

The University of
Alabama

The University of
Alabama at
Birmingham

The University of
Alabama in
Huntsville

UTCA NEWS

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Inside This Issue

Grad Students Attend TRB Meeting	2
Summer GUTEP Programs	3
Advanced Transportation Institute	4
UTCA Hosts FTA Research Workshop	5
Traffic Congestion Worsening	6
Seat Belt Pilot Program	7
Research Article B-WIM System	8
Research Article Managed Lanes	9
Advisory Board	10

Introduction to the UTCA

Since becoming a university transportation center of the US Department of Transportation in 1999, the University Transportation Center for Alabama (UTCA) has conducted transportation education, research, and technology transfer activities throughout the state and region. Faculty and students at The University of Alabama (UA), The University of Alabama at Birmingham (UAB), and The University of Alabama in Huntsville (UAH) have participated in all of these service areas.

Our mission reflects the mission of the US Department of Transportation. Specifically, the UTCA seeks

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 (*2006 UTCA Strategic Plan*, p. 12).

Our theme – *Management and Safety of Transportation Systems* – reflects the transportation needs of Alabama and the expertise of The University of Alabama System faculty. Last year the Executive Committee narrowed and sharpened the focus of the UTCA research program. Management research projects now focus on maximizing traffic management and minimizing congestion. Similarly, new safety research projects highlight infrastructure sustainability.

The Director's Notes

During the past eight years the UTCA has initiated over 240 projects. The Center continues to be a leader in transportation research, education, and technology transfer. Serving as Executive Director of the UTCA has been an exciting and rewarding experience, but the time has come for others to take the lead. I look forward to devoting more of my time to teaching and research. I would like to thank all of the individuals, particularly the faculty, who have worked to make the UTCA the mature and successful enterprise it is today.

Dr. Jay Lindly, Professor of Civil, Construction, and Environmental Engineering at The University of Alabama, will become the new Executive Director of the UTCA in January 2008. I am confident the UTCA will continue to grow under his leadership.

Sincerely,
Daniel S. Turner



Graduate Students Attend TRB's Annual Meeting

Funds from UTCA Project #06311 by Dr. Michael Anderson of UAH enabled six students engaged in UTCA research to attend the 86th Annual Meeting of the Transportation Board in Washington, DC, January 21-25, 2007. These students had presented papers at the 2006 UTCA Research Symposium and were awarded travel funds to attend this prestigious, international transportation conference.



The theme of this year's TRB Annual Meeting was *Transportation Institutions, Finance, and Workforce*. At paper presentations and poster sessions, students learned about some of the latest research on these key transportation issues. Additionally, many students were able to discuss research ideas and data with leading transportation administrators, academics, and practitioners.

Secretary of Transportation Mary E. Peters delivered a keynote address at the Chairman's Luncheon on Wednesday, January 24th. Former Secretary of Transportation Norman Y. Mineta was also on hand to share his experiences and perspectives on national transportation concerns.

Students who attended the TRB Annual Meeting were required to write summaries of the sessions they attended. They were specifically asked to identify relationships between

conference sessions and their current research in transportation. As one student concluded,

My capstone project is on freight model validation, and my proposed dissertation subject is creation of time of day factors for rural roadways. Freight forecasting and modeling are key to both of these projects. Going to the TRB meeting allowed me to network with professionals in the freight and logistics business, researchers from other schools and research centers, and other graduate students from across the country. I feel that the contacts I was able to make during the meeting and the information that was presented will help me do a better job of addressing all the relevant factors as I finish my master's degree and begin the doctoral process.

Students also found time to explore our nation's capital. Michelle McGaha (UA) writes

I stayed near DuPont Circle and became familiar with many of the stores and restaurants in the area. I really liked a little bookstore/cafe called *Afterwords*. While I was eating breakfast there one morning, it began to snow. We ended up with a two-inch blanket of snow on the ground! It was amazing how just a little bit of snow made everything so much more beautiful. The view from The Mall was gorgeous – the Capitol building, the Smithsonian, and the Washington Monument were all covered with that light blanket of snow.

Other students attending the 2007 TRB Annual Meeting were Walter Anderson (UAB), Roy Berryman (UAH), Ian Hosch (UAB), Heather Shar (UAH), and Stephanie Watson (UAB).

Dr. Virginia Sisiopiku (UAB) and Dr. Daniel Turner (UA) assisted Dr. Anderson in coordinating this wonderful trip.



Middle School Students Enjoy Summer GUTEP Programs

For the past eight years over 200 middle school students from the Huntsville area have enjoyed the Gearing Up for Transportation Engineering Professions (GUTEP) Summer Program. During this summer's week-long event, participants learned basic concepts of materials, structures, safety, and other transportation engineering topics by engaging in a variety of hands-on experiments. Civil engineering professors from The University of Alabama in Huntsville and local professional engineers were instructors.

Field trips were also an important component of the program. During these outings, students saw real-world applications of the concepts they learned in the classroom. Seeing this connection between theory and practice reinforced the importance of transportation engineers to our community. For example, following a classroom session on public transportation, students were asked to use the city's public transit system to travel from the UAH campus to the downtown Huntsville traffic operations center and the railroad depot museum.



2007 GUTEP Participants

The GUTEP Alumni Summer Program was also extremely popular this year. Twelve participants from previous GUTEP summer sessions were invited to campus to work with faculty on advanced research-oriented experiments. Each day of this week-long session was devoted to a specific area of civil engineering. For example, one day students learned how to use a Global Positioning Satellite (GPS) to locate areas on the UAH campus and download their data onto a digital map with Dr. Michael Anderson. Another day students designed, built, and raced solar-powered cars with Dr. Kate Leonard.

By providing fun learning experiences in an academic setting, program planners hope to encourage females and other under-represented students to consider a career in transportation engineering. These



2007 GUTEP Alumni Participants

GUTEP programs were funded by UTCA Project #07305 and organized by Dr. Kate Leonard, Dr. Michael Anderson, Dr. Lois Schwarz, and Dr. Houssam Toutanji, all of whom are professors at The University of Alabama in Huntsville.

2007 Summer Advanced Transportation Institute a Success

The University of Alabama's 2007 Advanced Transportation Institute was held in June for rising high school juniors and seniors from the Black Belt region of the state. This Institute was funded by UTCA Project #07102 and organized by Dr. Dan Turner (UA). As in preceding years, the Alabama Department of Transportation (ALDOT) co-sponsored this event and provided staff members, engaged speakers, and coordinated field trips.

The Institute curriculum featured presentations by ALDOT professionals and university faculty. Activities and presentations were designed to prepare the students for university life and transportation careers. The highlight of the week was a series of competitions in concrete cylinder preparation, computer bridge design, pin and straw bridge design, and egg drops.



Presentations during the week focused on the following topics:

- Bridge Design, Construction, and Underwater Inspection
- Environmental Studies
- Intelligent Transportation Systems
- Professional Development and Business Etiquette
- Roadway Design and Construction
- Traffic Engineering
- Transportation Career Opportunities
- Transportation Safety
- University Admission Procedures and Scholarships

UTCA and the Federal Transit Administration Sponsored National Research Workshop

The UTCA and the Federal Transit Administration (FTA) sponsored a one-day research workshop on May 14, 2007 at the Sheraton Hotel in Birmingham, AL. The workshop was one of several similar opportunities sponsored by the FTA in such cities as Reno, Toronto, and Denver. At each location representatives from academia, the FTA, and transit systems met to produce practical research agendas on two transit topics chosen for that workshop. The Birmingham workshop offered a unique opportunity to define critical research needs in two important transit areas – (1) *United We Ride (UWR) Human Service Transportation and Mobility Management* and (2) *Disaster, Response, Recovery, and Security*.

The workshop began with opening remarks by Ms. Sherry Little, Deputy Administrator of the Federal Transit Administration. Then, participants heard presentations from FTA officials, transit providers, and university transportation center researchers. These presentations highlighted the problems, needs, and available resources in the two critical research areas. Dr. Jan Brecht-Clark, Associate Administrator for the Research and Innovative Technology Administration (RITA) summarized the intent of the workshop in a presentation entitled “How Can UTCs and Transit Providers Work Together?”

In the afternoon, focus discussion groups met and brainstormed practical research agendas for FTA consideration. At the end of the day, the UTCA gave FTA officials electronic files of potential research needs that had been ranked in priority order.

This workshop provided a forum for FTA representatives, transit providers, and university researchers to collaboratively address common transportation problems and identify potential research partners. Approximately 50 attendees from seven southeastern states as well as Illinois, Louisiana, Montana, and North Dakota shared their expertise.

This workshop was coordinated by Dr. Jay Lindly of The University of Alabama and Ms. Lisa Colbert of the FTA and was sponsored by a grant from the FTA’s Office of Research, Demonstration, and Innovation.

This workshop provided a forum for FTA representatives, transit providers, and university researchers to collaboratively address common transportation problems and identify potential research partners.



Annual Study Shows Traffic Congestion Worsening

(This press release was distributed to the media on Tuesday, September 18, 2007, at 11:30 a.m. EDT. It may be downloaded in its entirety at http://mobility.tamu.edu/ums/media_information/press_release.stm.)

COLLEGE STATION, TX — Traffic congestion continues to worsen in American cities of all sizes, creating a \$78 billion annual drain on the U.S. economy in the form of 4.2 billion lost hours and 2.9 billion gallons of wasted fuel—that's 105 million weeks of vacation and 58 fully-loaded supertankers.



These are among the key findings of the Texas Transportation Institute's *2007 Urban Mobility Report*. Improvements to the methodology used to measure congestion nationwide have produced the most detailed picture yet of a problem that is growing worse in all 437 of the nation's urban areas. The current report is based

on 2005 figures, the most recent year for which complete data was available.

"There is no 'magic' technology or solution on the horizon because there is no single cause of congestion," noted study co-author Tim Lomax, a research engineer at TTI. "The good news is that there are multiple strategies involving traffic operations and public transit available right now that, if applied together, can lessen this problem."

The 2007 mobility report notes that congestion causes the average peak period traveler to spend an extra 38 hours of travel time and consume an additional 26 gallons of fuel, amounting to a cost of \$710 per traveler.

The *2007 Urban Mobility Report* may be downloaded at <http://mobility.tamu.edu/ums/report>.

Does your agency or firm have a problem that the UTCA can solve? Or, do you need a professional development course taught? Over 40 different professors have conducted UTCA projects on a variety of transportation topics. Chances are, we have the expertise you need.

The best part is that UTCA *may already have half of the funding* needed to conduct your project or course. Contact the UTCA headquarters in Tuscaloosa to see if we can help! (205) 348-9925



UTCA to Conduct Alabama Department of Education Seat Belt Pilot Program

For over 65 years school systems across the nation have transported students. School bus safety has been and continues to be a major transportation concern. Responsible school systems are proactive in their approach to school bus safety. For example, regularly-scheduled maintenance checks and driver training workshops are routine in most states. A few states – California, Florida, New York, and New Jersey – have laws requiring some type of safety belts in school buses. Other states, including North Carolina, have completed pilot studies investigating the feasibility of having lap/shoulder seat belts in their school buses.

Alabama Governor Bob Riley, the Governor's Study Group on School Bus Seat Belts, and the Alabama Department of Education recently issued a request for proposals to colleges and universities to assist in a pilot study of the use of lap/shoulder seat belts in a limited number (10-15) of Alabama school buses.

State officials note that

it is unlikely. . . the pilot study will yield information regarding improving fatality rates in school bus accidents. However, the study may yield some vital information on seat belt usage, bus discipline, attitudes, passenger injuries, and/or other school bus safety issues (*Requests for Proposals: Seat Belt Pilot Program*, p. 1).

The Alabama State Department of Education will receive an appropriation from the Alabama Legislature to pay for the initial and on-going costs of this study. Allocations to participating local education agencies (LEAs) will be used to purchase new buses equipped with lap/shoulder seat belts and fuel and maintenance services for these buses. LEAs may also use these allocations to hire new school bus personnel.



Additionally, the Alabama Legislature will provide funds to cover the research and administrative costs of the study.

In a press release on November 6, 2007, Governor Riley announced that the grant of \$316,000.00 had been awarded to the University Transportation Center for Alabama (UTCA) located on The University of Alabama campus.

All aspects of the pilot study – formulating a research design, collecting and analyzing data, and producing an annual report for Governor Riley – will be determined and completed by researchers from the UTCA. This pilot study is scheduled to last approximately three years and will focus on several issues:

- Bus Fleet Alterations
- Determination of School Bus Seating Configuration
- Monitoring of Seat Belt Usage
- Survey of Students, Parents and Local School Personnel
- Cost-Benefit Analysis (*Governor's Press Release*, 11/06/2007)

Bridge Weigh-in-Motion (B-WIM) System Testing and Evaluation

The expansion in freight shipments on the nation's highways has led not only to a substantial increase in traffic congestion but also an increase in the **number**, **size**, and **weight** of heavy commercial vehicles. Clearly, overweight vehicles can severely reduce the life of structural pavement and bridges, and oversized vehicles can potentially be detrimental to safe travel conditions for all other vehicles on the road. A reliable, accurate, and portable dynamic sampling system capable of delivering measurements of moving vehicle type, size, and weight would be a very attractive tool for heavy freight traffic enforcement, transportation infrastructure maintenance, and future design planning. The simple objective of bridge weigh-in-motion technology (B-WIM) is to provide portable instrumentation technology which transforms a highway bridge into a temporary weigh station capable of detecting overweight vehicles traveling at freeway speeds. The continued advancement in Europe of B-WIM technology has established an interest for field demonstrations of the technology and potential applications in the United States.

The state of Alabama is a national leader in providing an opportunity for researchers and ALDOT to test a current state-of-the-art, commercially available B-WIM designed and constructed by CESTEL, a Slovenian firm. The proprietary system, named SiWIM, is a portable B-WIM system installable in one day. Under UTCA Project #07212 headed by Dr. Bill Hitchcock, a multi-campus team of researchers from The University of Alabama at Birmingham (UAB), The University of Alabama (UA), and The University of Alabama in Huntsville (UAH) will evaluate the potential use of SiWIM systems in Alabama. During the eighteen-month project the team will work closely with ALDOT representatives, worldwide technology experts, AASHTO, FHWA, and TRB WIM task force members. The B-WIM technology will be fully



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evaluated through literature review and field test demonstrations. The initial experimental work is designed to gain expertise among the UTCA test team and ALDOT personnel in the installation and calibration of the SiWIM system under actual field conditions. The bridge selected for the first research installation is appealing because of its simplicity of design and easy access for installation of equipment and observation by researchers. The bridge is a concrete girder bridge with multiple simply supported spans located on I-59 about 35 miles north of Birmingham, AL.

As part of the project, a symposium is scheduled for April 16-18, 2008 at the Renaissance Ross Bridge Golf Resort and Spa in Birmingham, AL. The objective of the symposium is twofold: (1) bring together leading engineers and researchers from the United States and Europe to exchange ideas and information concerning the state of practice and state-of-the-art research in the area of WIM systems and techniques and (2) develop an agenda for future research and deployment.

Members of the research team include Dr. Bill Hitchcock, Dr. Jason Kirby, Dr. Jim Richardson, Dr. Talat Salama, Dr. Virginia Sisiopiku, Dr. Houssam Toutanji, and Dr. Nasim Uddin. Graduate students Ahmed Abd-El-Meguid, Jugnu Chemmanur, and Hua Zhao and undergraduate student Stephanie Strong are also working on the project.



Managed Lanes: Current Status and Future Opportunities

Transportation agencies around the world are seeking ways to better manage the flow of traffic on existing transportation facilities. Typically, this has been done by using lane management strategies that regulate demand, separate traffic streams to reduce turbulence, and utilize available and unused capacity. In the recent years, application of such operational policies is evolving into the notion of "managed lanes." Managed lanes apply one or more of these elements to enhance the efficiency of use of a freeway facility through options such as high-occupancy vehicle (HOV) lanes or truck-only lanes

While no managed lanes currently operate in Alabama, there exists a recent interest in determining the feasibility of managed lanes supported by the Regional Planning Commission of Greater Birmingham. Responding to this interest, UTCA Project #07204 conducts an in-depth examination of the potential of managed lanes strategies in improving traffic operations and assisting in congestion mitigation in the Birmingham, AL region. This examination is accomplished through an extensive literature and state-of-the-practice review, traffic modeling and analysis using sophisticated simulation modeling tools, and estimation of benefits and costs from managed lane implementation.

The objective of the project is to develop a better understanding of managed lanes and their potential to address congestion issues in urban settings. Specifically, the project has several goals:

- Identify and address key issues related to planning, implementation, and operation of managed lanes
- 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
- Conduct technology transfer activities to advance the implementation of managed lanes as a strategy to enhance traffic management and congestions mitigation

The project research team consists of Dr. Virginia P. Sisiopiku, Associate Professor; Mr. Andrew Sullivan, Research Engineer; and Ms. Ozge Cavusoglu, Graduate Research Assistant at the University of Alabama at Birmingham. So far, a comprehensive review of the state of practice was completed, and best practices and lessons learned from earlier deployment efforts were summarized. Moreover, a regional simulation model of the Birmingham area was developed and calibrated in the VISTA environment (www.vistatransport.com). The model is currently used to perform an alternatives analysis to examine the operational impact of managed lanes implementation along selected Birmingham facilities. HOV lanes, value-priced lanes, and truck-only lanes are among the strategies being considered. Following the alternatives analysis, a cost-benefit evaluation of selected managed lanes options in the Birmingham area. will take place using the IDAS software.

On October 31, 2007 Dr. Sisiopiku delivered a presentation related to this project entitled "Implementation of High Occupancy Vehicle Lanes" at the 2007 Huntsville (AL) Simulation Conference. This paper, co-authored by Ms. Ozge Cavusoglu, is scheduled to appear in the printed proceedings of the conference.. UTCA Project #07204 is currently on schedule and is expected to be completed by June 2008.

UTCA News is published biannually by the University Transportation Center for Alabama at The University of Alabama campus in Tuscaloosa. For more information about our education, technology transfer, and research programs, please contact us at:

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