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ODU Transportation Program: Transportation Research Institute and Graduate Program in Civil & Environmental Engineering

The transportation program at Old Dominion University grew substantially during this year. The highlights include:

- Substantial work was done on a collaborative project with the Virginia Modeling Analysis and Simulation Center (VMASC) to develop a commodity-based model. The study models distribution of freight in southeastern Virginia, a region including 31 counties. A unique aspect of the study, presented in a paper at the Transportation Research Board annual meeting, is using a genetic algorithm to calibrate the gravity model for distribution of freight. In terms of applications, freight transport via a new tolled US Route 460 was modeled. The project entails the construction of approximately 55 miles of four-lane, divided, limited access highway between Petersburg and Suffolk, Virginia. The work will help the Commonwealth capitalize on future State and Regional economic and business growth in the areas impacted by the corridor improvement, which may position the region to become a strategic mid-Atlantic hub for logistics, transportation, distribution, and warehousing.
- The analysis of incidents and secondary incidents in particular are problematic in the Hampton Roads area. A Virginia Department of Transportation (VDOT) sponsored project on the topic of secondary incidents was completed.
- Work on VDOT sponsored behavioral surveys of travelers was completed. A unique aspect of the work is the development, implementation and analysis of University students' travel behavior. The work is being done in collaboration with ODU Social Science Research Center (SSRC).
- Volume delay functions are critical inputs in travel demand models. A VDOT sponsored study analyzed alternative volume delay functions used for demand forecasting.
- TRI faculty in presented several technical research papers at the 2011 TRB Annual Meeting, National Academies.

Notably, the sponsored transportation research projects are from diverse sources that include Virginia Department of Transportation/Virginia Center for Transportation Innovation & Research, North Carolina Department of Transportation, California Department of Transportation, and Oregon Department of Transportation.

The development of ODU's transportation education program has occurred rapidly since the program was formed. The graduate education program has several Ph.D. and Masters students most of whom are involved in sponsored research projects. This annual report provides a summary of the developments that have occurred during 2010-2011, including the profiles of full-time and adjunct faculty, summaries of current research activities, a description of activities at the Transportation Research Board, and a description of the graduate program.

Transportation Faculty Profiles

The Civil and Environmental Engineering Department has full-time and adjunct faculty working on transportation research and education.

Faculty

Dr. Asad J. Khattak

Frank Batten Endowed Chair Professor
Department of Civil and Environmental Engineering
akhattak@odu.edu
 Intelligent Transportation Systems, Transportation Safety, and
 Transportation Planning

Editor-in-chief Journal of Intelligent Transportation Systems
 Associate Editor International Journal of Sustainable Transportation



Dr. Mecit Cetin

Assistant Professor
Department of Civil and Environmental Engineering
mcetin@odu.edu
 Transportation Modeling & Simulation, Intelligent Transportation Sys-
 tems, Traffic Operation, Freight, and Congestion Pricing



New Faculty

Dr. ManWo Ng

Assistant Professor
Department of Modeling, Simulation and Visualization Engineering
Department of Civil and Environmental Engineering
mng@odu.edu
 Transportation Network Modeling, Dynamic Traffic Assignment, and
 Transportation Planning

Dr. Ng is an Assistant Professor in the Department of Modeling, Simulation and Visualization Engineering, and the Department of Civil and Environmental Engineering at Old Dominion University. He joined at ODU in 2011. His research focuses on the general area of Transportation Modeling and Simulation. Much of his work centers on the development of probabilistic models to further our understanding of fundamental phenomena arising in modern transportation systems.

- Ph.D., Civil Engineering/ Transportation, The University of Texas at Austin, 2010.
- M.S., Statistics, The University of Texas at Austin, 2010.
- M.Sc., Applied Mathematics/ Probability, Delft University of Technology, Netherlands, 2005.
- B.Sc., Mechanical Engineering, Delft University of Technology, Netherlands, 2002.



Transportation Faculty Profiles

The Civil and Environmental Engineering Department has full-time, associated, and adjunct faculty working on transportation research and education.

Associated Faculty

Dr. Bryan E. Porter

Associate Professor
Department of Psychology at Old Dominion University
bporter@odu.edu
Traffic Psychology and Pedestrian Safety



Adjunct Faculty

Dr. Camelia Ravanbakht

Deputy Executive Director
Hampton Roads Transportation Planning Organization (HRTPO)
cravanbakht@hrpdcva.gov
Transportation Planning, Intelligent Transportation System, and
Transportation Operations Applications



Dr. Guzin Akan

Civil Engineer, Transportation
Old Dominion University
goakan16@gmail.com
Traffic Signal Systems Operations and Design Applications



Mr. Dwight Farmer, P.E.

Executive Director
Hampton Roads Transportation Planning Organization (HRTPO)
dfarmer@hrpdcva.gov
Transportation Policies & Planning and Travel Demand Forecasting



Mr. Robert Case, P.E.

Principle Transportation Engineer
Hampton Roads Transportation Planning Organization (HRTPO)
rcase@hrpdcva.gov
Traffic Operations, Travel Demand, and Public Transit and Non-Drivers



ODU Transportation Research Focus

The ODU research program in transportation continues to expand at a rapid pace. The core faculty have been successful in bringing new transportation research projects to ODU as well as in completing research projects successfully .

Active Research Projects

The active research projects during 2010-2011 include:

- ***Exploratory Methods for Truck Re-identification in Statewide Network Based on Axle Weight and Axle Spacing Data to Enhance Freight Metrics (Principal Investigator: Mecit Cetin), Oregon Transportation Research and Education Consortium, 2009-2010, Phase II:*** This proposed research seeks to develop new methods to determine flow patterns of trucks (those without transponders) by matching archived vehicle-attribute data such as axis spacing and axis weights at multiple geographic locations.
- ***Transportation Alternatives Modeling (Co-Principal Investigator: Asad Khattak and Mecit Cetin), Virginia General Assembly, 2009-2010:*** This project defines secondary incidents, understand the occurrence of secondary incidents, and develop a tool capable of estimating incident durations in real-time. It will allow VDOT to estimate the chances of a secondary incident occurrence, evaluate associated delays, and aid in identifying incident management strategies to mitigate the impacts of both primary and secondary incidents.
- ***Nationwide Household Travel Survey (Principal Investigator: Asad Khattak) , Virginia Department of Transportation, 2008-2011, Phase I & II:*** To get a sense of students' travel behavior, this project is conducting a survey of Old Dominion University students. The survey modifies the NHTS (National Household Travel Survey) instrument for University Application. The NHTS survey instrument, which also includes a travel diary, has been modified for online implementation.
- ***Comparative Analysis of Virginia University NHTS (Principal Investigator: Asad Khattak), Virginia Department of Transportation, 2010-2011:*** This project compares university students' travel behavior across four universities in Virginia: Old Dominion University, Virginia Commonwealth University, University of Virginia, and Virginia Technology. It is to develop and empirically test hypotheses regarding associations between university students' travel behavior and their spatial and socio-demographic characteristics. The travel behavior is to be compared across four universities as well as between university students and the general population.
- ***Hampton Roads-Crater Multimodal Transportation and Distribution Study (Co-Principal Investigator: Asad Khattak and Mecit Cetin), US Department of Transportation, 2010-2011:*** The Commonwealth of Virginia is considering proposals to construct a limited access toll road between Hampton Roads and Petersburg. This project creates an intermodal transportation model that combines the Hampton Roads and Crater regional areas as well as the space between the two. This model will be capable of estimating vehicle travel demand and freight flows. It will also be used to estimate freight and traveler flows for the improved U.S. Route 460 Corridor. This research effort will help the Commonwealth plan for and capitalize on future State and Regional economic and business growth in those areas to position the region to become a strategic mid-Atlantic hub for logistics, transportation, distribution, and warehousing.

ODU Transportation Research Focus

Technical Reports Published

The transportation faculty co-authored technical reports to sponsoring agencies that included Virginia Department of Emergency Mgt. and the Virginia General Assembly. The technical reports include:

- Khattak A., X. Wang, A. Hayes, and T. Vandecar-Burdin, Old Dominion University Supplemental Student Travel Survey, Final report submitted to Transportation & Mobility Planning Division, Virginia Department of Transportation, Richmond, VA, 2011.
- Khattak A., X. Wang X., H. Zhang, and M. Cetin, *Primary and Secondary Incident Management: Predicting Durations in Real-Time*, Research Report No. VCTIR 11-R11, Virginia Center for Transportation Innovation and Research, Charlottesville, VA, 2011.
- Khattak A., X. Wang, T. Vandecar-Burdin, and W. Wilson-John, *Old Dominion University Student Travel Survey*, Final report submitted to Transportation & Mobility Planning Division, Virginia Department of Transportation, Richmond, VA, 2010.
- Rodriguez, Daniel, Y. Song, S. Arunachalam, A. Hanna, B. Morton, A. Khattak, C. Frey, N. Roupail, *Advanced Modeling System for Forecasting Regional Development, Travel Behavior, and Spatial Pattern of Emissions*, Final Report, NCER Assistance Agreement, STAR #R831835, November 2004-November 2009, Regional Development, Population Trend, and Technology Change Impacts on Future Air Pollution Emissions, 2010.
- M. Cetin, A. J. Khattak, M. Robinson, S. Son, and P. Foytik, Evaluation of Volume-Delay Functions and Their Implementation in VDOT Travel Demand Models” VDOT Project Number: 0095078, May 2011.

Upcoming Research Projects

The new research projects to be initiated shortly include:

- Analysis of Virginia Add-On National Household Travel Survey and Metropolitan Washington Council of Governments Household Travel Survey, Virginia Department of Transportation, VA, ODU Transportation Research Institute, 2011-2012.
- Investigation of New Equilibrium Assignment Methods for VDOT Travel Demand Models, Virginia Department of Transportation, VA, ODU Transportation Research Institute, 2011-2012.
- Developing a Visualization of Traffic Operations at HRBT Under Different Conditions, Tunnel Vision, LLC, 2011.



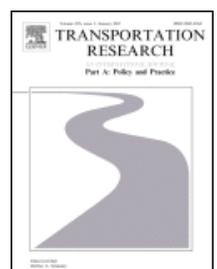
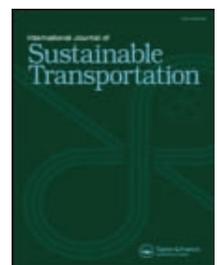
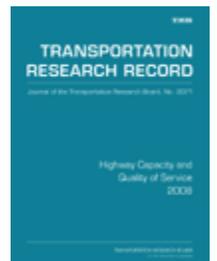
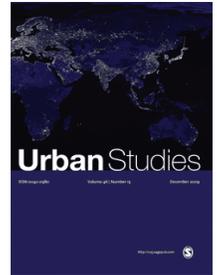
Publications of ODU Transportation Program

Our 2010-2011 goals were to work collaboratively across the campus and nationally to do scholarly research, obtain sponsored research projects and effectively complete the projects that are underway; continue working with graduate students, involving them in research and recruit new students into the transportation program; and enhance ODU and BCET reputation and visibility through editorships, publications, conference presentations and marketing activities. In this context, there have been a number of accomplishments in 2010-2011.

Journal Publications

In 2010-2011, 13 peer-reviewed scholarly papers in ISI-indexed journals were published, resulting from collaborative research efforts. Research journal publications are as follows:

- Zhang H., and A. Khattak, Spatio-Temporal Patterns of Incidents on Urban Freeways, *Transportation Research Record: Journal of the Transportation Research Board*, 2229, National Academies, Washington, D.C., 2011, pp. 19-27.
- Son S., A. Khattak, and J. Chen, A comparative analysis of University students' acquisition and use of travel information, *Transportation Research Record: Journal of the Transportation Research Board*, 2243, National Academies, Washington, D.C., 2011, pp. 46-54.
- Robinson M. and A. Khattak, Traffic Information Source Selection and Use in Emergency Situations, *Transportation Research Record: Journal of the Transportation Research Board*, 2234, National Academies, Washington, D.C., 2011, pp. 71-78.
- Khattak A., X. Wang, S. Son, and P. Agnello, University Student Travel in Virginia: Is this Travel Different from the General Population?, *Transportation Research Record: Journal of the Transportation Research Board*, 2255, National Academies, Washington, D.C., 2011, pp. 137-145.
- Fan Y., A. Khattak, and D. Rodriguez, Household excess travel and neighborhood characteristics: Associations and trade-offs, *Urban Studies*, 48:6, 2011, pp. 1235-1253.
- Cetin M., C.M. Monsere, A.P. Nichols, and I., Ustun, Investigating the Key Factors Affecting the Accuracy of Re-identification of Trucks over Long Distances Based on Axle Measurement Data, *Transportation Research Record: Journal of the Transportation Research Board* 2243, pp. 1-8, 2011.
- Comert G. and M. Cetin, Analytical Evaluation of the Error in Queue Length Estimation at Traffic Signals from Probe Vehicles Data, *The IEEE Transactions on Intelligent Transportation Systems*, Vol. 12, Issue 2, pp. 563-573, 2011.
- Cetin M., C. M. Monsere, and A.P. Nichols, Bayesian Models for Re-identification of Trucks over Long Distances on the Basis of Axle Measurement Data, *Journal of Intelligent Transportation Systems: Technology, Planning, and Operations*, 1547-2442, Volume 15, Issue 1, pp. 1-12, 2011.
- Ng, M.W., Waller, S.T. Reliable Evacuation Planning via Demand Inflation and Supply Deflation, *Transportation Research Part E: Logistics and Transportation Review* Vol. 46, Issue 6, pp. 1086-1094, 2011.
- Ng, M.W., Szeto, W.Y., Waller, S.T., Distribution-free Travel Time Reliability Assessment with Probability Inequalities, *Transportation Research Part B: Methodological* Vol. 45, Issue 6, pp. 852-866, 2011.
- Ng, M.W., Zhang, Z., Waller, S.T., The Price of Uncertainty in Pavement Infrastructure Management Planning: An Integer Programming Approach, *Transportation Research Part C: Emerging Technologies*, in press.
- Ng, M.W., Waller, S.T. A Dynamic Route Choice Model considering Uncertain Capacities, *Computer-Aided Civil and Infrastructure Engineering*, in press.



2011 Transportation Research Board Presentations

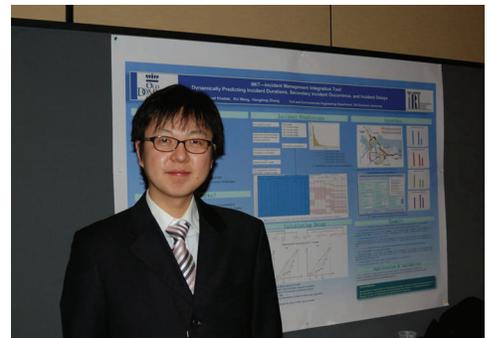
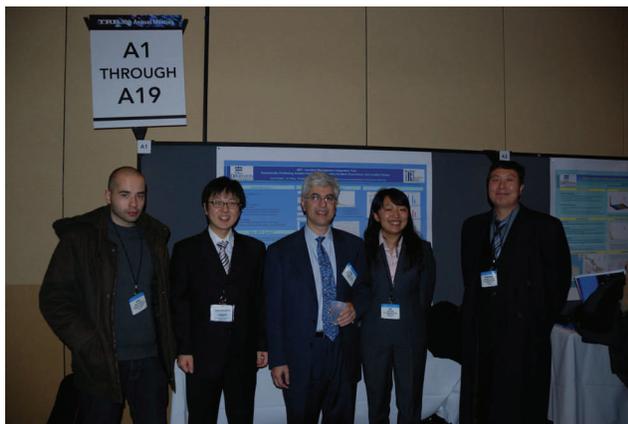
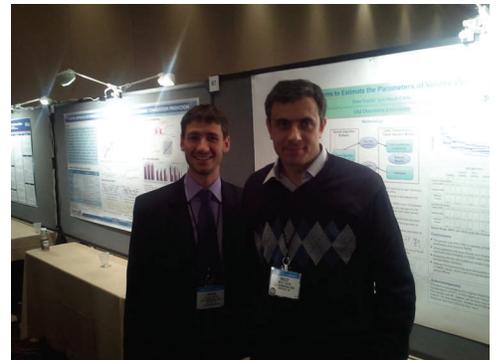
ODU Civil and Environmental Engineering faculty, Drs. Khattak and Cetin, present 9 research papers at the 2011 TRB Annual Meeting

Transportation Research Board

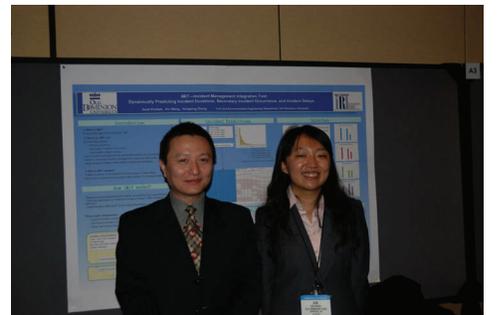
ODU Civil and Environmental Engineering faculty participated in the 90th Annual Transportation Research Board (TRB) held in January in Washington, DC. They presented 6 research papers/posters, reflecting collaborations with other centers. At the conference, they arranged the Second Annual Lunch for students, researchers and practitioners of Hampton Roads, with participants from Old Dominion University, Virginia Modeling Analysis and Simulation Center, and Hampton Roads Metropolitan Planning Organization.

The TRB Annual Meeting covered all transportation modes, with more than thousands of presentations in nearly 600 sessions addressing topics of interest that included a diverse set of transportation topics. The TRB 90th Annual Meeting attracted nearly 10,000 transportation professionals from around the world to Washington, D.C., in January 2011. ODU Civil and Environmental Engineering faculty chaired the Advanced Traveler Information Systems subcommittee and presented the following papers and posters on transportation planning and op-

Photos at Transportation Research Board



**Transportation Research Board
90th Annual Meeting
January 23–27, 2011 • Washington, D.C.**



2010 Transportation Research Board Presentations

We are pleased that the transportation faculty presented 9 research papers at the 2011 Transportation Research Board annual meeting in Washington, D.C. Some of the papers involve graduate students as co-authors—reflecting the emphasis that we place on developing a workforce that is exposed to research and a solid curriculum. The following papers were presented:

ODU Civil and Environmental Engineering faculty, Drs. Khattak and Cetin, present 9 research papers at the 2011 TRB Annual Meeting.

90th Transportation Research Board Annual Meeting

- Khattak A., X. Wang, H. Zhang, iMiT: A Tool for Dynamically Predicting Incident Durations, Secondary Incident Occurrence, and Incident Delays, TRB Paper No. 11-0803, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Zhang H. and A. Khattak, Spatio-Temporal Patterns of Incidents on Urban Freeways, TRB Paper No. 11-2732, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Son, S., A. Khattak, and J. Chen, A Comparative Analysis of University Students' Acquisition and Use of Travel Information, TRB Paper No. 11-0752, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Khattak A., X. Wang, S. Son, and P. Agnello, University Student Travel in Virginia: Is it different from the General Population? TRB Paper No. 11-0753, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Robinson, M. and A. Khattak, Traffic Information Source Selection and Use in Emergency Situations, TRB Paper No. 11-2857, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Bandeira J., T. Almeida, A. Khattak, N. Roupail, and M. Coelho, Generating Emissions Information for Route Selection: Experimental Monitoring and Routes Characterization, TRB Paper No. 11-0515, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Son, S., M. Cetin, and A. Khattak, Are Some Freeway Lanes Under-utilized?, TRB Paper No. 11-2707, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2011.
- Cetin M., C.M. Monsere, A.P. Nichols, and I., Ustun, Investigating the Key Factors Affecting the Accuracy of Re-identification of Trucks over Long Distances Based on Axle Measurement Data, *The 90th Annual meeting of the Transportation Research Board*, Washington, D.C., January 23-27, 2011.
- Foytik P and M. Cetin, Genetic Algorithm Optimization of BPR Volume Delay Parameters, *The 90th Annual meeting of the Transportation Research Board*, Washington, D.C., January 23-27, 2011.

2011 Transportation Research Board Presentations

The ODU Transportation Program was well-represented at the 2011 TRB Annual Meeting, with 9 papers presented. The TRB Annual Meeting is an excellent opportunity for the program to share its most innovative research, while receiving valuable input from colleagues in transportation. Some highlights of 2011 are discussed here.

A Comparative Analysis of University Students' Acquisition and Use of Travel Information

Sanghoon Son, Asad J. Khattak, and Ju-Yin Chen

Advanced Traveler Information Systems (ATIS) provide pre-trip and en-route information, which can improve the travel experience of individuals and increase efficiency of the transportation system. While research on travelers' acquisition and use of relevant information on their intended routes and modes has been conducted, behavioral responses of sub-populations that might be particularly sensitive to information are not well-understood. A key segment of the population is university students, who are often technology savvy, early adopters of new information technology, have widespread access to computers and the Internet, and often use a multitude of travel modes. Student responses to travel information are explored in this study. As part of a larger study, behavioral surveys were conducted to collect and analyze data on university students' travel behavior. This study focuses on a sub-set of the collected data that deals with acquisition and use of travel information. The study explores how students at four universities in Virginia acquire and respond to travel information, and it identifies important factors associated with these decisions. Statistical models are estimated to rigorously test hypotheses. Results show that travel information acquisition is higher if students report longer travel times and on urban campuses. Furthermore, the Internet, and variable message signs have the strongest associations with travel decision changes regardless of campus location. Unique elements include the finding that students not only alter their routes relatively frequently, but also their modes of travel, especially in suburban campuses, pointing to the importance of delivering multimodal information. The implications of the findings are discussed.

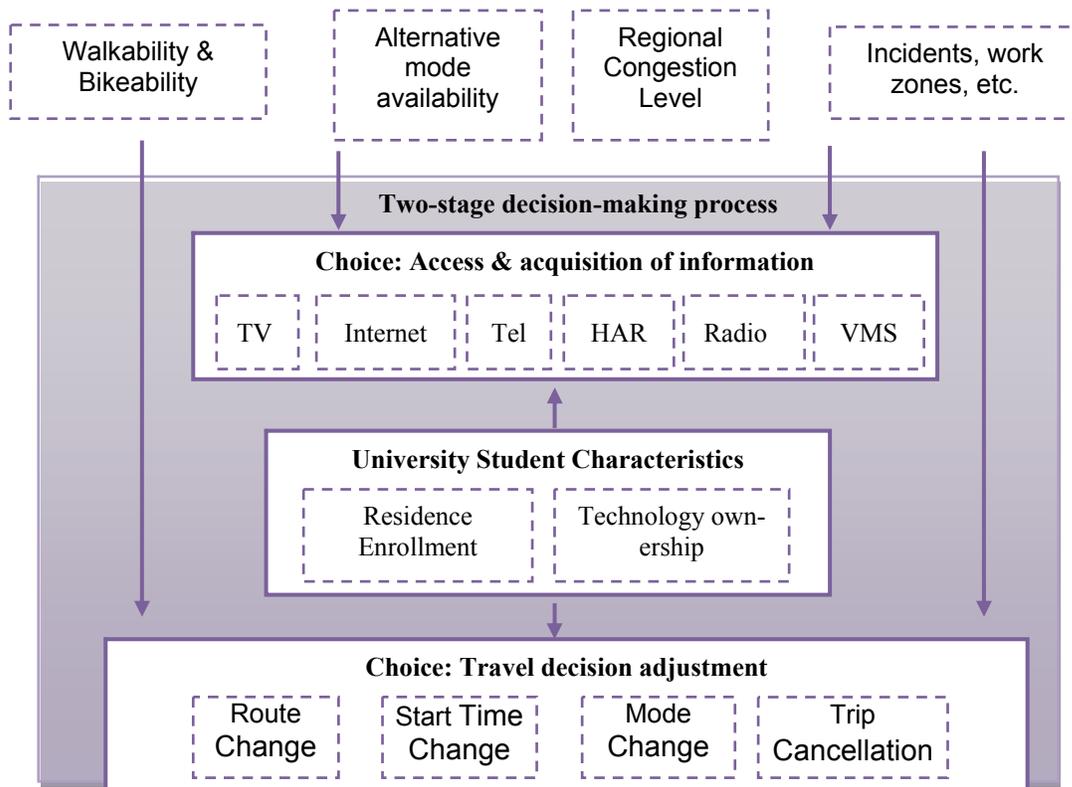


Figure 1. Conceptual framework

2011 Transportation Research Board Presentations

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iMiT: A tool for dynamically predicting incident durations, secondary incident occurrence, and incident delays Asad J. Khattak, Xin Wang, and Hongbing Zhang

Successful network operations of a metropolitan area requires overcoming the traffic congestion that restricts traffic flow in a region. This congestion may result from accidents and incidents or other events that reduce road capacity, including travelers' unreliability of travel times in urban areas is partly due to traffic incidents. Traffic operations can be further hindered by the occurrence of secondary incidents and associated traffic delays. Understanding the characteristics of incidents that occur on urban freeways and forecasting their impacts can help decision-makers select better operational strategies. Using roadway inventory and traffic incident data provided by the Hampton Roads Traffic Operations Center, this study analyzes traffic incidents and presents an online tool (called iMiT-Incident Management Integration Tool) that can dynamically predict incident durations, secondary incident occurrence, and associated incident delays. This prediction tool was developed based on rigorous statistical models for incident duration and secondary incident occurrence, and uses a theoretically-based deterministic queuing model to estimate associated delays; iMiT relies on available inputs about the roadway conditions, and incoming incident information, e.g., location, time of day, and weather conditions. It can aid incident management by generating information about primary and secondary incidents and help effectively assign incident management resources.

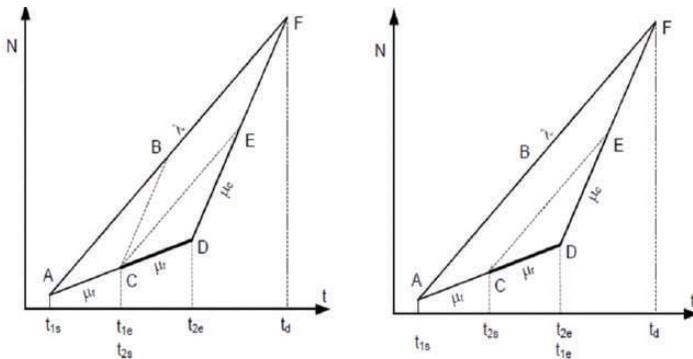


Figure 1. Illustration of primary-secondary incident events

Figure 2. Map of Hampton Roads, showing chokepoints in iMiT (initial input screen)



2011 Transportation Research Board Presentations

The ODU Transportation Program was well-represented at the 2011 TRB Annual Meeting, with 6 papers presented. The TRB Annual Meeting is an excellent opportunity for the program to share its most innovative research, while receiving valuable input from colleagues in transportation. Some highlights of 2011 are discussed here

Using Genetic Algorithms to Estimate the Parameters of Volume Delay Functions *Peter Foytik and Mecit Cetin*

In the traffic assignment step of travel demand models, volume delay functions are used to calculate congested travel time in order to distribute volume over the transportation network in a manner consistent with the driver route choice behavior. These functions, such as the Bureau of Public Roads (BPR) or Conical functions, have parameters that allow the analyst to calibrate the model to more accurately reflect the route choice behavior in a given urban area. The Highway Capacity Manual (HCM) provides default parameters for these functions based on the road classification. Finding the proper parameters for a specific area is very difficult to do with limited data and is mostly done in a brute force manner by hand in a trial and error manner. Exhaustive searches could be performed to find the best parameter settings, but because of the complexity of the problem an appropriate search would not finish in an adequate amount of time. Genetic algorithms can perform a very large search covering all of the problem space in a reasonable amount of time and find a near optimum solution. A genetic algorithm is developed to find and determine the best parameters for the Hampton Roads and Charlottesville, Virginia travel demand models. The results show that the genetic algorithm is able to reduce root mean square error by more than five percent for the Hampton Roads network and about 18 percent for the Charlottesville network

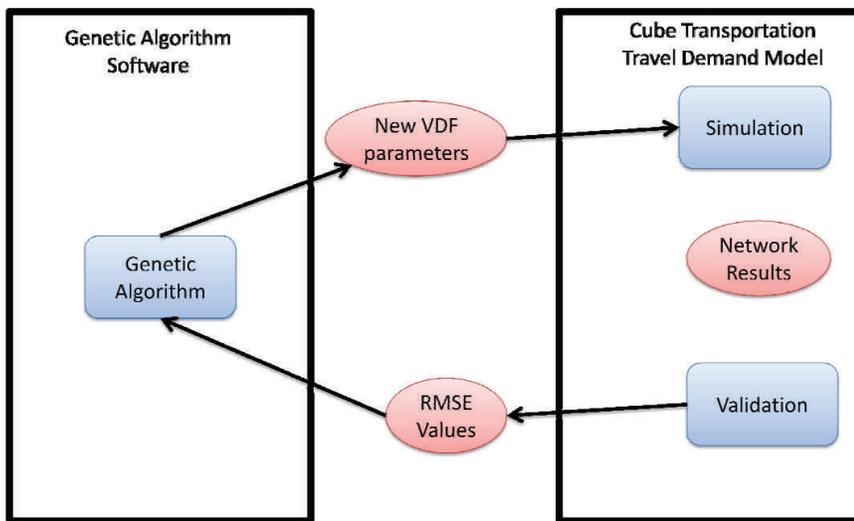


Figure 1. Data flow from the genetic algorithm and the Cube transportation travel demand model

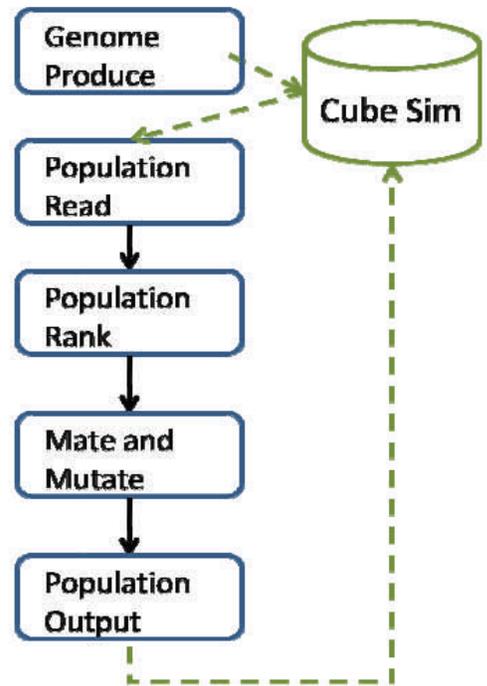


Figure 2. Major components of the designed genetic algorithm

Thesis/Dissertation of ODU graduates

Dr. Mike Robinson has graduated this year. He has led VMASC's research in transportation and evacuation modeling. Dr. Robinson is currently leading a study of suggested transportation construction projects for the Hampton Roads region, forecasting the different alternative's effectiveness at reducing the congestion issues currently experienced as well as those anticipated in the year 2034. Robinson is a U.S. Naval Academy graduate who also holds a Master's degree in physics from the Naval Postgraduate School in Monterey, California. He completed his Ph.D. in Modeling and Simulation at ODU. Other research interests include decision modeling and emergency planning and decision-making. His dissertation is presented as follows:

Dr. Mike Robinson

Modeling Decision Making Related to Incident Delays during Hurricane Evacuations

Successful evacuations from metropolitan areas require optimizing the transportation network, monitoring conditions, and adapting to changes. Evacuation plans seek to maximize the city's ability to evacuate traffic to flee the endangered region, but once an evacuation begins, real time events degrade even the best plans.

To better understand behavioral responses made during a hurricane evacuation, a survey of potential evacuees obtained data on demographics, driving characteristics, and the traffic information considered prior to and during an evacuation. Analysis showed significant levels of correlation between demographic factors (e.g., gender, age, social class, etc.) and self-assessed driver characteristics, but limited correlation with the decision to take an alternate route. Survey results suggest evacuees' decisions to divert are functions of the length of time a driver has been in congestion, the amount of travel information provided, and its method of delivery. This association differs significantly from those identified by other studies that focused on routine, non-evacuation, conditions. A decision-making model that forecasts decision tendencies using these factors was created.

The model was integrated in and tested using a dynamic evacuation simulation. The combined model and simulation allow assessment of the impacts traveler information content, timing, and method of delivery have on traffic flow and evacuation times, imitating the impact of traffic information systems. The effectiveness of alternate route use was assessed by measurements of total vehicle volumes processed and queue persistence. Effectiveness was highly dependent on the road network in the immediate vicinity, especially the number of accesses to the alternate route and vehicle capacity on the alternate route and accesses. Integration of the decision-making model in a dynamic hurricane evacuation simulation is unique to this study.

This study yields a greater understanding of evacuee decisions and factors associated with related travel decisions. It provides the novel integration of a behavioral model and a dynamic evacuation simulation, increasing the realism of evacuation planning and providing a valuable tool supporting the decision process. Understanding gained may contribute to reduced evacuation times and enhanced public safety.

Regional Transportation News

The Tide

The Tide, Virginia's first light rail system, opened for service in Norfolk on August 19, 2011. It extends 7.4 miles from the Eastern Virginia Medical Center complex east through downtown Norfolk and adjacent to I-264 to Newtown Road. Eleven stations provide access to dining, shopping and entertainment as well as the Norfolk State University and Tidewater Community College (Norfolk) campuses. There are four park-and-ride lots where parking is always free. Here is how media describe the excitement and concerns about The Tide:

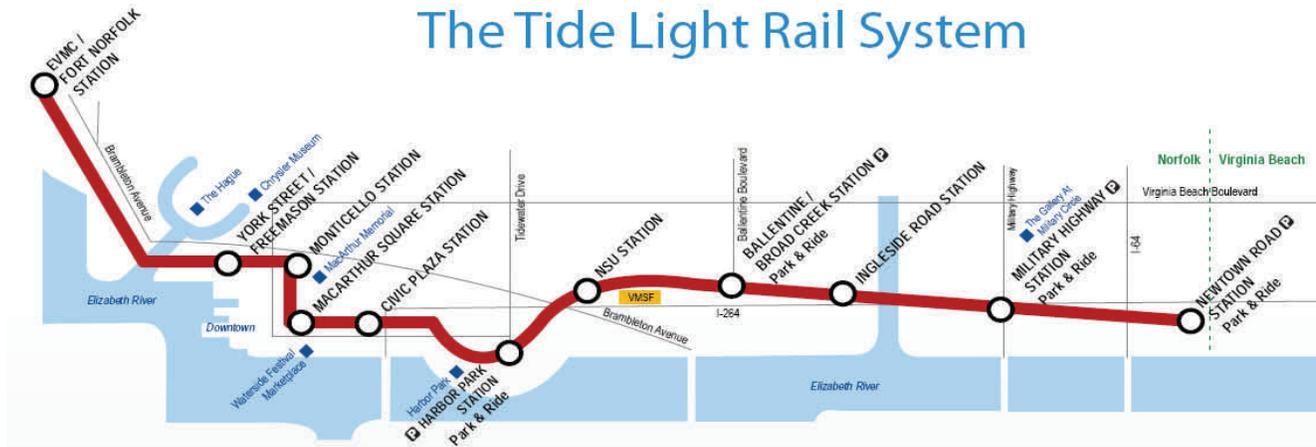
- Norfolk light rail's start-up could start up rash of accidents (7/24/2011, The Virginian-Pilot)
- Light-rail Tide rolls in Norfolk (7/24/2011, Richmond Times-Dispatch)
- More than 75,000 rode The Tide on debut weekend (8/23/2011, The Virginian-Pilot)
- Passengers on board with The Tide on 1st day with fares (8/30/2011, The Virginian-Pilot)

Although there has been much concerns on the safety, it is believed that The Tide will play an important role in regional public transportation systems.



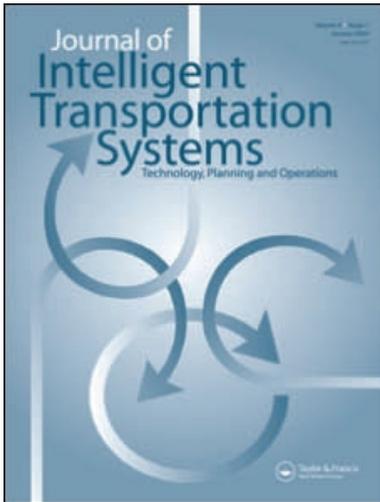
(Photo: Hampton Roads Transit Website)

The Tide Light Rail System



(Map: <http://www.railfanguides.us/va/tide/index.htm>)

Journal Editing



Journal of Intelligent Transportation Systems: Technology, Planning, and Operations

Published By: Taylor & Francis
 Frequency: 4 issues per year
 Print ISSN: 1547-2450/Online ISSN: 1547-2442

Dr. Asad Khattak is the editor of Journal of Intelligent Transportation Systems. The Journal of Intelligent Transportation Systems is devoted to scholarly research on the development, planning, management, operation, and evaluation of intelligent transportation systems. Characterized by the application of information and communication technologies to transportation, such systems provide innovative solutions to contemporary transportation problems. They encompass the full scope of information technologies used in transportation, including control, computation and communication, as well as algorithms, databases, models, and human interfaces. The emergence of these technologies as a pathway for transportation is a relatively new field of research. The Journal of Intelligent Transportation Systems is particularly interested in research that leads to the development of such systems and improved planning and operation of the transportation system through the application of these new technologies. The journal also publishes papers that add to the scientific understanding of ITS impacts on accessibility, congestion, pollution, safety, security, noise, and energy and resource consumption. The journal is interdisciplinary and multi-modal, dealing with research in the fields of engineering, economics, planning, policy, business, and management, and in all forms of ground, air, and water transportation.

Submissions Welcome

The Journal of Intelligent Transportation Systems accepts submissions of original work. A complete list of instructions for the preparation of manuscripts is available on the journal's website: (<http://www.tandf.co.uk/journals/titles/15472450.asp>)

2009 Impact Factor: 0.727

ransportation, traffic flow and control, vehicle control, routing and scheduling

- Traveler response to dynamic information
- Planning for ITS innovations
- Evaluations of ITS field operational tests
- ITS deployment experiences
- Automated highway systems
- Vehicle control systems
- Tools/software for ITS analysis

The Journal of Intelligent Transportation Systems has a 2009 Impact Factor of 0.727.

This places JITS as one of the highly ranked journals in the growing field of intelligent transportation systems. It is ranked high among Transportation Science and Technology Journals, based on 2010 Thomson Reuters, Journal Citation Reports. This result could not have come without the valuable contributions of the editors, authors, and reviewers. Note that a high impact factor increases the visibility and awareness of journals, and it can drive up usage and increase journal distribution. Here are five most-cited articles from 2008-2010.

- B. Balcik, B.M. Beamon, K. Smilowitz, Last Mile Distribution in Humanitarian Relief Volume 12, Issue 2, pp. 51-63.
- I. Kaparias, M.G.H. Bell, H. Belzner, A New Measure of Travel Time Reliability for In-Vehicle Navigation Systems Volume 12, Issue 4, pp. 202-211.
- A. Higatani, T. Kitazawa, J. Tanabe, et al., Empirical Analysis of Travel Time Reliability Measures in Hanshin Expressway Network Volume 13, Issue 1, pp. 28-38.
- I. Lin, R. He, A.L. Kornhauser, Estimating Nationwide Link Speed Distribution Using Probe Position Data Volume 12, Issue 1, pp. 29-37.
- N. Uno, F. Kurauchi, H. Tamura, et al., Using Bus Probe Data for Analysis of Travel Time Variability Volume 13, Issue 1, pp. 2-15.

Transportation Engineering Degrees at ODU

The goal of the transportation educational program at ODU is to provide students with the knowledge and tools that they will need to succeed in the workforce. The undergraduate program provides a solid foundation in design, operations, and planning. At the graduate level, students learn advanced analytical tools and technologies to help address transportation problems. The graduate program in transportation offers Master's and Ph.D. degrees. Qualified full-time students pursuing a Master of Science or Ph.D. degree are eligible for funding through Research Assistantships. Students interested in learning more about the program are invited to contact Dr. Khattak or Dr. Cetin.

DEGREES & COURSEWORK

Degrees The Department of Civil & Environmental Engineering offers graduate programs leading to the following degrees:

- Bachelor of Science in Civil Eng (BSCE)
- Master of Science in Civil Eng (MSCE)
- Master of Engineering in Civil Eng (MECE)
- Doctor of Philosophy in Civil Eng (Ph.D. CE)

Bachelor's and Master's students build a solid foundation in engineering by taking a courses in transportation fundamentals, transportation planning, & operations. In addition, Master's students produce a Thesis or Project. Students can also take transportation courses through ODU Extension.

The Ph.D. program provides training in research methods that enables graduates to contribute to the development of substantive theory, knowledge, and scholarship in transportation engineering.

Undergraduate Transportation Coursework Provides knowledge of transportation and the inter-relationships between multiple transportation modes. Students can take the following courses:

- Transportation Fundamentals
- Transportation Planning
- Transportation Operations I
- Transportation Operations Applications

Graduate Coursework Provides an extensive background in transportation engineering. Students may take the following courses:

- Transportation Fundamentals
- Transportation Planning
- Transportation Operations I & II
- Transportation Safety
- Intelligent Transportation Systems
- Transportation Network Models and Optimization
- Simulation Modeling in Transportation Networks

RESEARCH & INTERNSHIPS

Current Research Faculty and students conduct research in the following areas:

- Transportation operations
- Transportation planning
- Modeling and simulation of transportation systems
- Transportation safety
- Intelligent Transportation Systems

Student Publications Graduate students are encouraged to co-author articles with faculty. Additionally, students are encouraged to present their research at forums, such as the annual Transportation Research Board meeting.

Financial Assistance & Internships Research and teaching assistantships are available to full-time students. These typically pay for student stipends and partial or full tuition.

Internships provide employment experience and the opportunity to develop professional skills. Students can work for these partners:

- Virginia Modeling, Analysis & Simulation Center
- Virginia Department of Transportation
- Hampton Roads Transportation Planning Organization



Transportation at ODU

ODU Transportation Program
Civil & Environmental Engineering Department
135 Kaufman Hall
Old Dominion University
Norfolk, VA 23529

Contact: Asad Khattak, Batten Endowed Chair Professor and
Director of ODU Transportation Research Institute
Phone: (757) 683-6701 Email: AKhattak@odu.edu



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Mission

The mission of the ODU Transportation Program is to contribute to the advancement of transportation systems in three ways:

- The development of knowledge that stimulates applications of new strategies/technologies
- The education of transportation professionals
- The dissemination of knowledge to transportation practitioners and other stakeholders.

We achieve these goals by offering state-of-the-art research capabilities. Students have access to faculty with diverse backgrounds and research interests, and a broad curriculum. The program offers professional development opportunities in the Hampton Roads area.

Sponsors

The Virginia Department of Transportation directly supports research activity at the ODU Transportation Program. In addition, core ODU transportation faculty received research funding from the following sponsors:

- Virginia Department of Emergency Management
- California Department of Transportation
- Oregon Transportation Research and Education Consortium
- US Department of Transportation
- National Science Foundation

Faculty

Core Transportation Faculty

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