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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, focusing on regional issues in Hampton Roads, broader concerns in the Commonwealth of Virginia and also national issues. Examples of successful regional projects are the collaboration between Transportation Research Institute and the Virginia Modeling Analysis and Simulation Center (VMASC) to assess the impact of proposed transportation network improvements in the Hampton Roads region. This project was conducted at the request of the Commonwealth of Virginia General Assembly-Hampton Roads delegation. The results showed that the greatest improvement at the critical choke point of Hampton Roads Bridge Tunnel (HRBT) occurs from adding 2 lanes, but this improvement leaves significant congestion during peak rush hour periods in 2030. Simulations further showed that incidents can substantially worsen the performance of HRBT and adding capacity further helps with reductions in incident congestion. Another regionally significant project completed collaboratively with VMASC is the mesoscopic simulation to assess viability of evacuating the Hampton Roads region in a hurricane scenario using the Commonwealth of Virginia's Hurricane Emergency Response Plan. The role of accidents and incidents was analyzed, showing that they can significantly increase total travel time for those directly affected. However, the total capacity of the transportation system is large enough to recover from (non-catastrophic) incident induced congestion. On average, the total time to remove evacuees from the region increased by less than 5% as a result of accidents and incidents.

Examples of on-going research projects include analysis of secondary incidents in the Hampton Roads area (VDOT sponsored), hurricane evacuation studies taking into account the occurrence of traffic incidents (VDEM sponsored through VMASC), behavioral surveys of travelers and analysis of alternative volume delay functions in demand forecasting (VDOT sponsored), development of intelligent transportation systems decision support systems (Caltrans sponsored), re-identification of trucks (OTREC sponsored), detection of incidents in Vehicular Ad-Hoc Networks (NSF sponsored through ODU Computer Science Department). TRI has a multi-disciplinary research agenda, and it involves faculty members from various Departments on campus. We are very grateful to VDOT's Virginia Transportation Research Council for providing seed money.

The development of ODU's transportation education program has occurred rapidly since the program was formed. The graduate education program has several students (6 Ph.D. students and 8 Masters) most of whom are involved in sponsored research projects. This annual report provides a summary of the many developments that have occurred during 2008-2009, including the profiles of full-time and adjunct faculty, summaries of current research activities, a description of current activities at the Transportation Research Board, and a description of the graduate program.



Transportation Faculty Profiles

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

Faculty

Dr. Asad J. Khattak

Frank Batten Endowed Chair Professor of Transportation Engineering
 akhattak@odu.edu

Research Interests: Intelligent Transportation Systems, Safety, Planning

Dr. Mecit Cetin

Assistant Professor of Transportation Engineering
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Research Interests: Modeling & Simulation, ITS, Traffic Operation, Freight, Congestion Pricing

Adjunct Faculty

Dr. Camelia Ravanbakht

Deputy Executive Director
 Hampton Roads Transportation Planning Organization (HRTPO)
 cravanbakht@hrpdcva.gov

Planning, ITS and Transportation Operations Applications

Dr. Guzin Akan

Civil Transportation Engineer
 City of Norfolk , Norfolk, Virginia
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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 and Planning, Travel Demand Forecasting

Mr. Robert Case, P.E.

Principle Transportation Engineer
 Hampton Roads Transportation Planning Organization (HRTPO)
 rcase@hrpdcva.gov

Operations, Travel Demand, Public Transit, and Non-Drivers



Dr. Asad J. Khattak



Dr. Mecit Cetin



Dr. Camelia
Ravanbakht



Dr. Guzin Akan



Mr. Dwight Farmer
P.E.



Mr. Robert Case
P.E.

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.

Upcoming Research Projects

The new research projects to be initiated shortly include:

- ***Evaluation of Volume-Delay Functions and Their Implementations in VDOT Travel Demand Models, Virginia Department of Transportation:*** The overall objective of this research is to evaluate and recommend the most appropriate volume delay functions for travel demand models in Virginia. The benefits of incorporating network attribute data to support their correct applications will also be investigated. This research effort will help in achieving greater accuracy in modeling travel demand and more accurate evaluation of future transportation improvement strategies.
- ***Exploratory Methods for Truck Re-identification in a Statewide Network Based on Axle Weight and Axle Spacing Data to Enhance Freight Metrics, Oregon Transportation Research and Education Consortium (OTREC), Phase II.*** This research focuses on developing advanced methods and algorithms to anonymously identify, and match commercial trucks crossing two data collection stations on roadways; and on investigating how these re-identification methods can be employed to enhance freight metrics. The proposed methods can support and benefit multiple applications, such as determining travel times, quantifying travel time reliability, etc.
- ***Traffic Signal Priority For The Tide Light Rail System.*** This project will deal with the development of simulation models for evaluation and optimization of system operations in Norfolk, VA.

Active Research Projects

The active research projects during 2008-2009 include:

- ***Primary and secondary incident management: Predicting durations in real-time, Virginia Department of Transportation, 2007-2009:*** This project is to define 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, Virginia Department of Transportation, 2008-2009:*** 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.
- ***ITS Decision: Gateway to understanding and applying ITS, California Department of Transportation, 2008-2009:*** This project is developing an innovative Case-Based Reasoning (CBR) tool, which is meant to increase decision-makers' awareness of available ITS technologies and provide technical information about high-impact, feasible and cost-effective technologies. The user can view attributes of each historical case such as qualitative information about the technology as well as the program's performance measures.
- ***Exploratory Methods for Truck Re-identification in a Statewide Network Based on Axle Weight and Axle Spacing Data to Enhance Freight Metrics, Oregon Transportation Research and Education Consortium (OTREC), 2008-2009, Phase I.*** This research focuses on developing advanced methods and algorithms to anonymously identify, and match commercial trucks crossing two data collection stations on roadways; and on investigating how these re-identification methods can be employed to enhance freight metrics.
- ***An Architecture for the Notification of Traffic Incidents and Congestion (NOTICE), National Science Foundation, 2007-2010:*** The goal of this project is to develop and evaluate an architecture for the Notification of Traffic Incidents and Congestion (NOTICE). NOTICE will provide secure and privacy-preserving communications between vehicles and the belts, efficiently propagate incident information to vehicles, and infer the presence of traffic congestion without driver intervention.

Accomplishments of ODU Transportation Program

Our 2008-2009 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 through editorships, publications, conference presentations and marketing activities. In this context, there have been a number of accomplishments in 2008-2009.

Publications

In 2008-2009, 5 peer-reviewed scholarly papers in ISI-indexed journals were published, resulting from collaborative research efforts. Research journal publications are as follows:

- Holguín-Veras and M. Cetin, Optimal Tolls for Multi-Class Traffic: Analytical Formulations and Policy Implications, *Transportation Research Part A. Policy and Practice* Vol. 43, No 4, 445-467, 2009.
- Comert G. and M. Cetin, Queue Length Estimation from Probe Vehicle Location and the Impacts of Sample Size, *European Journal of Operational Research*, 197, pp. 196-202, 2009.
- Cho G., D. Rodriguez, and A. Khattak, What is the role of the built environment in explaining relationships between perceived and actual pedestrian safety? *Accident Analysis & Prevention*, 41:4, 2009, pp. 692-702.
- Pan X. and A. Khattak, Evaluating Traveler Information Impacts on Commercial and Non-Commercial Users, *Transportation Research Record: Journal of the Transportation Research Board*, 2086, National Academies, Washington, D.C., 2008, pp. 56-63.
- Khattak A., Y. Fan, and C. Teague, Economic Impact of Traffic Incidents on Businesses, *Transportation Research Record: Journal of the Transportation Research Board*, No. 2067, National Academies, Washington, D.C., 2008, pp. 93-100.
- Fan Y. and A. Khattak, Urban form, individual Spatial Footprints, and Travel: An Examination of Space-Use Behavior, *Transportation Research Record: Journal of the Transportation Research Board*, No. 2082, National Academies, Washington, D.C., 2008, pp. 98-106.
- Khattak A., X. Pan, W. Williams, N. Roupail, and Y. Fan, Traveler Information Delivery Mechanisms: Impacts on Consumer Behavior, *Transportation Research Record: Journal of the Transportation Research Board*, No. 2069, National Academies, Washington, D.C., 2008, pp. 77-84.

Conference Presentations

We are pleased that the transportation faculty presented 12 research papers at the 2009 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:

Traffic Operations and Intelligent Transportation Systems

- Robinson M., A. Khattak, J. Sokolowski, P. Foytik, and X. Wang, What is the role of traffic incidents in Hampton Roads hurricane evacuation? TRB CD-ROM, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- Zhang, H., and A. Khattak, What is the role of large-scale events in traffic operations? TRB CD-ROM, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- Al-Deek, H., S. Venkata, J. Flick, and A. Khattak, Dynamic message sign deployment and diversion behavior of travelers on Central Florida toll roads, TRB CD-ROM, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- Hu H., W. Williams, N. Roupail, A. Khattak, and X. Zhou, Modeling the role of transportation information in mitigating major capacity reductions in a regional network, TRB CD-ROM, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- X. Wang, A. Khattak, and Y. Fan, Travel information acquisition and travel decisions, TRB CD-ROM, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- M. Cetin and A.P. Nichols, Improving the Accuracy of Vehicle Reidentification Algorithm by Solving the Assignment Problem, *The 88th Annual meeting of the Transportation Research Board*, Washington, D.C., January 11-15, 2009.

Accomplishments of ODU Transportation Program

Traffic Operations and Intelligent Transportation Systems (continued)

- G. Comert, M. Cetin, A. P. Nichols, Incorporating queue length measurements into actuated signal control: evaluation of efficiency benefits at an intersection, *The 88th Annual meeting of the Transportation Research Board*, Washington, D.C., January 11-15, 2009.
- A. Khattak, X. Wang, H. Zhang, Are Incident durations and secondary incident occurrence interdependent?, *The 88th Annual meeting of the Transportation Research Board*, Washington, D.C., January 11-15, 2009.

Planning and Traveler Behavior

- Shay E., and A. Khattak, How does residential environment relate to auto ownership and travel choices? TRB CD-ROM, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- Cho G., D. Rodriguez, and A. Khattak, What is the role of the built environment in explaining relationships between perceived and actual pedestrian safety? TRB CD-ROM, Presented to Transportation Research Board, National Academies, Washington, D.C., 2009.
- Fan Y., and A. Khattak, Impact of the built environment on travel distance and time costs: A trip-level analysis, Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.
- Fan Y., and A. Khattak, Does urban form matter in solo and joint activity engagement decisions? Presented at the Transportation Research Board, National Academies, Washington, D.C., 2009.

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:

1. Robinson R., A. Khattak, J. Sokolowski, X. Wang, and P. Foytik, Hampton Roads Hurricane Evacuation Transportation Study, Final Report Number V07-008, Virginia Department of Emergency Management, Virginia Modeling, Analysis and Simulation Center, Old Dominion University, Norfolk, June 2008.
2. Robinson R., A. Khattak, R. Meilke, X. Wang, H. Zhang, and P. Foytik, Hampton Roads Transportation Alternatives Traffic Simulation, Final Report to Virginia General Assembly, Virginia Modeling, Analysis and Simulation Center, Old Dominion University, Norfolk, 2008.

These papers and technical reports reflect the diversity of the ODU Transportation Program research agenda, with topics that include transportation operations, intelligent transportation systems, planning, and traveler behavior.



2009 Transportation Research Board Presentations

ODU Civil and Environmental Engineering faculty, Drs. Khattak and Cetin, present 12 research papers at the 2009 TRB Annual Meeting

ODU Civil and Environmental Engineering faculty participated in the 88th Annual Transportation Research Board (TRB) held in January in Washington, DC. The TRB Annual Meeting covered all transportation modes, with more than 3,000 presentations in nearly 600 sessions addressing topics of interest that included a diverse set of transportation topics. ODU faculty presented 12 research papers/posters, reflecting collaborations with ODU's Virginia Modeling, Analysis, and Simulation Center, University of Minnesota, University of North Carolina, North Carolina State University, University of South Carolina, and Marshall University. ODU Civil and Environmental Engineering faculty chaired the Advanced Traveler Information Systems sub-committee.

The faculty arranged the First Annual Lunch for students, researchers and practitioners of Hampton Roads, with participants from Old Dominion University, Hampton University, Hampton Roads Transportation Planning Organization, and the City of Norfolk.



What is the role of multiple secondary incidents in traffic operations?

Hongbing Zhang, Asad J. Khattak

Traffic incidents are a major source of uncertainty. Sometimes, a primary incident can result in multiple secondary incidents, which can be particularly problematic. To identify roadways where multiple secondary incidents are more likely to occur and analyze primary and secondary incidents, an innovative analysis method based on a detailed incident dataset from Hampton Roads was developed. Incidents occurring on major freeways are categorized as 1) independent, 2) one primary-secondary pair, and 3) one primary with two or more secondary incidents, including secondary incidents in the same and opposite directions. The last category captures large-scale events involving several secondary incidents. Ordinal regression models are estimated to quantify associations with key factors that include incident characteristics, roadway geometry and traffic flows. Furthermore, a deeper analysis of secondary incidents is conducted by examining the time gap between primary and secondary incidents. The time-gap is treated as conditional on the occurrence of secondary incidents and the appropriate statistical method, the Heckman model, is used for estimation. This research contributes to incident management by characterizing and analyzing complex events involving multiple secondary incidents. The results support the planning and operation of service patrols.



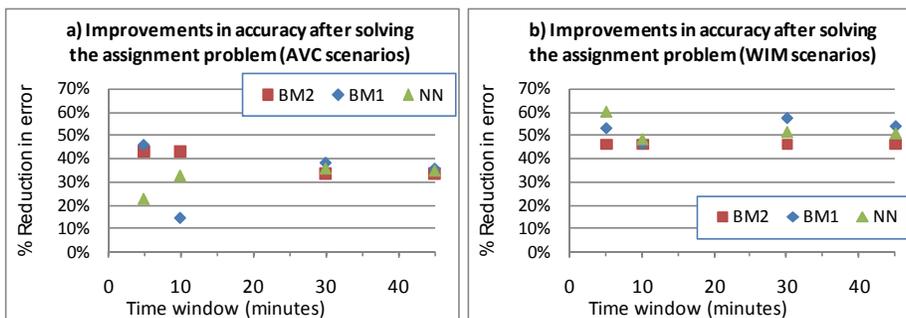
2009 Transportation Research Board Presentations

The ODU Transportation Program was well-represented at the 2008 TRB Annual Meeting, with 12 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 2009 are discussed here.

Improving the Accuracy of Vehicle Reidentification Algorithm by Solving the Assignment Problem

Mecit Cetin, Andrew P. Nichols

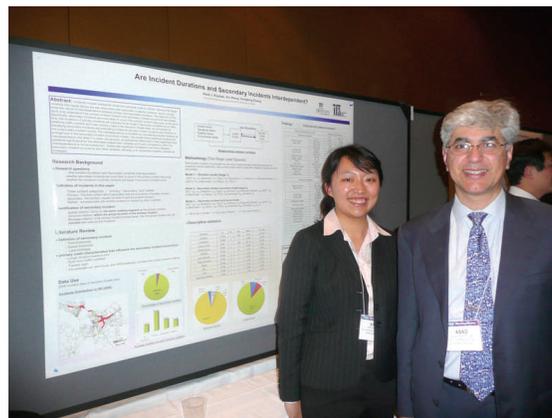
Vehicle attributes (e.g., length, sensor signature) collected at upstream and downstream points can be used to anonymously reidentify individual vehicles so that useful quantities like travel times and origin-destination flows can be estimated. In typical reidentification algorithms, each downstream vehicle is matched to the most “similar” upstream vehicle based on some defined metric. However, this usually results in matching one upstream vehicle to more than one downstream vehicle while some upstream vehicles do not get assigned to any downstream vehicles. This paper presents a two-stage methodology to alleviate this problem; first by (i) developing a Bayesian method for matching the most similar vehicles, and then by (ii) defining and solving an assignment problem to ensure that each vehicle is matched only once. The results indicate that the proposed method, when applied to the sample field data collected by AVC (automatic vehicle classification) and WIM (weigh-in-motion) sensors, reduces the mismatch error ranging from 15% to 60% and by an overall average of 42%. For the sample data, vehicles are matched with 99% accuracy after applying the methodology presented here.



Travel information acquisition and travel decisions

Xin Wang, Yingling Fan, Asad J. Khattak

Travelers can often benefit from acquiring relevant information on their intended modes and routes. By providing pre-trip and en-route information, Advanced Traveler Information Systems (ATIS) present real opportunities for improving the travel experience of individuals and increasing efficiency of the transportation system. In this regard, it is important that we understand how consumers acquire and respond to travel information. This study develops a conceptual framework identifying important factors influencing travelers’ information acquisition behavior and their response to dynamic information. The model is empirically tested using a recent and comprehensive regional travel survey. A sample-selection model is estimated to be consistent with the two-stage processing of travel information, i.e., acquisition and response. Results show that information acquisition and travel plan change are sensitive to different sets of factors. In the dataset analyzed, normal travel time to work is found to be a critical factor in information acquisition, but has an insignificant association with the change of travel plans. Furthermore, travelers respond differently to various information technologies. When examining change behavior (including route change, mode change, and trip cancellation), Internet access had the strongest association with change. When examining the specific route change behavior, transportation information obtained through radio had the strongest association with change. The study generates useful implications on how to improve the existing and future traveler information systems.



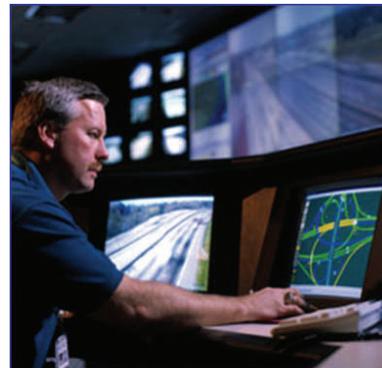
2009 Transportation Research Board Presentations

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Relationship Between ATIS and Drivers Shifting Choice of Crossing: Case Study of Hampton Roads, Virginia

Robert B. Case

Queues form daily at the Hampton Roads Bridge Tunnel (HRBT) due to high volumes and frequent incidents (accidents, disabled vehicles, etc.) at the tunnel. An advanced traveler information system (ATIS) informs drivers in the Norfolk area of the situation (e.g. queue length, lane blockages, and incidents) at the HRBT. It is hypothesized that some drivers shift to the alternative harbor crossing—the Monitor Merrimac Bridge Tunnel (MMBT)—as a result of ATIS information concerning the situation at HRBT. A linear regression analysis of MMBT volumes and synthetic blockage event data reveals that a moderate number of drivers shift from HRBT to MMBT due to blockage events at HRBT.



What is the role of traffic incidents in Hampton Roads hurricane evacuation?

Mike Robinson, Asad Khattak, John Sokolowski, Peter Foytik, Xin Wang

Successful completion of a hurricane evacuation necessitates efficiently removing those in the storm's path from harm's way. Mass exits from coastal metropolitan areas can overload road network, quickly reaching rush-hour like volumes and maintaining these for an extended time. Traffic incidents occurring during large-scale evacuations can potentially create substantial problems. This Study conducted an analysis of Virginia Hurricane Emergency Response Plan evacuation procedures using dynamic transportation simulations specifically addressing the impact of traffic incidents (including accidents) in Hampton Roads. Simulations were conducted of evacuation traffic over a 70-hour period, during which an average of almost 200 accidents and 1400 incidents (including disabled and abandoned vehicles) occur. Incident locations, severities, and durations for each hurricane evacuation scenario were randomly selected from the database and match historical values. The simulation accurately portrays congestion resulting from high traffic volumes and the increased congestion caused by reduced road capacities resulting from traffic incidents. While traffic incidents significantly extend the travel time of those involved, the time required to complete the evacuation of the region increased marginally. This assumed that no catastrophic traffic events (such as major hazardous material spills) occur and that incidents that do occur during the hurricane evacuation are cleared efficiently by service patrols. If catastrophic events occur completely closing the main interstate exit in Hampton Roads for five-hours during the evacuation, then the total time for the evacuation is extended by a little less than 10%.



2009 Transportation Research Board Presentations

The ODU Transportation Program was well-represented at the 2008 TRB Annual Meeting, with 12 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 2009 are discussed here

Dynamic Message Sign deployment and diversion behavior of travelers on Central Florida Toll Roads

Haitham Al-Deek, Srinivasa Ravi Chandra Chilakamarri Venkata, Jason Flick, Asad Khattak

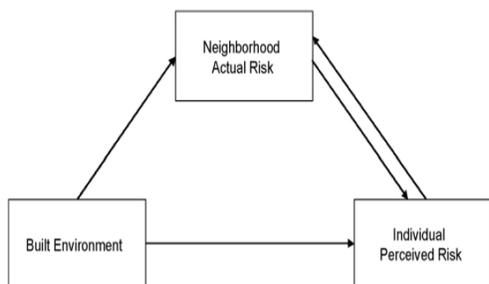
This research Advanced Traveler Information Systems (ATIS) are particularly helpful in supporting route diversion decisions. The effect of information on diversion behavior of non-tolled roads is well documented in literature. Revealed and Stated Preference studies have been traditionally conducted to analyze route diversion behavior. However, the effect of real-time traffic information on the behavior of toll road users is unexplored. This study examines the behavior of toll road users in Orlando, Florida. Orlando is serviced by a toll road network, on which Dynamic Message Signs (DMS) provide real-time travel time information to travelers. It was expected that the response to information of toll road users would be different from that of non-toll users. To capture the effects of information, specifically the DMS, a survey was conducted in two phases – a pre-deployment (with only one DMS installed) and post-deployment (after 29 DMS were installed). A detailed behavioral dataset with rigorous modeling was used to investigate the relationship between information and travel decision in the context of toll road trips. The surveys revealed that higher travel time savings due to diversion, 511 use, and toll payment by cash were associated with a higher propensity to divert in post-deployment. Travelers who experienced abnormal travel times or who reported that DMS helped them during congestion were more likely to divert. The study further showed toll road users might have a greater inertia and avoid leaving the toll road than non-toll road users. Implications of the results are discussed in the paper.



What is the role of the built environment in explaining relationships between perceived and actual pedestrian safety?

Gihyong Cho, Daniel A. Rodriguez, Asad Khattak

While the conventional approach to safety planning has emphasized crash analysis with police-reported crash information, transportation professionals increasingly recognize the importance of proactively identifying potential crash risk and considering environmental characteristics. In a proactive approach, individuals' perception of crash risk provides important information in identifying potential crash risk. As built environment characteristics influence the levels of pedestrian and bicycle safety, this study examined how perceived and actual crash risk are related with each other and with respect to built environmental characteristics. Our results showed that residents who live in low density-single residential neighborhoods are more likely to perceive their neighborhood as dangerous relative to residents of compact, mixed-use neighborhoods even though the latter exhibited higher actual crash rates. The results of path analyses confirmed that a simultaneous but opposite relationship exists between perceived and actual crash risks. Our results indicate that higher actual crash risk increases perceived crash risk, while higher perceived crash risk is negatively associated to actual crash rates. Consequently, low density and non-mixed land uses increase individuals perception of crash risk, and increased perception of risk and unfriendly environment for pedestrian and bikers reduces actual crash rates as a result of behavioral changes. From a policy standpoint, more attention and proactive interventions are desirable in suburban areas beyond the areas with high crash rates, as some of these areas have high-perceived risks.



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 on projects sponsored by these partners:

- Virginia Modeling, Analysis & Simulation Center
- Virginia Department of Transportation, including Virginia Transportation Research Council and Transportation Mobility Planning Division.
- Hampton Roads Transportation Planning Organization



Our Partners at ODU Transportation Research Institute

Successful collaborations with HRTPO and VMASC are established within ODU. Hampton Roads Transportation Planning Organization (TPO)'s participation and multi-investigation with VMASC is expanding.

The Hampton Roads Transportation Planning Organization

Several ODU adjunct faculty work at the Hampton Roads Transportation Planning Organization (HRTPO), which is the body created by the Hampton Roads localities and appropriate state and federal agencies to perform the duties of an MPO under the federal regulations. Representation on the HRTPO Board includes elected officials from the Cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the Counties of Gloucester, Isle of Wight, James City, and York; plus representatives from the Transportation District Commission of Hampton Roads (TDCHR), Williamsburg Area Transit Authority (WATA), and the Virginia Department of Transportation (VDOT). Four members of the VA General Assembly (2 Senators and 2 Delegates) are the voting members of the Board. Non-voting board members include representatives from the Virginia Department of Rail and Public Transportation (DRPT), the Virginia Port Authority (VPA), the Virginia Department of Aviation (VDOA), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Federal Aviation Administration (FAA). The HRTPO Board continually assesses its membership to account for emerging trends or shifts in the area of regional transportation and may add other stakeholders as deemed appropriate. The HRPDC provides staffing for the HRTPO to assist them in carrying out their responsibilities and to coordinate efforts with the Transportation District Commission of Hampton Roads (HRT), Williamsburg Area Transit Authority (WATA), and VDOT. The HRTPO's Transportation Technical Advisory Committee (TTAC) provides review and recommendations on all regional transportation planning efforts.



Virginia Modeling, Analysis & Simulation Center

Mr. Robert (Mike) Robinson is leading the transportation cluster at Virginia Modeling, Analysis and Simulation Center (VMASC) is a multi-disciplinary, not-for-profit, collaborative enterprise center of the Old Dominion University Research Foundation. Working with more than one hundred industry, government, and academic members, VMASC furthers the development and applications of modeling, simulation, and visualization as enterprise decision-making tools to promote economic, business, and academic development. VMASC also supports Old Dominion University's Modeling and Simulation (M&S) graduate degree programs, which offer M&S Masters and Ph.D. degrees to students across the Colleges of Engineering and Technology, Sciences, Education, and Business. With more than one hundred industry, government, and academic members, VMASC furthers the development and application of modeling, simulation, and visualization as an enterprise decision-making tool and promotes economic development.



Virginia Modeling, Analysis and Simulation Center
1030 University Blvd. • Suffolk, VA 23435



Mr. Robert Robinson
(Senior Project Scientist)



Mr. Peter Foytik
(Project Scientist)



New Faculty and Student

Mr. Robert Case is an adjunct faculty member in the Civil & Environmental Engineering Department, currently assisting in the teaching of Transportation Planning. He is licensed by the Commonwealth of Virginia as a Professional Engineer (PE), is a Fellow in the American Society of Civil Engineers, earned an M.S. in Civil Engineering from the Georgia Institute of Technology, and has more than 25 years of civil engineering experience, including 15 years in transportation research and analysis at the Hampton Roads Transportation Planning Organization (TPO).

Teaching of Transportation Planning Course at ODU

At the TPO, I have led the long-range planning process and developed models for the analysis of the cost of bikeways, the capacity of HOV lanes, the capacity of hurricane evacuation scenarios, the cost/benefit of intersection improvements, the ridership of a local bus system, and the mobility of non-drivers. I have published several papers on these efforts and presented my work at national conferences. In 2006, I received the Institute of Transportation Engineers "Innovative Intermodal Solutions for Urban Transportation Award" for my work on elderly non-drivers. I am co-chair of the Hampton Roads Transportation Operations working group and teach the transportation and construction portions of the Civil Engineering PE Exam Prep class offered by ODU's Virginia Applied Technology & Professional Development Center (VATPDC). I am currently helping Dr. Khattak teach Transportation Planning at ODU by showing the students the inner workings of Hampton Roads' four-step travel demand model and examples of its local application.



- Robert Case, Hampton Roads Transportation Planning Organization

In Fall 2009, A new Ph.D. student, Mr. Sanghoon Son, joined the ODU program. He received his Masters degree in Civil Engineering from Ajou University, South Korea, in 2006 and worked at Gyeonggi Research Institute, a government-sponsored research center for three years. We believe that his academic and professional background will be enhanced by the transportation engineering program at ODU.

Coming back to academic field

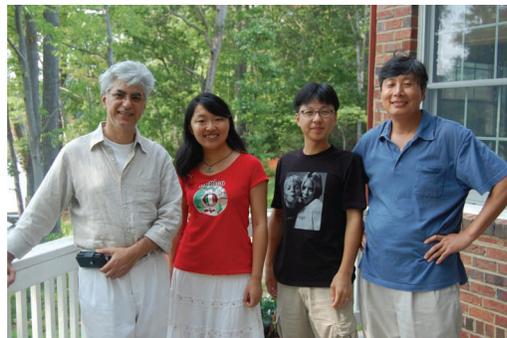
I am very pleased to have an opportunity to study Civil & Environmental Engineering at ODU. All the faculty, staff, and other students are welcoming at ODU. In the past, I worked at the government research center and was involved in several projects developing transportation policies on the transportation planning perspective. I really enjoyed my work. However, I realized that I needed in-depth knowledge and theoretical background to develop transportation improvement strategies. That is why I decided to pursue graduate studies. For my doctoral program, I would like to study Transportation System Analysis and Traveler Behavior Models. I am particularly interested in applying computational techniques and interdisciplinary knowledge to the various transportation problems, including Travel Demand Forecasting and Choice Problems for Routes and Modes. At the same time, I would like to strengthen my fundamental knowledge of methodologies to be able to solve many kinds of complex engineering problems. After graduation, I would like to share my knowledge and research background with university-level students as well as peers. Through my past teaching assistantships and instruction activities I have found that I fully enjoy teaching and believe that the best way for me to continue learning is to teach. I am sure that studying at ODU will enable me to achieve my goals.



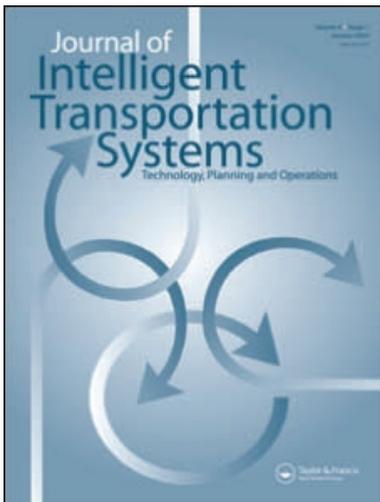
- Sanghoon Son, graduate student at ODU

Several Ph.D. students and Masters students are actively working toward their degrees.

Hongbing Zhang (Ph.D. student)
Xin Wang (Ph.D. student)
Sanghoon Son (Ph.D. student)
Faisal Mahmud (Masters Student)
Vijay Bheemajah (Masters Student)



Journal Editing



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>)

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

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- Cooperative Collision Warning Systems: Concept Definition and Experimental Implementation, R. Sengupta, S. Rezaei, S.E. Shladover, et al., Volume 11, Issue 3, pp. 143-155
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Transportation at ODU

Education, Research, and Public Service

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

We achieve these goals by offering students a broad curriculum, faculty with diverse backgrounds and research interests, and 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

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