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# The UAB University Transportation Center **update**

A newsletter of The University of Alabama at Birmingham University Transportation Center

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## UAB UTC Launches Second Wave of Targeted Research Projects

Shortly after its inception, UAB-UTC leadership began working closely with Dr. Fouad Fouad, Dr. Virginia Sisiopiku and other senior faculty and staff from UAB's School of Engineering (SOE) to develop a series of integrated research projects that would complement the UTC's major research effort *Emergency Medical Services and Congestion* (UAB-UTC Update Spring 2008, Volume 1 Number 1). After considerable effort, a comprehensive five-component project portfolio has been developed and is currently in final external review prior to implementation. The overall effort, that is known as *Development of a Dynamic Traffic Assignment and Simulation Model for Incident and Emergency Management Applications in the Birmingham Region* will be directed by Principal Investigators, Virginia Sisiopiku and Andrew Sullivan.

In keeping with the UTC's major research thrust addressing EMS delivery and congestion, SOE research scientists posited that since traffic incidents and natural or man-made disasters invariably disrupt traffic flow, congestion resulting from such disruptions will likely impede the ability of EMS and other first-responders to provide timely responses to those in need of medical attention or other emergency services. Thus, it was agreed UAB's effort would focus on understanding how traffic will be impacted in a large metropolitan area such as Birmingham, Alabama in such an event, for at least three reasons: First, to assure that traffic is man-

aged in a way that does not impede emergency operations; second, so threatened or endangered populations can be safely and efficiently evacuated and pass-thru traffic can be effectively diverted; and, finally so first responders are able to move to locations where they are needed quickly and safely.

As related to UPDATE by Dr. Sisiopiku, it turns out that the research community has not studied the interactions among these three kinds of traffic flows which is surprising because it is commonly acknowledged that one or all occur almost instantly after a major incident or disaster. Traffic engineers seem to understand fairly well how traffic flow behaves under normal conditions (usually User Equilibrium behavior is assumed); however, experience has demonstrated that this knowledge is simply inadequate when it comes to disaster-like situations. For example, under normal circumstances enforcement and emergency management operators can often successfully route first responders to an emergency site although they recognize that usual or typical background traffic can impede the movement of emergency vehicles. They recognize, also, that it is likely – in fact predictable – that they will not be able to manage the movement of emergency vehicles during disaster-like conditions, unless law enforcement takes drastic measures such as closing access roads. Also, when there is a sizeable area or high density corporate, educational or government campus that needs to be evacuated, then this kind of flow also generates highly

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# The Director's Clipboard

## UAB UTC ADVISORY BOARD

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I've long enjoyed and invariably benefit from insight or perspective found in old adages, proverbs, sayings and quotations. Among my greatest delights is running across one of these heretofore unknown gems of wisdom and then thinking about how I might use it (cleverly, I always hope) in something I might be asked to speak about or write. This is one of those occasions (... I hope).

As this is written, the UAB University Transportation Center (circa mid-2006) has come into its own. As its founding director, I am enormously gratified. Also, I am grateful and to some extent bewildered by the high energy and motivation of the many extraordinary people who have come together voluntarily and worked doggedly to help us get to where we are today. Our major research initiative *Emergency Medical Services and Congestion* is about to be implemented. Shortly thereafter, we should get the "green light" to start an exciting, five-project effort referred to collectively as *Development of a Dynamic Traffic Assignment and Simulation Model for Incident and Emergency Management Applications in the Birmingham Region*. One of the things that actually astonishes me about the point at which we find ourselves today is how much we've accomplished; how far we've come in a comparatively short period of time.

How can I defend that conclusion? To me, at least, it is simple: None of these six wonderful scientific projects even existed 20 months ago. Moreover, none of the team members who prepared these project proposals received any compensation for the many long hours they spent developing major proposals of high scientific quality. Yet, today, a series of six very important projects are about to be implemented. I think that's remarkable. It just goes to underscore that which we all know: it takes a lot of time to "think through" and then "do" good science, but it's worth it.

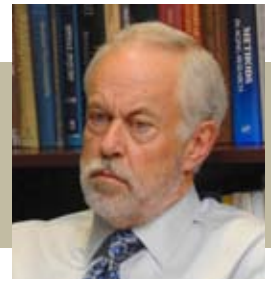
Consider: The outcome and translation of at least five of these research projects promise to impact in a dramatic way on how people and things such as emergency medical personnel, fire, police and even soldiers are able to move around rapidly and efficiently when we are faced daily emergency events as well as possible catastrophes like Katrina or, G-d forbid, another national calamity like 9-11. This is profoundly important research with profoundly important implications. We've got to get it right.

It may have taken a little longer than we would have preferred, but it's good stuff and there are great people with exceptional minds who've come together to do it ... and we're able to do it because a great United States Senator, Richard Shelby of Alabama has seen to it that we've been provided with the resources to pull-it-off and do a super job. In my opinion, every person in this country should thank Senator Shelby for recognizing the UAB UTC's potential to design and implement this critical work. If not for Senator Shelby, the research that is underway here, might at best have been delayed or in an unimaginable worst case scenario, might never have been undertaken at all. As far as I'm concerned, people who live in this great country can never, ever thank Senator Shelby adequately for making this particular research initiative possible. I sense that my colleagues, almost universally, feel exactly the same way.

In retrospect, I can honestly say that it may have taken a little more time because it was more difficult to do it well than we anticipated it being. It was hard. We were working from Square one to build a meaningful, useful, significant research portfolio while at the same time working to develop all the other non-research related activities outlined in our Strategic Plan. ... Yes, it did take a little longer than we had projected, but, like John Heywood wrote, in the mid-1500s, "*A hard beginning maketh a good ending.*"

*Russ Fine*

# Automotive Research Alliance Representatives Visit UAB



Mr. Ken Baker

The UAB UTC and the Southern Consortium for Injury Biomechanics (SCIB), both key components of the UAB Injury Control Research Center hosted Ken Baker and Joe Petrolino of the Automotive Research Alliance on March 13, 2008. The purpose of the meeting was to familiarize them with the UTC's and the SCIB's transportation safety research portfolios. With motor vehicle crashes continuing to be the number one cause of death from unintentional injuries for ages 1-34, innovative research into better primary and secondary prevention methods is greatly needed. Scientists at UAB are performing cutting-edge research in various fields related to transportation and automotive safety, which led the Automotive Research Alliance (ARA) to explore establishing a partnership with UAB. Mr. Baker is President, Chief Executive Office and a member of the Board of Trustees of Altarum Institute, one of the nation's leading nonprofit research institutes, and is a former Vice President for Research and Development at General Motors. His colleague Mr. Petrolino has over thirty years of experience in management of complex motor vehicle systems and is Center Director for the National Transportation Research Center, Inc (NTRCI) University Transportation Center (UTC) as

well as NTRCI Vice President for Heavy Vehicle Research and Development.

The ARA was established in May 2007 with the goal of assisting the US auto industry through cooperative research and development in the Southeast. The ARA is a technological problem-solving clearinghouse that provides the automotive industry with access to research funding and a vast collection of automotive-focused scientists, engineers, researchers, laboratories, and equipment. UAB is one of eight educational institutions with whom the ARA is partnering to solve current issues facing the automotive industry and to work together to create sustainable automotive technologies for the future. The ARA focuses on the Southeast because it is the second-largest automobile manufacturing region in the country, with more than 3,000 automotive suppliers and 10 major automotive assembly plants.

The meeting at ICRC showcased the UAB UTC's *Emergency Medical Services and Congestion* study <[www.uab.edu/utc](http://www.uab.edu/utc)>, as well as the SCIB's *Digital Child Project* <[www.uab.edu/scib](http://www.uab.edu/scib)>. In addition to meeting with the ICRC leadership, Mr. Petrolino and Mr. Baker visited the School of Engineering for an in-depth look at the *Digital Child Project* labs.



Mr. Joseph Petrolino



Dr. Loring Rue



Dr. Gerald McGwin



complex interactions with the previous two flows. Suffice to say, none of these possibilities or combinations under disaster-like or catastrophe situations has been adequately addressed in the literature or in practice.

Thus, it follows, logically, that there is a critical need for models that can capture the fast evolving dynamic conditions that take into account real-world consequences of these three traffic flow conditions, in addition to the management measures such as street closures, traffic signal control alterations, informational messages and infrastructure failures.

This is all complicated by the reality that a catastrophe is an extraordinary event and drivers confronted with catastrophic conditions and circumstances are not expected to behave in a perfect world scenario which is the basis of User Equilibrium and System Optimum behavior (commonly accepted in transportation planning), which makes existing models not directly applicable to addressing this very unique congestion-driven problem.

Finally, a major emergency situation may impact very large parts of the network. This potential requires the availability of models that can emulate large-scale regional networks while still achieving reasonable computational time. Currently, at least to our knowledge, no such tools exists in the market that can model dynamically large network traffic operations under emergency conditions.

### Purpose of the Projects

To address the unmet needs, UAB's proposed research focuses on the development of a comprehensive regional model of the Birmingham region to be used as a training and evaluation test bed. The tool will allow stakeholders to examine the impact of, and develop response strategies to, major incidents and emergencies with a potential to minimize the impact of emergencies on traffic operations and the safety of the traveling public. Special attention will be placed on optimizing decision-making, and addressing needs of vulnerable populations including the injured and disabled. The benefit of the holistic preparedness planning approach in this research is that it is likely to lead into better management of all assets of the transportation system, which in turn has the potential to greatly assist planners and emergency responders in the selection and implementation of strategies that serve best the needs of all roadway users.

UAB's approach to this challenging problem is an exciting multi-component research and training effort consisting of five inter-related projects each addressing various aspects of incident and emergency management. Each project is briefly described in the following:

- Project 1: Capacity Building, Education, and Technology Transfer. This activity will focus on the development and delivery of a comprehensive research,

education, and training plan aimed at advancing the knowledge and practice in incident and emergency management.

- Project 2: Development, Calibration, and Testing of the Birmingham Prototype Model – This activity will focus on the development, calibration and refinement of the Birmingham test bed and is a precondition for the successful execution of the three remaining research projects.
- Project 3: Development and Testing of a Decision Support Tool for Optimization of EMS Response Time – This project will develop and test an integrated simulation-optimization technique to enhance emergency vehicle response and transport time.
- Project 4: Evaluation of Incident and Emergency Management Options in the Birmingham Region – This project will develop a framework capable of integrating physical infrastructure, transportation demand, and crash data to simulate and test hypothetical incident and emergency management scenarios and response actions.
- Project 5: The Role of Transit in Safe Evacuation of the Elderly and Disabled in Emergencies and Disasters – This project will study issues related to the evacuation of individuals without personal vehicles and models the transit evacuation scenarios during small and large-scale evacuations.

Co-investigators include Fouad H. Fouad, PhD and Wilbur Hitchcock, PhD from UAB, Burcu B. Keskin, PhD, Sharif H. Melouk, PhD and Daniel Turner, PhD from the University of Alabama's UTCA, Kyriacos Mouskos, PhD from the City College of New York, Athanasios Ziliaskopoulos, PhD from the University of Thessaly (Greece), and Curtis Barrett and Tom Vick from the VISTA Transportation Group. Other collaborators include Saiyid Hassan Sikder, PhD from UAB, David Brown, PhD from the University of Alabama's UTCA and UAB's ICRC, Michael Anderson, PhD from the University of Alabama at Huntsville and Neville Parker, PhD, also from the City College of New York.

Additional information about these projects can be acquired by contacting Andrea Underhill, the UAB UTC's Associate Director for Administration and Finance, at 205.934.2862 or [andrea.underhill@ccc.uab.edu](mailto:andrea.underhill@ccc.uab.edu).

# UAB UTC Sponsors Session of ALSITE Annual Meeting

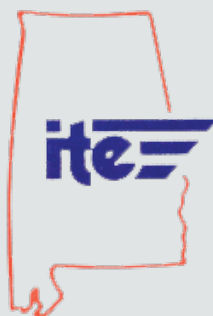


The Alabama Section of the Institute of Transportation Engineers (ALSITE) and the Deep South Section of the Institute of Transportation Engineers (DSITE) combined forces to hold a joint annual meeting June 4-6, 2008, in Gulf Shores, Alabama. The UAB UTC, in conjunction with the University Transportation Center for Alabama (UTCA), sponsored the Older Drivers session of the meeting.

Linda Guin, a Safety and Technology Engineer with the Alabama Division of FHWA, kicked off the session with *The Alabama Strategic Highway Safety Plan and Older Drivers*, an overview of the Older Drivers section of the Alabama Strategic Highway Safety Plan. Dr. Ball's presentation, *Enhancing the Safety and Mobility of the Older Driver*, followed. Dr. Ball is a Professor in the University of Alabama at Birmingham's Department of Psychology, Director of the UAB Center for Translational Research on Aging and Mobility, and a UAB UTC affiliated researcher. Mr. Amparano, a safety engineer with the FHWA Resource Center, wrapped up the session with his presentation, *Engineering Countermeasures for Older Drivers*.

ALSITE and DSITE are educational and scientific associations of transportation professionals who are responsible for meeting mobility and safety needs in Alabama and the Deep South. The UAB UTC was thrilled to assist with this meeting and we look forward to future collaborations.

UTCA



## Spotlight on Karlene Ball, PhD



Dr. Karlene Ball is a Professor of Psychology and the Director of the UAB Center for Translational Research on Aging and Mobility (an Edward R. Roybal Center). In addition to these two roles,

she serves as Associate Director, Center for Aging; Director, Lifespan Developmental Psychology Graduate Program; Senior Scientist, Center for Outcomes and Effectiveness Research and Education, Vision Research Center; and Senior Scientist, Vision Science Research Center.

Dr. Ball is recognized internationally as an expert in the field of vision, aging, and cognitive function and is particularly known for her work with older drivers. This work has been featured extensively in the media, including appearances on the Today Show, Good Morning America, and NBC Nightly News. She has served on the panel of experts for setting the Commercial Drivers Licensing Standards, as an advisor to the National Academy of Sciences, and as an author for the National Optometrist certification examination. Dr. Ball has participated as an author on eleven U.S. Patents related to assessment and training techniques developed through the Small Business Innovation Research (SBIR) program. Additionally, she has functioned as an expert witness for age discrimination suits related to school bus and other commercial driving positions. She is one of the 1996 winners of a Nationwide Insurance award for Highway Safety based on her work with older drivers and older driver training programs.

Dr. Ball currently serves on the Transportation Research Board of the National Research Council, and chairs the Committee for the Safe Mobility of Older Persons. She has been successful in translating basic research findings into practical applications, which are being evaluated in real-world settings, and her method for identifying at-risk drivers is currently being used in several states. Her work in the applied cognitive aging sector is noteworthy in that it is stimulating change in both attitudes and policy.

For more information about Dr. Ball and the UAB Center for Translational Research on Aging and Mobility visit [www.uab.edu/roybal](http://www.uab.edu/roybal).

# UAB UTC Affiliated Injury Course Targets Transportation Professionals and Students Who Hope To Work in Transportation Safety Field

**A** long term objective of the UAB-UTC is to institutionalize traffic safety and injury control research at UAB. One step towards achieving this objective is to establish a multi-pathway traffic safety and injury control curriculum to provide training and degree opportunities that address needs of current and future workers from Alabama as well as from other states in this region.

There is a precedent for this sort of educational activity at the UAB-ICRC, where ICRC leadership working with faculty from UAB's School of Engineering and School of Public Health continue to develop and offer wide ranging curricula and graduate training programs in relevant disciplines. Examples include several graduate courses in injury biomechanics and injury epidemiology; sponsoring, planning, and hosting national training workshops for public health and vocational rehabilitation professionals and

university-wide injury control seminars; funding research seed grants for graduate students and junior faculty; and funding an innovative research-training opportunity for minority faculty and students from historically

black colleges and universities (HBCUs).

This past year, the ICRC and the UTC joined forces in providing support and faculty for a centerpiece educational offering, Epidemiology 603: Injury -- Epidemiologic Principles and Prevention Strategies to graduate and professional students. By design there were a number of transportation-related lectures presented during the semester. These included the General Introduction and Overview (which spanned two consecutive class sessions) presented by Dr. Russ Fine; Causes and Prevention of Motor Vehicle Crashes (MVCs) presented by Dr. Gerald McGwin; Public Policy Interventions and Motor Vehicle Fatalities presented by Dr. Mike Morrissey; The Biomechanical Basis of Injury presented by Dr. Alan Eberhardt; and, Childhood Injuries with Special Emphasis on Transportation Related Events presented by Dr. Bill King.

This course is an excellent introduction to injury, overall, and to transportation-related injury, specifically. Based on their experiences in this class, many former students have been inspired to seek internships, research opportunities, and/or employment in the transportation injury field. Two current UAB ICRC-UTC-SCIB staff members sought affiliation with the Center as a result of having taken EPI 603. Carrie Connolly came to the UAB ICRC as a student intern in 2007 after taking EPI 603. She now serves as the Program Coordinator for the ICRC's Outreach and Education Core, and is the UTC's Education Liaison. Jeffrey Foster came to the UAB ICRC in 2004 as a student research assistant after taking the Injury Course. He is now an Associate Director of the Southern Consortium for Injury Biomechanics, webmaster for the UAB ICRC, UTC, and SCIB, and he provides general support to the Director and Associate Directors of the UAB UTC.



# Stavrinos Unanimous Choice for UAB UTC Student of Year Award

**T**he UAB UTC is pleased to announce the selection of Despina “Dessie” Stavrinos as the UAB University Transportation Center’s Student of the Year for 2007-2008.

Dessie Stavrinos, a 4th year doctoral student in Developmental Psychology at UAB, joined the ICRC / UTC group in August 2007 as a graduate research assistant. Her duties have included assisting with various UTC activities, including planning and executing the University Transportation Center (UTC) Annual Advisory Board Meeting and Southern Consortium for Injury Biomechanics (SCIB) Symposium held in December 2007.

When not in her UTC office, Dessie can be found in the UAB Youth Safety Lab where she is pursuing her personal research interest in child pedestrian safety. Dr. David Schwebel, Vice Chair of Psychology and an Associate ICRC Scientist serves as her research advisor. In addition to working, going to school, and conducting her own research, Dessie is co-supervisor of two Honors Theses students and is active in the UAB Graduate Student Association where she serves as the Travel Grants Officer and as a Budget Committee Member.

*In 2007, Dessie was the recipient of three prestigious extramural grants to support her doctoral research.*

Dessie, who is scheduled to receive her PhD in December 2008, has devoted her dissertation project to the identification of underlying factors for pedestrian injury risk in children who have or who do not suffer from Attention-Deficit/Hyperactivity Disorder (ADHD). In 2007, Dessie was the recipient of three prestigious extramural grants to support her doctoral research: an Injury Prevention Fellowship from the Society for Public Health Education, United

States Centers for Disease Control and Prevention, the Lizette Peterson-Homer Injury Prevention Grant from the Society for Pediatric Psychology, and the National Science Foundation — Children’s

Hospital of Philadelphia Injury Center for Injury Prevention Studies Grant. In addition, Dessie received the 2007 Dwight David Eisenhower Transportation Fellowship from the National Highway Institute and the U.S. Department of Transportation. This award provided Dessie with the opportunity to represent the UAB UTC by attending the Transportation Research Board (TRB) Annual Meeting in January 2008. Dessie is also the recipient of training stipends from the UAB Injury Control Research Center and the UAB University Transportation Center.

Dessie received a MA in Developmental Psychology from UAB in 2006. Before attending UAB, she attended The University of Alabama where she received a BS in Psychology in 2003.

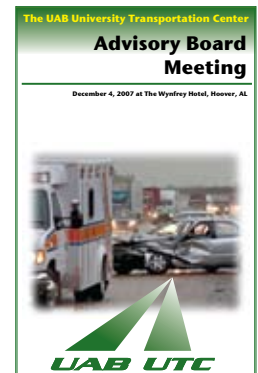
UAB UTC voted unanimously to honor Dessie for several reasons: (1) Her exemplary research in the area of childhood pedestrian injury; (2) Her success in securing extramural support for this research clearly demonstrates her commitment to the topic area; (3) Her scholarly productivity and community service make her an asset to the field of transportation in general and transportation and traffic safety in particular; (4) Through her teaching experience and her student mentoring activities, she is helping build transportation infrastructure by inspiring students to choose transportation-related career fields.



*Dessie Stavrinos*

*A few DVD copies of the 2007 Advisory Board Meeting still remain available.*

Contact Andrea Underhill, [andrea.underhill@ccc.uab.edu](mailto:andrea.underhill@ccc.uab.edu)





# Save the Date

Dec. 9, 2008

## UAB UTC Advisory Board Meeting and Site Visit December 9 & 10, 2008

The UAB University Transportation Center will hold its Annual Advisory Board Meeting on Tuesday, December 9. Attendees to this year's meeting will include representatives from the UAB UTC's funding agency, the Research and Innovative Technology Administration (RITA). The following day, Wednesday, December 10, the UAB UTC leadership will host a site visit for representatives from RITA. The site visit will enable RITA leadership to meet UAB UTC faculty and staff; learn more about the UTC's organizational structure and relationship with both the Injury Control Research Center and the Southern Consortium for Injury Biomechanics; and increase their understanding of our traffic

safety and injury control research, education, and technology transfer activities.

Following the UAB UTC Site Visit and Advisory Board Meeting, RITA representatives will travel to Tuscaloosa, Alabama for a site visit of our sister UTC, the University Transportation Center for Alabama (UTCA).

More information concerning both the Site Visit and the Advisory Board Meeting will be available soon. (Note: A few DVD copies of the 2007 Advisory Board Meeting still remain available. These are particularly instructive because the UAB UTC's major research initiative, *Emergency Medical Services and Congestion*, is discussed in considerable detail by key members of the project team).

*The UAB University Transportation Center is made possible by Grant No. DTRT06-G-0048 from the US Department of Transportation, Research and Innovative Technology Administration to the UAB Injury Control Research Center.*



### UAB University Transportation Center

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