and Annual Reports

◆ Items in business updates section of News & Observer (Career Moves, Tech Moves)

- * Kyle Snyder/NGAT director - Career Moves, June 5, 2012
- * Ron Hughes & Bob Foyle retirements - Tech Moves, June 25, 2012
- * James Martin as associate director - Tech Moves, July 16, 2012
- * Steve Gurganov - Tech Moves, October 2012

Transportation training on budget on time ONLINE

Workforce Training
Technology Transfer
Continuing Education
Job Skills Improvement
Certification and Licensure

ITRE
Institute for Transportation Research and Education
Distance Learning

NC STATE UNIVERSITY

ITRE DIRECTIONS
Quarterly Newsletter published by the Institute for Transportation Research and Education (ITRE) at NC State University | September 2012

ITRE Students Win International Traffic Bowl Competition

Four graduate students at ITRE recently won an international quiz bowl competition involving 55 colleges and universities from across the U.S. and Canada. Abbeey Arya, Zachary Buga, Thomas Chase, and Tyler Fowler won the Traffic Bowl Grand Championship at the Institute of Transportation Engineers (ITE) Annual Meeting in Atlanta on August 14, 2012, after defeating Texas A&M University and the University of Toronto in the final.

The Traffic Bowl is a seven-year-old, Jeopardy-style student competition hosted by the ITE at its international and district meetings as an activity for student networking and involvement. The game features clues taken from several engineering manuals, general transportation trivia, and the history of ITE. Each of the winning students has been involved in research at ITRE as part of their graduate work at North Carolina State University.

To qualify for the championship in Atlanta, the HCSU team first defeated the University of North Carolina-Charlotte in November 2011 at the HCSITE Annual Meeting in Raleigh. Then in April 2012 they defeated the University of Louisiana-Lafayette, the University of Alabama, Clemson University, and Virginia Tech University to win their second consecutive Southern District championship in Lexington, Kentucky. Finally, they defeated Purdue University and the University of Massachusetts-Amherst in August 2012 to reach the title game against Texas A&M and Toronto. The final game required seven tiebreaker questions to determine the champion.

Students Work with ITRE to Conduct Rail Surveys

ITRE is nearing completion of a project for the North Carolina and Virginia Departments of Transportation that involved many HCSU students collecting origin and destination travel data. The data will be analyzed by HCSU to update modeling estimates on the Southeast High-Speed Corridor (SEHC). The SEHC runs between Charlotte, NC and Washington, DC via Raleigh, NC and Richmond, VA.

Fifteen HCSU students and 10 UNC-Charlotte students participated in an extensive series of intercept surveys to collect travel data from motorists, train passengers, and air travelers. HCSU students surveyed motorists at six rest areas and passengers on board Amtrak trains running between Charlotte, Raleigh, Richmond, VA, and Washington, DC. UNC-Charlotte students surveyed motorists at the Concord rest area on I-85 and air travelers at the Charlotte Douglas International Airport. HCSU students will survey air travelers at Raleigh-Durham International Airport in October.

Surveys were conducted at each location over a two-day period involving one weekday and one weekend day. In addition to paid work opportunities, the survey provided an opportunity for some students to travel to parts of the state that they had not visited previously. A preliminary report with updated modeling estimates is anticipated to be produced by the end of the year. For more information on our projects, contact Tom Cook at tc3@ncsu.edu.

Visit us on the Web: www.itre.ncsu.edu Email us at: itre_inf@ncsu.edu

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The Context Sensitive Solutions (CSS) National Dialog 2 builds upon FHWA's efforts to promote an ongoing exchange of ideas, and to drive momentum for wider implementation of CSS in the transportation industry. The 2012-2013 workshop series highlights the linkages between CSS and sustainability, livability, striking a balance between needs and affordability, as well as the value of CSS for improving all phases of the transportation decision-making process, from planning, to design, construction, maintenance, performance evaluation, and into the next planning cycle.



The Roads Scholar and Advanced Roads Scholar programs provide special training administered by North Carolina's Local Technical Assistance Program (NC LTAP) at ITRE that allow local government agencies access to high quality training for their employees at a reasonable cost. The Roads Scholar Program consists of 14 different one- or two-day training sessions regularly offered each year. To become a Roads Scholar, seven of the 14 training sessions must be completed.

Appendix I

Summary of Program Groups

Center for Transportation and the Environment (CTE)

As a US Department of Transportation University Transportation Center of Excellence, the Center for Transportation and the Environment (CTE) conducts research, education, and technology transfer activities that seek to mitigate the impacts of surface transportation on the environment. CTE's mission is national in scope, though it co-sponsors activities and makes its services available at the local, state, and regional levels.

CTE has provided more than 20 years of service to transportation and environmental professionals and has a pivotal role in developing the next generation of professionals who will be charged with meeting future mobility needs in an environmentally sound manner. Funding is provided by USDOT, with matching funds provided by NCDOT.

NC Local Technical Assistance Program (NC LTAP)

The North Carolina Local Technical Assistance Program (NC LTAP) is one of the 59 LTAP centers nationwide. There is an LTAP program in each state, including Puerto Rico, and with several Native American centers. LTAP was established by the Federal Highway Administration in 1982. The North Carolina center was one of the first organized in 1986.

The mission of LTAP is to help local agencies tap into new technology, information, and training so they can operate more efficiently and safely. LTAP centers provide access to training and information that may not have otherwise been accessible. Centers are able to provide local road departments with work force development services, resources to enhance safety and security, solutions to environmental, congestion, capacity and other issues, technical publications, and training videos and materials.

NC LTAP offers the following training and technical assistance:

- ◆ Roads Scholar and Advanced Roads Scholar programs
- ◆ Additional training courses covering maintenance, safety, traffic and management
- ◆ Email discussion list—NCROADS
- ◆ Quarterly newsletter—*Transportation Tracks*

Geovisual Analytics and Decision Management Group (GADA)

In summer 2012, the Visual Analytics, Modeling and Simulation (VAMS) and the Operations Research Education Laboratory (OREd Lab) were combined to form the Geovisual Analytics and Decision Management Group (GADA). Both programs apply their geospatial analytics skills to conduct research that yields conclusions to support operation management decisions and to influence public policies.

- ◆ *Coverlab* (www.coverlab.org). The Commercial Vehicle Enforcement Resource Lab (Coverlab) is ITRE's flagship resource for the motor carrier enforcement assistance program. Coverlab represents an assembly of decision support tools such as scorecard and dashboard services, geospatial analytics, data visualizations and applied research that aid in the operation enforcement planning decisions conducted by the Motor Carrier Enforcement section of the North Carolina State Highway Patrol and NCDOT
- ◆ *OREd Program* (www.itre.ncsu.edu/OREd). The Operations Research and Education Laboratory (OREd) conducts population forecasts, land use studies, location optimization, and GIS analysis. By integrating schools and community planning data and goals, OREd assists school systems in developing data-driven and policy-based facility and assignment plans.

Highway Systems Group

The Highway Systems Group was formed in the early 1980s to assist the North Carolina Department of Transportation (NCDOT) with pressing surface infrastructure challenges. Many research and development projects conducted for maintenance, construction, and central office staff have helped provide implementable solutions to pressing needs. Group staff are also engaged in many national research projects under FHWA, ITE, NCHRP, NCFRP, and SHRP2 research programs, and the group is involved in teaching and professional development for the National Highway Institute (NHI).

Today, public and private sectors nationwide look to the group to conduct research and provide solutions for surface and air issues including the following.

- ◆ Traffic Operations
- ◆ Microscopic and Mesoscopic Traffic Simulation
- ◆ Accessibility to Complex Intersections to Pedestrians with Vision Disabilities
- ◆ Automated Data Collection and Inventory of Transportation Assets
- ◆ Operational Assessment of Modern Roundabouts and Unconventional Intersections and Interchanges
- ◆ Freeway Performance Assessment, Modeling, and Monitoring
- ◆ Video-Based Detection and Assessment of Traffic Patterns
- ◆ Work Zone Operations and Safety Evaluation
- ◆ Economic Impact Assessment and Benefit-Cost Analysis
- ◆ Transportation Policy and Funding
- ◆ Professional Engineering Review and Career Development Training

Staff also provide job-specific training and education for transportation professionals at every level along with supplementary reference materials. Public and private sector groups also take advantage of our technical assistance opportunities.

NextGen Air Transportation (NGAT) Center

The NGAT Center was formed in 2008 to support North Carolina efforts in modernizing aviation technologies and transportation initiatives in the state. In the summer of 2012, the NGAT Center was re-launched under a statewide initiative to unite the Unmanned Aircraft Systems (UAS) community in North Carolina. This new focus is intended to spur economic growth in the UAS industry, coordinate the academic research and training resources across the state, and develop a holistic infrastructure that includes establishment of a UAS test site on the NC coast. By preparing for UAS emergence in civilian and commercial applications, the NGAT Center is embracing the core technologies and native resources that position North Carolina to be a national leader in modern aviation transportation and research. In 2013 the NGAT Center will be launching a new Membership Program designed to provide a variety of services and products that will provide new opportunities for research, careers, and collaboration across industry, academia, and agencies interested in UAS and NextGen-related activities. *The NGAT Center's guiding mission is to discover, evaluate, implement, and disseminate advanced air transportation technologies at the regional, national, and international level to improve the capacity, safety, and environment surrounding air transportation.*

Public Transportation Group

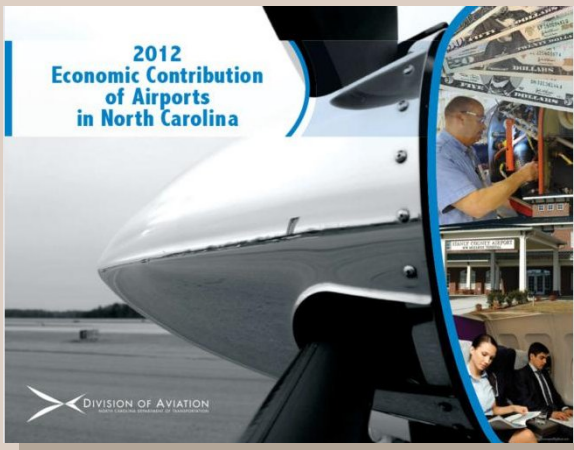
The Public Transportation Group is responsible for research, training, and technical assistance in the area of public transportation. Activities focus on the following transportation modes both singularly and in multimodal settings: urban fixed-route transit, Paratransit, rural demand-responsive transit.



Equipment used to evaluate driver's reactions to a large radius horizontal curve on two-lane roads. This effort focused on driver's behavior when passing a large truck which involved the measurement of distance of the passing vehicle behind the truck, video of the passing maneuvers, and the speed of the passing vehicle based on the change in distance from the truck.



ITRE's Public Transportation and Highway System groups recently completed a project for the NC and Virginia Departments of Transportation that involved the collection of origin and destination travel data that will be used to generate updated ridership estimates for the Southeast High Speed Rail Corridor (SEHSR).



The Division of Aviation commissioned the Institute for Transportation Research and Education (ITRE) at North Carolina State University to compile the 2012 Economic Contribution of Airports in North Carolina Report on how aviation impacts the state's economy. According to the report, the state's 63 general aviation and nine commercial service airports provide a vital link to regional, national and international markets. Also shown in the report is that North Carolina airports support more than \$4 billion in personal income for aviation-related jobs; state and local governments received more than \$770 million in sales, property, corporate and personal taxes due to airport activity; and local property taxes related to airport activities is about \$277 million. For a copy of the 2012 report and/or brochure, visit www.ncdot.gov/aviation.

The NCDOT Public Transportation Division is a primary client by providing opportunities to link applied research with ongoing technical and technology assistance. A passion for this group is pursuing practical applications that can have immediate benefits by increasing efficiencies in transit operations and positively impacting service and transportation choices for the traveler.

Bicycle and Pedestrian Program. The Bicycle and Pedestrian Program has the distinction of a long-standing working partnership with NCDOT's Division of Bicycle and Pedestrian Transportation including its Safe Routes to School Program. Through this partnership ITRE works on research and technical assistance projects and offers professional development opportunities to improve bicycle and pedestrian transportation in the state. In addition, program staff work in collaboration with the Highway Systems Group on national research projects that contain bicycle and pedestrian elements and will begin teaching planning and design courses around the country through the National Highway Institute.

Pupil Transportation Group

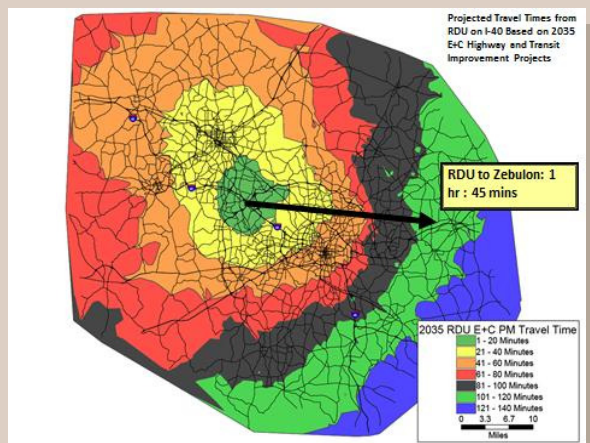
ITRE is the only research center in the nation with a program group dedicated to addressing school travel safety and operation topics. Through the applications of transportation engineering principles, operations research, and technology to the operation and management of multi-modal school transportation, the Pupil Transportation Group conducts two major services:

- ◆ **Transportation Information Management Systems (TIMS).** The TIMS program area provides support and consultation of a GIS-based school bus routing and scheduling software system used by all public school systems in NC. Through the use of the software and support from the Pupil Transportation Group staff, school systems in NC were able to design and implement cost-cutting transportation plans during the recent difficult economic years.
- ◆ **Pupil Transportation Technical Assistance.** The Pupil Transportation Group offers consultation services to school districts improving safety and efficiency transportation students to and from schools. The Group also provides Web site hosting and maintenance for three (3) nationally-recognized organizations:

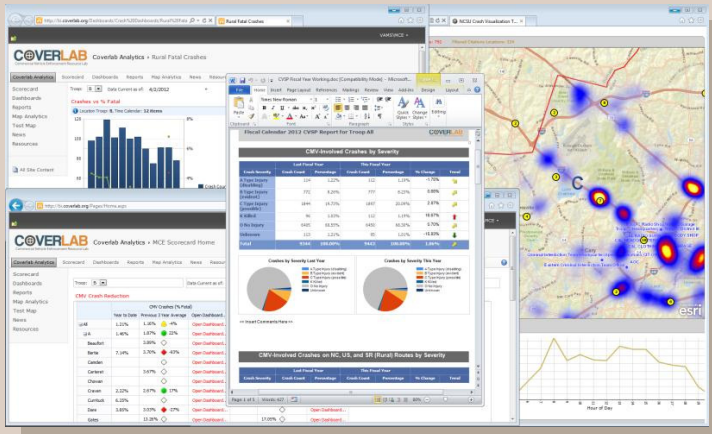
- * National Association for State Directors of Pupil Transportation Services (www.nasdpts.org);
- * Transportation Research Board School Transportation Subcommittee (www.itre.ncsu.edu/anb10_6)
- * NC School Bus Safety (www.ncbussafety.org)

Travel Behavior Modeling Group

ITRE expanded its commitment to conducting research in travel behavior by creating the Travel Behavior Modeling Group in July, 2012. The new group will pursue research opportunities in travel behavior and modeling research in a variety of topics and will include the Triangle Regional Model Service Bureau. Research work so far includes: an investigation of land use models for small areas in North Carolina, the effect of alternative development strategies on emissions in small and medium sized communities, and surveys of university student travel behavior in North Carolina.



The new version of the Triangle Regional Model, called TRM V.5, is used to develop updates to the transportation plans for the triangle region with a 2040 forecast year. The new model adds many improvements including a bicycle and pedestrian model, an airport passenger model, and an improved parking cost and parking capacity constraint model.



The Commercial Vehicle Enforcement Resource Lab (COVERLAB) has released COVERLAB Analytics, a web-based decision support and visualization tool for the Motor Carrier Enforcement (MCE) section of the North Carolina State Highway Patrol. COVERLAB Analytics represents a significant milestone as part of the COVERLAB's suite of products and services that provide program evaluation, analysis and research in support of MCE's operational enforcement planning program.

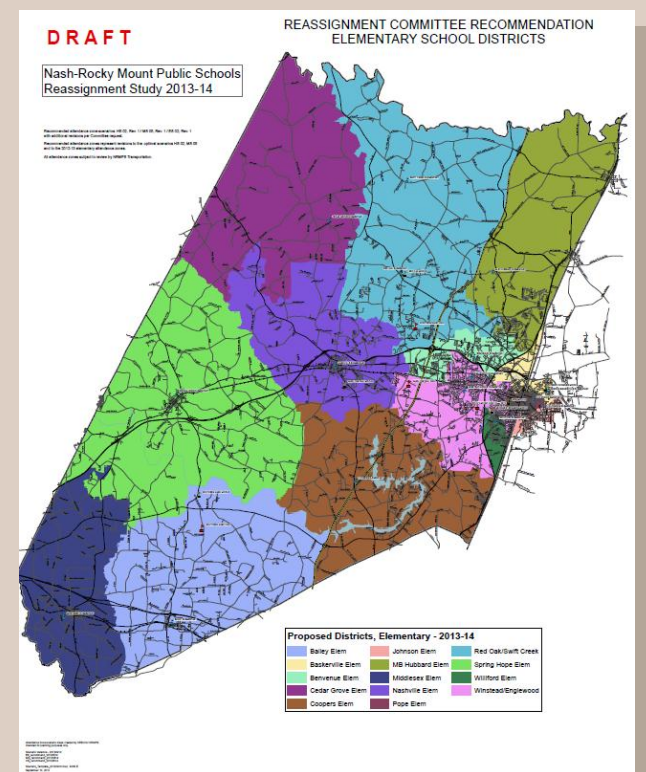
The Operations Research and Education Laboratory (OREd) recently completed a year-long project with Nash-Rocky Mount Public Schools to design a comprehensive reassignment plan for the 2013-14 school year. The plan originated with the opening of a new high school but focused on a better balance of school building utilization for both middle and high schools in the entire district.

COVERLAB's mission is to improve individual states' commercial vehicle enforcement programs by anticipating emerging commercial vehicle enforcement issues and to serve as a center of excellence for optimized commercial vehicle enforcement planning through innovative decision support technologies.

By using operations research techniques, OREd was able to guide the appointed reassignment committee through multiple assignment scenarios that considered several constraints including building capacity, proximity, demographic balance, and travel distance. Committee members were challenged by the connections and conflicts between these constraints and the impact they had on the assignment map. The scenario maps (example shown below) and related data eventually led the Committee to school boundaries that represented a manageable and practical solution to many of the issues facing the district.

MCE's goals are to improve the enforcement effectiveness to significantly reduce commercial vehicle crashes and damage to federally funded road infrastructure from overweight vehicles. COVERLAB Analytics will provide NCSHP MCE with online scorecards to track performance for meeting operational goals, dashboards for in-depth trend and comparison analysis, dynamic reports to streamline and simplify Federal reporting requirements, and geospatial analytics to prioritize times and locations for prioritized enforcement.

The geospatial analytic application allows users to easily filter and map commercial motor vehicle (CMV) crashes, inspections, and citations by location, time, contributing circumstance and many others. Users can visualize patterns and trends with interactive graphs and tables that are linked to the filtered map results.



ITRE Staff Participation in Community Service

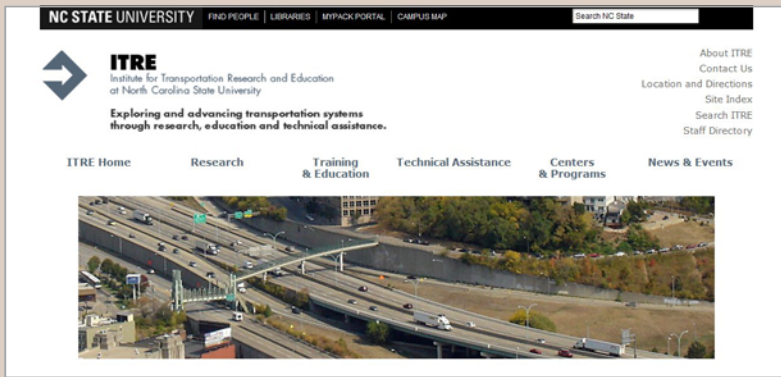
We helped at the Food Bank in March and again in December



And we framed a house with Habitat for Humanity



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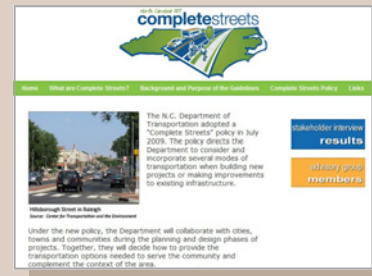
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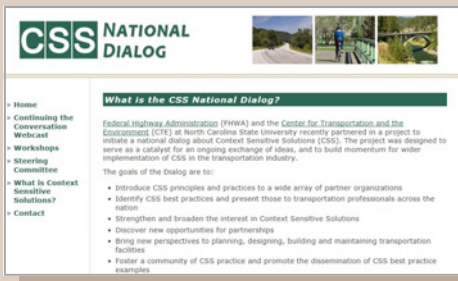
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