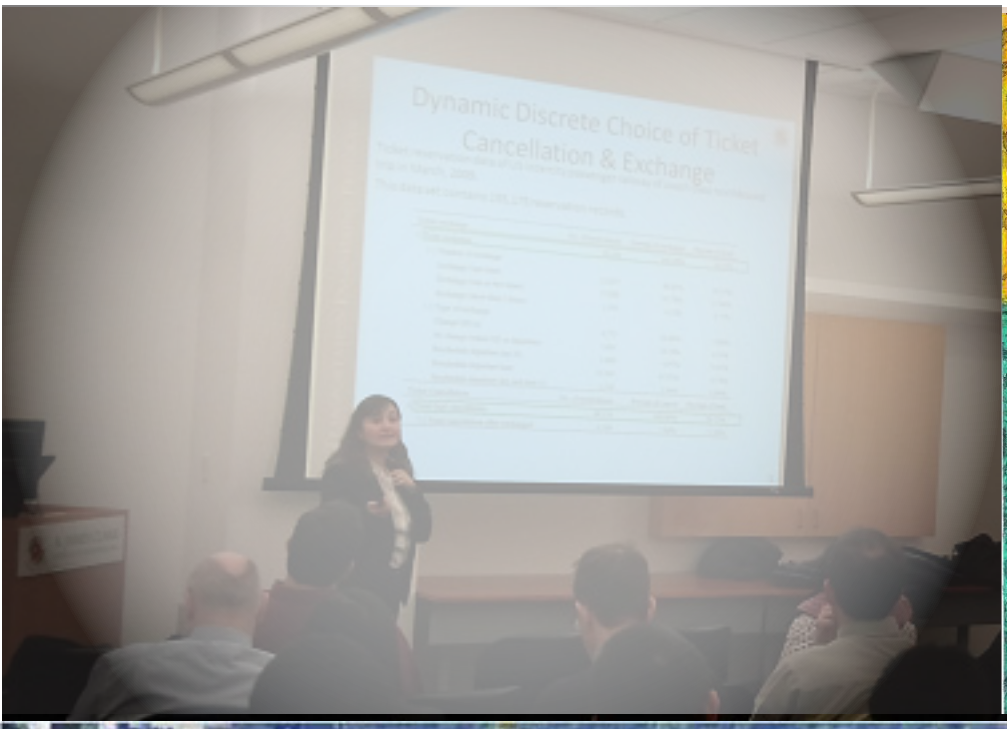
CITSM

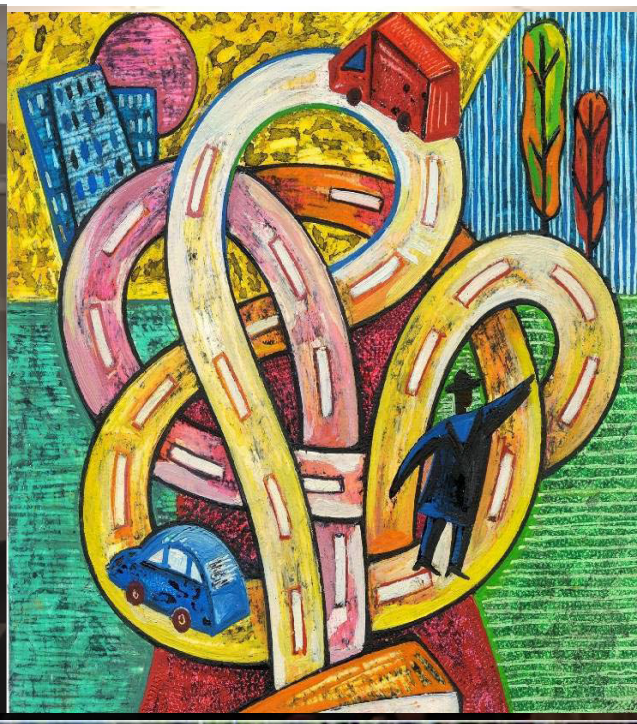
The Transporter

A Newsletter From The Center For Integrated Transportation Systems Management

University of Maryland 18 56

Fall 2012





Modeling Violations in High-Occupancy Toll Lane Studies

Dr. Elise Miller-Hooks

This report addresses the movement of crowds in large public gathering. Unlike most of the literature in this area, this work seeks not only to model pedestrian choice, but also the impact of command and control on pedestrian flows given various levels of freedom of choice. Mathematical methods are developed herein to capturing collective behavior. These techniques exploit concepts of utility maximization and recognize that the utility of a route depends on both fixed route characteristics, such as length or grade, and characteristics that depend on the choices made by others who simultaneously seek passage along the same routes. Results of numerical experiments are provided to demonstrate the effectiveness of the proposed methodologies and investigate the impact of groups on flow efficiency.
The majority of models developed for the study of crowd movement, such as building evacuation models, assume that pedestrians/ evacuees will make decisions about their ingress and egress routes independent of what is best for the system. Command and control, however, may provide a means for coercing or forcing pedestrians in a crowd to make choices that lead to the greatest system efficiency. The effectiveness of strategies ranging from providing information only to reconfiguring the built environment through architectural design changes and forcing pedestrians to follow system optimally designed evacuation routes are compared using mathematical formulations and computational methodologies proposed herein.
Finally, problem dynamics associated with a changing environment are addressed with methods that seek to update command or control strategies in response to real-time information. These methods predict the evolution of pedestrian response to the dynamically evolving environment and changing system design to support command and control.

Understanding the Potential Impact of Various DMS Messages on Traffic Flow

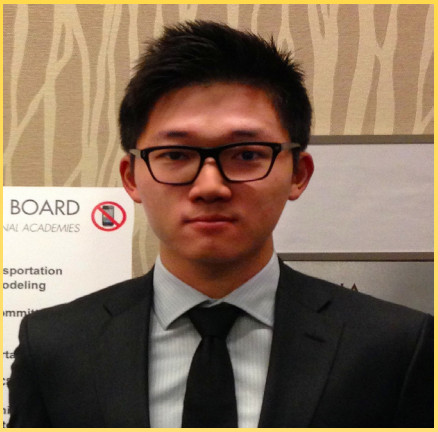
Dr. Ali Haghani

Knowledge of rapidly changing trafficconditions gives road users the option tomodify their behavior in order to avoiddelays and dangerous situations. Manystates, as part of an Advanced TravelerInformation System (ATIS), have installedDynamic Message Signs (DMS) in order tohelp provide this information.While most agree that DMS are a valuable tool in reaching motorists and conveying important information, there has long been speculation that DMS messages could possibly adversely affect traffic conditions, too. Recent publicity surrounding the new travel time messages on DMS have rekindled this debate. The question remains: can a message posted onto a DMS adversely affect traffic? If so, do all classes of messages have this potential or do only certain types and/or lengths of messages pose a threat?Another important measure of the value of a DMS message is its credibility. It is important that travelers believe thata message displayed on a DMS is basedon fact and accurately describes present roadway conditions. This research project studied the potential impact of the DMS messages on traffic flow and evaluated the quality of the messages posted on the signs in term of accuracy, timeliness,relevance and usefulness. Additionally the anonymous vehicle tracking feature of the Bluetooth were used for analyzing the diversion of traffic to the alternative routes suggested by the messages asa proxy for drivers' response to the DMS.

Kleoniki Vlachou Won the WTS DC Chapter Award

The Washington DC Chapter of the Women's Transportation Seminar (WTS) selected Ms. Kleoniki Vlachou to receive a 2012-2013 graduate scholarship. WTS is an international organization of transportation professionals committed to career and industry excellence. There were three scholarships awarded, 2 for graduate female students (Ph.D. and Master) and 1 for an undergraduate female student with focus on any transportation area. Applicants were evaluated based on their specific transportation involvement and goals, job skills, and academic record. Kleoniki is currently a Ph.D. candidate and her research focuses on aviation congestion management. She is part of the NEXTOR group under the supervision of Pr. David Lovell; and has worked on various projects funded by Federal Aviation Administration and NASA.

Student BIOGRAPHY



Chenfeng Xiong

Mr. Chenfeng Xiong is a Ph.D. candidate in the field of transportation at the civil and environmental engineering department of the University of Maryland. Mr. Xiong earned his M.S. in transportation engineering from the University of Maryland in 2011. He is also double-majoring in Economics. He is working with Dr. Lei Zhang on the research topics related to travel demand, behavioral economics, and agent-based modeling. His M.S. thesis employed GPS and Smartphone-based travel behavior data collection technologies, and developed novel model for travelers' scheduling decisions.

So far Mr. Xiong has co-authored more than 10 journal and conference papers and has delivered 9 podium/poster presentations at international conferences. Several of his papers have received conference travel awards and best essay prize. Now he is working on his Ph.D. dissertation with a focus on experimental methods and modeling travel behavior in multi-dimensional decision-making processes.

Transfer Operation Strategy for Paratransit

UMD Transportation Seminar Series
Friday, Nov 11, 2012, from 2:30 to 3:30 pm
Pepco Room (1105), Kim Engineering Building

Speaker: Dr. Luca Quadrifoglio holds a Laurea in Chemical Engineering (1996) from the Politecnico of Milan (Italy), a M.S. in Engineering Management (2002) and Ph.D. (2005) degrees from the Daniel J. Epstein Department of Industrial and Systems Engineering at USC. After a year as a Postdoc at CREATE (USC), he joined the Faculty of the Zachry Department of Civil Engineering at Texas A&M University in 2006. He won the 2006 Pritsker Doctoral Dissertation Award (3rd place), the 2004 Council of University Transportation Center (CUTC) National Student Award for best publication in Science and Technology and published a number of papers in top rated Journals.
His research mostly focuses on modeling, design, optimization and scheduling of Transportation Systems, primarily DRT Services, such as Feeders and ADA Paratranist.

Summary: ADA paratransit systems are a demand responsive type of service offering disabled customers a more accessible service than fixed route transit systems because they provide door-to-door service and flexible schedules. For larger service areas (such as Los Angeles County), a zoning strategy is a more practical operating strategy, with each provider responsible for their service zone to which their vehicles have been assigned. This practice will, however, likely reduce the productivity of the whole system; in fact, additional geographical constraints (zone boundaries) are added and the scheduling solution intuitively cannot be improved. We therefore analyze a zoning with transfer strategy, an operating practice requiring customers to change vehicles at specific "transfer points" to complete their inter-zonal trips. This practice is attracting attention from transit providers because of its perceived potential to significantly reduce operating costs mainly by reducing empty backhaul miles and by increasing rideshare rates. Our results used the demand data of the paratransit system in Houston, Texas (a relatively low-density region), and concluded that the zoning with transfer method proved indeed to be a productive organizational structure. It was especially found that the transfer design in this study enabled the system to increase the passenger trips per revenue hour significantly without excessively increasing in-vehicle ride times for passengers.

ABOUT CITSM

The Center for Integrated Transportation Systems Management (CITSM) at the University of Maryland College Park was established as a tier I university transportation center in 2008. The goal of the center is the Development of Advanced Technology, Improved Processes, and Enhanced Organizational Structures for the Integrated Management and Operation of Transportation Facilities and Corridors.

The CITSM focuses on the development of tools, processes and institutional relations that foster seamless management and operations of today's transportation infrastructure. Such seamless operations will be derived from concentrating on the overall mission of transportation agencies rather than the narrower objectives of individual institutions and facilities. Integrated operation of the transportation infrastructure as a system rather than a collection of individual resources, offers the potential for significant improvements in system efficiency as measured by reductions in travel time and congestion along with improvements in travel reliability. Integrated system operation will have a positive impact on the nation's economy, safety, air quality and energy consumption.

The theme of the Center is "Integrated Transportation Systems Management." The Center conducts research and provides education and technology transfer related to this theme. The objective of this research is to provide improved mobility and reduced congestion for travelers and shippers using the nation's transportation infrastructure. The emphasis of this work is on the integrated management of the transportation systems at all levels including planning, engineering, and operations. The University of Maryland has selected this theme because of its potential for significantly improving transportation system mobility and reliability, as demonstrated by numerous prior research projects conducted by its faculty and staff. A second, but equally important, objective of the Center is to educate the next generation of transportation engineers and planners with the tools needed for seamless management and operations of today's transportation infrastructure and the deep understanding of the benefits of such a fully integrated system.

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