

# UTCA News

University Transportation Center for Alabama  
The University of Alabama, The University of Alabama in Birmingham,  
and The University of Alabama at Huntsville

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### Introduction to UTCA

Since becoming a “University Transportation Center” of the USDOT in 1999, UTCA has completed nine years of research, education and tech transfer activities for the state and region. Faculty members and students at all three UA System campuses (UA, UAB and UAH) have participated in these activities.

Mission Statement – The UTCA mission reflects the mission statement of the USDOT:

*To advance technology and expertise in the multiple disciplines that comprise transportation through the mechanisms of education, research, and technology transfer while serving as a university-based center of excellence.*

Theme - The theme, “*Management and Safety of Transportation Systems*,” reflects the transportation needs of Alabama and the region, and the capabilities of UA System faculty members. The majority of UTCA’s funds are spent on projects that support the theme.

### UTCA Hosts National Research Workshop For Federal Transit Administration

UTCA is co-sponsoring one of three national Federal Transit Administration (FTA) workshops. The workshops have several purposes:

- To bring together university transportation centers (UTCs), the FTA, and transit providers.
- To discuss joint interests in research projects that support the national strategy for surface transportation research.
- To identify cooperative opportunities to work on commonly held critical transit needs.

The UTCA-FTA Workshop will be held May 14, 2007 at the Sheraton Hotel in Birmingham. Two transit research themes will be addressed:

- United We Ride Human Service Transportation and Mobility Management
- Disaster, Response, Recovery & Security

In Birmingham, FTA representatives, transit providers, and UTC researchers will become acquainted with each others’ capabilities, needs, and resources during morning presentation sessions. During separate afternoon breakout sessions, attendees will work in groups to produce practical research agendas within the two themes and to identify potential partners and working groups that can conduct the research in ways that will benefit all partners.

FTA Deputy Administrator Ms. Sherry Little will make opening remarks. UTCA’s Dr. Jay Lindly is organizing and directing the workshop, and UTCA’s Dr. Dan Turner will serve as facilitator during the “Disaster, Response, Recovery, & Security” afternoon session.

UTCA and FTA have issued invitations to all UTCs to attend this workshop, with the goal of defining the nation’s transit research agenda for two high priority topics. UTCA is proud of the role that it is filling in helping the transit community reach its full potential.

## **Research Spotlight Faculty Team Led by Dr. Michael Anderson Conducts an Urban Transit System Review**

Researchers from three UTCA campuses joined forces to evaluate the level of service (LOS) provided by transit systems in Alabama. Dr. Michael Anderson and Mr. Roy Berryman of UAH, Dr. Virginia Sisiopiku of UAB, and Dr. Steven Jones of UA collaborated in the effort.

The objective of UTCA project 05319 was to perform a pilot review of urban transit systems' LOS using the new *Transit Capacity and Quality of Service Manual (TCQSM)*, published by the Transit Cooperative Research Program. The TCQSM provides six areas where transit systems can be evaluated: service frequency, hours of service, transit supportive area, reliability, travel time difference, and passenger loading.



**Dr. Michael Anderson**  
PI for UTCA Project 05319

The pilot study reviewed transit agencies in Birmingham, Huntsville, and Tuscaloosa and produced two main conclusions. First, the LOS values obtained for the three case study cities ranged from "B" to "F" for the six categories. The greatest deficiency was reliability – an area frequently beyond the control of transit providers, since general traffic congestion might delay transit vehicles.

The second conclusion was that the TCQSM uses only the passenger perspective to determine quality of transit service, whereas the operator's perspective was disregarded. For example, a transit operator might alter the hours of service headway between vehicles to achieve better levels of service; however, this improved level of service might come at the expense of increased operating cost and

larger budget deficiencies. This study showed that there is a need to incorporate budget and operating parameters into the level of service analyses to improve the grading system and provide more meaningful results.

## **2006-07 UTCA Student of the Year**

Mrs. Johnnie C. Waid is a working mother (four children) whose activities include graduate school and a Graduate Research Assistantship at UAB, where she is pursuing a doctoral degree in Civil Engineering. She completed a Bachelor of Science in Civil Engineering in May 2005, a Construction Management certificate in August 2005, and a MS in Civil Engineering in May 2006, all from UAB. Her MS thesis was the result of her work on a UTCA research project on alternative funding for Alabama highways.

Ms. Waid has presented or co-presented at six state and national transportation meetings and is the author or co-author of four technical reports and papers. She is a Goodridge Foundation Fellow and a Future Faculty Fellow, and has been recognized by a number of honor societies including Chi Epsilon, Tau Beta Pi and Phi Theta Kappa. Her professional activities include membership in ASCE, SWE and NSBE, and service as VP of the Student Chapter of ITE, President of the Student Chapter of AGC, and a Senator in the UAB Graduate Student Association Senate. UTCA is proud to recognize her as its 2006-07 Student of the Year.



**Photo from National Student-of-the-Year Awards Ceremony.**

Ms. Johnnie Waid is third from the left on the second row. Former USDOT Secretary of Transportation Norman Mineta, middle of first row, presented the awards.

## 2007 UTCA Projects

UTCA awards projects to faculty members on all three UA System campuses, based upon peer review of competitive proposals. Project topics are taken from an Annual Research Plan prepared by the Advisory Board. The proposals are reviewed by outside experts, the Advisory Board, and the Executive Committee prior to selection for funding. In addition, other agencies like ALDOT also fund UTCA projects.

Due to space limitations, only brief descriptions of projects are shown here. For brevity, the names of Co-PIs and other details are not included. Readers may find more complete information about individual projects on the "projects" page of the UTCA web site (<http://utca.eng.ua.edu/>).

### Projects Dealing with Congestion

*07110 – “Alabama Freight Congestion,” Dr. Jay Lindly (UA):* The project takes the first steps toward developing a strategy to identify, anticipate, and mitigate freight bottlenecks on Alabama’s Interstate system. The research team will analyze and model the freight bottlenecks in Alabama, supply specific recommendations to mitigate them, and devise a methodology for conducting additional studies to mitigate freight bottlenecks on Alabama’s Interstates. This project is being conducted in conjunction with Project 07304.

*07112 – “Characterization of Arterial Traffic Congestion,” Dr. Steven Jones (UA):* Long-term monitoring of an oversaturated arterial will be used to characterize recurring versus non-recurring congestion. The project will collect and analyze field measurements of operational parameters such as gap acceptance, start-up lost time, queue spillback, lane distribution, lane changing, merging, control adherence, etc., to provide insight into travel time uncertainty (predictability) along an oversaturated arterial.

*07204 – Managed Lanes: Current Status and Future Opportunities, Dr. Virginia Sisiopiku (UAB):* The objective of the proposed project is to develop a better understanding of managed lanes (High-Occupancy Vehicle lanes, value priced lanes, truck-only lanes, etc.) and their potential to address congestion issues in urban settings. Specifically, the project will utilize traffic analysis tools (micro simulation, dynamic traffic assignment, etc.) to predict the impact

of managed lanes strategies on traffic operations in the Birmingham area.

*07211 – Traffic Responsive Signals and Weather Related Congestion, Mr. Andrew Sullivan (UAB):* This project will evaluate the effectiveness of traffic responsive/closed-loop signal systems to address weather-related congestion, specifically rain. Issues addressed will include environments and operating regimes under which closed-loop signal systems are most effective, whether benefits justify implementation, and whether traffic responsive systems could implement weather timing plans without human intervention.

*07304 – “Modeling Truck Traffic Volume Growth Congestion,” Dr. Greg Harris, (UAH)* National projections are that 18-wheeler shipments will double in the next ten years. This project will investigate the impact of doubling heavy truck travel on the Alabama road system. It will identify congestion chokepoints in Alabama and produce a list of high priority capacity improvements needed to ensure continued mobility of the state highway system. This truck congestion project is being conducted in conjunction with Project 07110.

### Bridge Projects

*07212 – “Bridge Weigh-in-Motion (B-WIM) System Testing and Evaluation,” Dr. Wilbur Hitchcock (UAB):* This is another project that is being conducting to support the national surface transportation research program, as implementation research associated with a 2006 scanning tour of OS/OW vehicles (see

project 07115). It will examine bridge Weigh-in Motion (B-WIM) technology developed in Europe to identify vehicles that exceed allowable weight limits. A commercially available B-WIM system will be acquired and tested for suitability of use in Alabama. ALDOT will partner in the effort during purchase and installation of the pilot system. The project will conclude with a national symposium on the topic.

*07401, “Develop Multimedia Resource and Short Courses for LRFD Design” Dr. Houssam Toutanji, (UAH):* It continues development of resource materials to assist ALDOT in converting to Load Factor Resistance Design (LRFD) of structures. Projects 05315 and 06303 addressed LRFD for steel and concrete bridges. This project addresses prestressed concrete girders, reinforced concrete substructures and foundations. A two-day short course will be developed from these materials and taught semi-annually. This project was funded by ALDOT SPR funds.

### **Education Projects**

*07102 – “Advanced Transportation Institute 2007,” Dr Dan Turner (UA).* This is the sixth edition of the Institute, which is jointly sponsored by UTCA and ALDOT. It is conducted at ALDOT headquarters, and introduces rising junior and senior high school students to transportation careers through presentations, design labs, field trips and similar activities

*07301 – “Student Funding to Attend TRB Conference,” Dr. Michael Anderson (UAH).* This project hosts a student research paper competition to award funding to graduate students to attend the Transportation Research Board Annual Meeting in Washington D.C.

*07306 – “Summer Transportation Engineering Institute - Phase VIII,” Dr. Kate Leonard (UAH).* This is a continuation of a summer program for encouraging diversity in transportation-related educational programs. In the eighth year of this program, participants will be selected from eighth grade students, with preference to female and minority students. A highlight will be

the use of practicing professionals who serve as mentors.

### **Safety Project**

*07115 – Safety Synthesis for OS/OW Vehicles, Dr. Dan Turner (UA):* This project is being conducted to support the national surface transportation research program, as implementation research associated with a 2006 scanning tour of commercial vehicle size and weight enforcement in Europe. The tour was initiated to seek advances in addressing infrastructure damage and safety related to Oversize/Overweight (OS/OW) vehicles. The project will include a review of existing domestic and international literature, interviews with experts, and the merger and analysis of OS/OW data from permitting and traffic crash files.

### **Want More Information About One of These Projects?**

For more complete information about any UTCA project, visit our web site at

<http://utca.eng.ua.edu/>

From there go to the “projects” page and search for the information you need by looking for the name of the project PI, project number, or project name. If a final report is available, you may download it from the web site.

**Need a project?** Does your agency or firm have a problem that UTCA can solve? Or, do you need a short course? Over 40 different professors have conducted UTCA projects, meaning that a wide range of expertise is available for your project.

The best part is that UTCA may already have half of the funding to conduct your project. Conduct the UTCA headquarters office to discuss your ideas.

## UTCA Research Symposium

On November 13<sup>th</sup> 2006, UTCA hosted the UTCA Research Symposium & Transportation Career Fair. The event was held at the Ferguson Center on the campus of the University of Alabama. There were over 60 attendees, including faculty members and students from the three UTCA campuses (UA, UAB and UAH) as well as representatives from transportation agencies and private consulting firms from around the state. Participants received a total of four professional development hours (PDHs) for attending.

The morning portion of the Symposium was devoted to a technical program as listed in the table below.

<b>Safety Session</b>
Kerri Keith (UA), "Integration of GIS into the CARE software"
Jay Lindly (UA). "Safety Impacts of Rumble Stripes"
<b>Advanced Technology Session</b>
Mike Anderson (UAH), "Design and Application of an Internet-based Travel Survey"
Virginia Sisiopiku (UAB), "Transit Operations in Birmingham, and Potential Impacts of Signal Priority Implementation"
<b>Policy Session</b>
Qingbin Cui (UA), "Long-Term Warranties on Highway Projects"
Johnnie Waid (UAB), "Available Options for Financing Alabama Highways"

Dr. Dan Turner provided the luncheon keynote address that reviewed the accomplishments and status of UTCA and the major changes anticipated for future research topics. Lunch was followed by a student poster session showcasing student research on UTCA-sponsored projects, combined with a career fair. Students from all three UTCA campuses participated in the career fair and visited with representatives from the Alabama Department of Transportation as well as transportation consulting firms from around the State.

The career fair was followed by an intensive seminar on Dynamic Traffic Assignments presented by Dr. Sisiopiku from UAB and her colleague, Mr. Curtis Barrett of Vista Transport Group, Inc. It was well attended, especially by graduate students.

## UTCA Shifts Research Focus

During the past year, three factors led the Executive Committee to narrow and sharpen the focus of the UTCA research program.

The first factor was a "visioning the future" session at the 2006 Advisory Board meeting, when the Members identified congestion and infrastructure sustainability as the two primary issues in Alabama's transportation future. The second factor was a clause in SAFETEA-LU that required federally-funded University Transportation Centers to "support the national surface transportation research program." The third factor was a review of UTCA by the Research Competitiveness Program of the American Association for the Advancement of Sciences, which pointed out the advantages of a narrower scope of research.

Since UTCA is required to conduct research within its theme areas, the Executive committee chose "Maximizing Traffic Management and Minimizing Congestion" as a subtopic within the "management" portion of its theme. This choice addressed the first and third of the factors, and will assist state and local transportation agencies in preparing for tomorrow's mobility demands. An additional benefit is that this thrust will also support the USDOT high priority topic of congestion chokepoints.

UTCA addressed the second factor, supporting national surface transportation research needs, by giving priority in funding projects to those taken from the "Operations and Mobility" theme of the *National R&T Partnership Report*, the "Traffic Management Research" portion of the FHWA Highway Operations section of the 2005 *USDOT Research, Development and Technology Plan*, and the *Federal Transit Administration Strategic Research Plan*.

As you will see in the listing of 2007 research projects on the next page, this change immediately impacted the types of projects proposed by faculty members. Although UTCA will continue to conduct projects in other topics (especially education of tomorrow's transportation professionals), the majority of future funding will be centered on congestion and mobility. This will help maintain a high quality of life for Alabama citizens and economic competitiveness for Alabama businesses.

## 2007-2009 UTCA Advisory Board Members

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Deputy Director and Chief Engineer  
ALDOT, Montgomery, AL

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Gresham Smith, Inc.  
Birmingham, AL

### Transportation Engineering

Mr. James Brown  
President, Almon Associates, Inc.  
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