Amer named MAUTC Outstanding Student of the Year

Ahmed Amer is a Ph.D. candidate at the Charles E. Via, Jr. Department of Civil and Environmental Engineering, Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, and also a graduate research assistant with the Center for Sustainable Mobility, Virginia Tech Transportation Institute. Ahmed has been receiving financial support from the MAUTC program since his enrollment in January 2007. Since then, he has completed his required coursework successfully with a cumulative GPA of 4.0. He is currently working on modeling driver behavior at signalized intersections for the development of safe and efficient traffic signal timings under the supervision of Ahmed Amer.

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In-vehicle Driving Behavior Field Study

Researchers at Penn State are instrumenting 240 vehicles to observe them with miniature cameras and electronics as they drive along central Pennsylvania roads. The project is one of six funded by the Strategic Highway Research Program. The study seeks to obtain a clearer and more accurate knowledge of road crash causes with the objective of identifying and understanding effective countermeasures.

A multidisciplinary team with backgrounds in civil engineering, mechanical engineering and psychology will lead the project. Several graduate students and Larson Institute technicians will also participate. The research team has begun to instrument cars. MAUTC and Penn State are contributing funds to this project.

University of Maryland and Virginia Tech Continue Work on Greenhouse Gas Emissions Reduction

Phase I of Tools to Support Greenhouse Gas Emissions Reduction has been completed. Greenhouse gas emissions associated with the transportation sector are directly correlated with fuel consumption, which is a function of fuel efficiency and vehicle miles traveled. In Phase I, researchers from the University of Maryland and Virginia Tech developed:

- Energy and CO2 emission models for light-duty gasoline vehicles;
- Agent-based routing strategies that incorporate energy and environmental impacts, which have been implemented in the INTEGRATION software;
- An eco-cruise control algorithm that uses grades to reduce vehicle fuel consumption levels;
- A predictive eco-cruise control system - the cruise control system is currently being tested on a Crown Victoria;
- The Carbon Footprint Estimation Tool for predicting or estimating the carbon footprint of construction and maintenance projects associated with roadways and other components of the transportation infrastructure; and
- The Optimal Equipment Selection Problem (OESP) decision support tool for optimizing the selection of equipment for various construction tasks so as to reduce overall emissions from construction projects.

In Phase II, the team will study the behavior of drivers and conventional cruise control systems to develop a base case for the estimation of alternative eco-driving strategies; estimate the benefits of a predictive eco-cruise control system; develop eco-drive logic and incorporate it into a traffic simulation; develop a portable simulation-based module for on-road GHG emissions estimation; analyze the impact of policies and programs for reducing on-road emissions and develop models for car ownership to analyze the impact of new technology vehicles acquisition.
Strong Turnout for Student Showcase at TRB Annual Meeting

More than 25 students presented research posters at the Larson Institute/MAUTC Student Showcase on January 25 at the Marriott Wardman Hotel.

Penn State
- Joseph Reiter: Crack Detection for Structural Health Monitoring of Concrete Pavements and Bridge Decks
- Mohammadreza Sharafbayani: 1. Prediction of Movement and Stresses in Curved and Skewed Bridges: Development of Representative Bridges (Mohammadreza Sharafbayani, Daniel Linzell, Abner Chen) and 2. Prediction of Movement and Stresses in Curved and Skewed Bridges: Parametric Studies (Mohammadreza Sharafbayani, Daniel Linzell, Abner Chen)
- Edward Vincent O’Hare: Computational Assessment of Steel-Jacketed Bridge Column Performance under Blast Loads
- Xiaochao Tang: Inverse Analysis of Flexible pavements from Lightweight Deflectometer Testing and Instrumentation Measurements
- Bo Zhang and Byung Do Chung: Robust Congestion Pricing Under Demand Uncertainty
- Scott Himes: SHRP 2 S-07B In-Vehicle Driving Behavior Field Study: Central PA Site
- Kun-Feng Wu: Defining, Screening, and Testing Crash Surrogate Using Event-based Naturalistic Driving Data
- Tejas Varunjikar: Super-elevation Criteria for Sharp Horizontal Curves on Steep Grades
- Shane Murphy: Skewed Steel Bridge Cross-Frame Response to Truck Loading
- Todd Rasey: Balancing Structural Safety and Physical Security within an LRFD Framework
- Nima Ostadi: Back-Calculation of Flexible Pavement Structural Properties using Artificial Intelligence Strategies
- Lin Yeh: Comparison of Matched and Mismatched Transverse Joints of Unbonded Concrete Overlays at the FAA NAPTFF
- Chen Chen: Multiday Driving Patterns: Driver Characteristics Research

University of Virginia
- Jeremy Schroeder: Inclusion of Economic Impacts for Prioritization of Infrastructure Improvements on Critical Freight Corridors
- Matthew Edwards: Feasibility of Developing a Telerobotic Platform for Bridge Inspection
- Jaehyun “Jason” So: Integrated GPS/INU Simulator for Enhanced Traffic Safety
- Peter Sauerwein: Exploration of Pavement Maintenance Applications Utilizing an IntelliDrive Data Environment
- Kristin Malakorn: Evaluation of IntelliDrive-Based Vehicle-Infrastructure Control Impacts using Traffic Simulation and Life Cycle Assessment

University of Maryland
- Rahul Nair: Equilibrium Network Design of Shared-vehicle Systems

Center for Transportation Studies Launches Transportation Training Academy

The Center for Transportation Studies (CTS) at the University of Virginia has launched the Transportation Training Academy. The Academy’s mission is to help transportation professionals enhance their knowledge and develop technical skills necessary to improve performance and accelerate advancement in their careers. The Academy is a result of the merger of two previous training programs offered by CTS: the Virginia Local Technical Assistance Program (VA-LTAP) and the Transportation Professional Development Program (TPDP). By merging these two programs CTS is better positioned to meet the technical transportation training needs of a wider workforce by offering a broader range of courses. The Academy’s new curriculum will be comprised of one, two, and three-day classes encompassing over 60 key topics in transportation. Courses are taught by University of Virginia faculty and other transportation experts and held throughout Virginia. Courses are targeted to a wide range of participants including road maintenance personnel, technicians, inspectors, planners, transportation engineers, public works directors, road builders and consultants.

The Center for Transportation Studies is a joint partnership between the University of Virginia’s School of Engineering and Applied Science and the Virginia Center for Transportation Innovation and Research (VCTIR), the research branch of the Virginia Department of Transportation.

U.Va.: Brian Smith is New CEE Department Chair

Professor Brian L. Smith, University of Virginia, was recently appointed CEE Department Chair, replacing Mike Demetsky. Dr. Smith has been a faculty member in CEE since 1998. Most recently, he was the director of the Center for Transportation Studies at the University of Virginia. He is an ASCE Fellow and recipient of the ASCE Huber Research Prize, the CUTC-ARTBA New Faculty Member Award, the NSF CAREER award, an Eno Transportation Leadership Fellow, and a 2001-2002 University of Virginia Teaching Fellow.

Virginia Tech
- Weihao Yin: Imputing Erroneous Data of Single-Station Loop Detectors: Comparison between Temporal and Spatial Methods
- Daniel Sonenklar: Determinants of Bicycle Commuting in Washington, DC
- Ismail Zohdy: Inclement Weather Impact on Driver Left-Turn Gap Acceptance Behavior
- Ahmed Amer: Stochastic Modeling of Driver Decision at the Onset of Yellow Indication at Signalized Intersections
- Raj Kishore: Traffic Adaptive Offset-Based Emergency Vehicle Preemption
Featured Students

Byungdo Chung graduated from Penn State in December 2010 with a Ph.D. in industrial engineering. He is currently a graduate researcher working on two MAUTC projects, Dynamic, Stochastic Models for Congestion Pricing on Congestion Securities and Large Scale Evacuation Transportation Systems: Robust Models and Real Time Operations under the direction of Dr. Tao Yao, associate professor in industrial engineering, and Dr. Terry L. Friesz, professor of industrial engineering. His primary interests are congestion pricing/options that can mitigate congestion as well as improve social welfare.

Kelly Donoughe’s primary area of interest is transportation safety. She graduated in Fall 2010 from Virginia Tech with a degree in civil engineering focusing on transportation systems. She received an award in the IRF student paper competition for the paper, “Verifying the Efficacy of Electronic Stability Control on Heavy Commercial Vehicles.” She is employed by SAIC and will begin a Ph.D. program in biomedical engineering to study injury biomechanics. In that field, she will study how the human body reacts during a crash in order to improve occupant protection systems and reduce injury and fatality rates.

Scott Himes is pursuing a Ph.D. in civil engineering at Penn State. His primary area of interest is the operational and safety effects of highway geometric design. He is currently working on the SHRP 2 Naturalistic Driving Experiment. Through this ground-breaking endeavor, researchers are hoping to have a more accurate understanding of how road crashes occur so that more effective countermeasures can be developed.

Brian Markovich is pursuing his M.S. in mechanical engineering at Penn State and expects to graduate in Summer 2011. Brian has been working on the project, Hydrogen Plant Module (HPM) and Vehicle Fueled by Same for the past 18 months under the direction of Dr. Joel Anstrom. “I have enjoyed working on hybrid vehicle systems. It gives you a chance to do modeling and analysis while still getting your hands dirty.” The project’s sponsors include U.S. DOT, Pennsylvania Department of Environmental Protection and Alloy Surfaces, Inc.

Shane Murphy is working with a team at Penn State researching the effects of increased heavy truck traffic on the local infrastructure in the Marcellus Shale region of Pennsylvania. He will graduate from Penn State in August 2011 with a M.S. in structural engineering and hopes to be employed by a bridge design firm.

Jeremy Schroeder is a fourth-year graduate student studying transportation in the Department of Civil and Environmental Engineering at the University of Virginia. He is pursuing a Ph.D. and plans to graduate by May 2012. Although he has many diverse interests within transportation, his current MAUTC-sponsored research seeks to measure the economic importance of freight highways based on the economic interdependence of the trucking sector with other industries and their commodities. This will then be applied to the prioritization of infrastructure needs on those freight corridors. The project is interesting to him because it helps to address the problem of our economy increasingly relying on aging infrastructure when budgets are unable to keep up with every infrastructure need.

Lekshmi Sasidharan is a Ph.D. student in civil engineering at Penn State focusing on geometric design and traffic safety. She expects to graduate this coming fall. Lekshmi was a student researcher on “Bead Gun Angle When Applying Glass Beads on Paving.” Her role in the project was to arrange and analyze the pavement marking detection distance data and retroreflectivity data for different combinations of paint truck speed and bead gun angles. The researchers determined the optimal combination of truck speed and bead gun angle that corresponded to maximum detection distance and minimum change in retroreflectivity over time. The findings will help PennDOT reduce the cost and maintenance of applying pavement markings. “I was really interested in this project because there were not many studies conducted on the optimum bead gun angle-truck speed combination that can be used by the crew while applying pavement markings on roads.”

Aly Tawfik is a Ph.D. student in civil and environmental engineering at Virginia Tech who will graduate in Fall 2011. His primary area of interest is in human travel behavior, and in particular, route choice and value of information. He is a founding member of the National Interdisciplinary Research Honor Society, Iota Delta Rho. In 2009/2010, he was the recipient of a Dwight David Eisenhower Transportation Graduate Fellowship.

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The MAUTC Partners:

Penn State (lead)

University of Maryland

University of Virginia

Virginia Polytechnic Institute and State University

West Virginia University

Strategic Alliances:

University of Delaware

Morgan State University

University of Pennsylvania

Featured Students (from page 3)

Ismail Zohdy is a Ph.D. student in transportation engineering at Virginia Tech. His areas of interest are intelligent transportation systems, agent-based modeling, human behavior, inclement weather impacts and gap acceptance modeling. He has a particular interest in driverless car studies. Ismail won several awards in 2010: International Road Federation (IRF) student essay competition, Virginia Section ITE (VASITE) Ken Wilkinson Continued Engineering Studies Scholarship, Paul E. Torgersen Research Excellence Award (College of Engineering), Graduate Student Assembly Research Symposium Award, and the Southern District ITE Outstanding Graduate Student Paper Award, 2009/10.

Student of the Year (from page 1)

of Professor Hesham Rakha. As part of his research, Ahmed conducted a large data collection experiment on the Virginia Smart Road, where he led a team of ten research assistants to conduct experiments on 30 test subjects over a six-month period. This study involved 180 two-hour driving sessions. He has four peer-reviewed papers published and another two papers accepted for presentation/publication.

He received his B.S. (with honors) and his M.S. degree in civil engineering from Cairo University, Egypt, in 2001 and 2006, respectively. During his academic career, Ahmed has won several awards and prizes for his outstanding academic and research performance. He is also an active member of the Alliance of Transportation Engineering Students (ATES) at Virginia Tech, in addition to serving as the Treasurer of an Egyptian Student Organization at Virginia Tech (Egypt Friends).

Final Reports

Real-time Rideshare Matching Problem, Keivan Ghoseiri, Ali Hagani, and Masoud Hamedi, University of Maryland

Passenger Demand Model for Railway Revenue Management, Cinzia Cirillo and Pratt Hetrakul, University of Maryland

An Integrated Economic, Land Use and Network Growth Model for Transportation Management and Policy Analysis in the Washington DC Area, Lei Zhang and Dilya Yusufzyanova, University of Maryland