Evolution of the Transportation Center

Eleven years ago, John Collura-of the New England Center and University of Massachusetts Amherst-and a colleague placed a video camera alongside the Coolidge Bridge, which connects Hadley and Northampton, Massachusetts. At the time, reconstruction of the bridge was causing heavy traffic congestion and the information relayed by the camera back to the UMass Transportation Center allowed observers to better estimate their commute time.

What began as a one-camera operation has grown into a longstanding collaboration between the University of Massachusetts, the Massachusetts Department of Transportation and the Regional Planning Agencies and Transit Authorities of Western Massachusetts. The Regional Traveler Information Center (RTIC) is housed in UMass’ Transit Bus Garage and collects data from 24 cameras streaming images of commuting routes to display real-time traffic flows on a website, www.masstraveler.com.

“I can go on my Blackberry, look at the queue and delay departure or seek an alternate route,” said Collura. Also on the site, travel times are estimated for Route 116 and Route 9, including the average speed of cars currently on Route 9. Updates are posted on traffic advisories and a bus tracker allows website visitors to see exactly where the bus is. Riders can text or email the RTIC to get bus arrival times.

Students in Collura’s Intelligent Transportation Systems class learn about the system first-hand. They install and upkeep the equipment, performing the type of work one expects from professional consultants. At the same time the program was gaining momentum, UMass Transit hired students to drive their bus routes part-time. To this day, UMass students (including more than a few transportation majors) drive the buses along the five-college bus route.

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Live feeds of key routes in the 5-College area offer real-time travel information.
Source: masstraveler.com
From the Director

At this year’s symposium we brought together leaders from multiple fields, such as the insurance and automotive industries, to discuss the future of the older driver from varying perspectives. The dialogue sparked conversation on a wide range of issues that arise as our driving population ages and our technology advances. We follow the same approach in our daily research as we study everything from how we watch the road to how we build the road. The innovations and advances the Center makes are largely due to a diverse team, which is made up of not only leading researchers, but students with differing skill sets and fresh ideas of how to better the world of transportation.

Without intentionally doing so, we have filled this issue with several accounts of the outstanding work of our students. You will read of how University of Massachusetts’ Regional Traveler Information Center is supported by students performing professional level maintenance on the equipment. We recount the events of the 19th National Conference on Rural and Intercity Bus Transportation, hosted by University of Vermont, during which their own New England Center-funded student was awarded first place in the student paper competition. And you will meet Tiyasha De Pinto, a TRC fellow who brings a unique background to commute pattern research, as well as Lisa Rayle, our 2010 UTC Outstanding Student Award recipient.

At the New England Center, open minds and creative spirit take our research into new and rewarding directions. I welcome any questions or comments regarding our work and look forward to continuing to break the boundaries of traditional transportation research.

Joseph F. Coughlin
Center Director & Policy Committee Chair, MIT

NEWS AND EVENTS

New England Center Schools Keep Open Dialogue

It may seem obvious that when our attention is divided our driving suffers, but how can we quantitatively measure these changes in attention? Reimer and his team collected data on skin conductance, heart rate and gaze dispersion to a minute degree. In a video he showed the students, an alert driver demonstrates constant and sweeping eye movement while fully focusing on traffic. He switches lanes often and is clearly alert to his surroundings. When the researchers engaged the driver in simple cognitive tasks, the driver’s gaze steadies and he no longer switches lanes.

The bottom line? “We do not multitask well,” said Reimer. And it takes us some time to fully focus again: “In the two minutes post-cognitive task, skin conductance is still elevated,” he explained. In other words, the effects of a distraction linger even after the task is completed.
My name is Tiyasha De Pinto, and I am currently pursuing a Master’s Degree in Public Administration at the University of Vermont (UVM). After graduating in 2006 from the University of California, Berkeley, with a Bachelor of Arts Degree in Psychology, I worked for 4 years as a case manager for the Restorative Justice Program at a non-profit organization in California. As a Transportation Research Center fellow of the research group of Dr. Asim Zia at the UVM, I am currently studying the funding and governance structures of Metropolitan Planning Organizations (MPOs) as well as socio-economic determinants of “journey to work” commute patterns. My interests lie in researching the relationship between the MPOs’ funding strategies and the actual MPO’s projects, as well as examining the extent of accountability of the funded organizations and their decision-making capabilities. My work also includes the analysis of the American Housing Survey (AHS) data in studying the travel modal choice decision-making patterns of workers between the ages of 16 and 65 years old in the United States.

Born and raised in Sri Lanka, I lived in Namibia, Malawi and Australia before moving to California with my family in 2001. In part, my life experiences in those countries proved invaluable for me in choosing to explore the realm of non-profit organizations and, eventually, choosing to work on transportation-associated issues that are urgent both in developing and developed economies, such as land use for transportation, traffic congestion, and the impact of MPO’s on transportation projects.

On the other hand, the TRC fellowship proved to be an excellent opportunity for me to expand my knowledge in the operation and efficacy of non-profit organizations and explore an entire new spectrum of decision-making procedures and means of function of inter-governmental bodies.
NEWS AND EVENTS

Symposium Addresses Older Driver Well-Being

The New England Center hosted the symposium “Convergent Opportunities or Collision Course? Age, Health & New In-Vehicle Technologies” on November 15. The event brought together policy makers, researchers, commercial firms and the public to discuss the trends and implications of aging and health on individual performance and transportation systems safety from the older automobile driver to the aging motor carrier, rail and transit operator over the next 10 years. Topics included in-vehicle systems, which offer both improvements in performance as well as increases in demand upon the driver’s capability to learn, trust and adopt new technology, as well as manage more information while safely driving. Operator well-being was also of concern, and intervention opportunities in passenger, transit and commercial carriers were considered.

The conference was free and open to the public and featured a luncheon speech from Scott Belcher, President and CEO of ITS America. Panel speakers included Ann Dellinger of the Center for Disease Control, Elinor Ginzler of the AARP, Stephanie Binder of the National Highway Traffic Safety Administration, Pamela Kramer of GreenRoad and James Purvis of Healthways, among others.

PowerPoint presentations given by many of the speakers, as well as videos of interviews held during the event, are available at agelab.mit.edu/driverwell-being.

RESEARCH PROJECT HIGHLIGHTS

University of Vermont Hosts Event for Rural and Intercity Bus Transportation

University of Vermont hosted the 19th National Conference on Rural and Intercity Bus Transportation, with over 320 people from around the nation in attendance. Held every two years, the conference offered a valuable experience for rural, human service, and tribal transit managers, planners, state agency staff, intercity bus operators, consultants, researchers and trainers. The UVM Transportation Research Center (TRC) facilitated the welcome session with Senator Bernie Sanders and keynote speaker David Blittersdorf, President and CEO of AllEarth Renewables. A Town Hall Session on Livability featured TRC Director Lisa Aultman-Hall, FTA Deputy Administrator Therese McMillan, Senior Advisor for Accessible Transportation to the US Secretary of Transportation Richard Devylder (via Skype) and CCTA General Manager Chris Cole. In addition to the above sessions, TRC staff, associated faculty, and advisors facilitated, moderated and presented at many of the 30 individual sessions.

“Hosting a national TRB conference was a great way to bring value to our community by providing the latest in best practice and current research for our regional rural transit and human service transit providers, planners, state agency staff, intercity bus operators, consultants, researchers and students,” said Karen Giltman, Program Manager at UVM’s Transportation Research Center.

New England Center-funded student Nathan Belz of UVM was awarded first place in the student paper competition. Nathan Belz’s paper and presentation were entitled, “Transit-Supportive Zones and Demand Potential in Vermont”. He addressed the challenge of developing rural transportation systems—long travel distances and low density—by using spatial analysis to determine the arrangement of transit demand potential in rural Vermont. He identified Transit-Supportive Zones (TSZs), within which 21% of current vehicle-miles traveled in Vermont occur.
The New England Center Announces This Year’s Research Projects

The New England University center’s research projects for the 2010-2011 academic year were awarded following a competitive evaluation and review process. Following is a list of the projects.

Massachusetts Institute of Technology
- Capturing Wellbeing in Activity Pattern Models
  Within Activity-Based Travel Demand Models
  Prof. Moshe Ben-Akiva

Massachusetts Institute of Technology
- Caregiver Information Search Behavior
  for Alternative Transportation
  Dr. Joseph Coughlin

Massachusetts Institute of Technology
- AGNES and Livable Communities
  Dr. Joseph Coughlin

Massachusetts Institute of Technology
- Planning for the Future: The Role of Mobility in Residential and Lifestyle Choices of Baby Boomers and Older Adults
  Dr. Lisa D’Ambrosio

Massachusetts Institute of Technology
- Linking Mileage to Auto Accident Risk and Urban Form
  Prof. Joseph Ferreira Jr.

Massachusetts Institute of Technology
- Evaluation of a Natural Speech Based Informational Inquiry System as a Potential Means to Increase Transit Utilization
  Dr. James Glass

Massachusetts Institute of Technology
- Individual Differences in Peripheral Physiology and Implications for the Real Time Assessment of Driver State
  Dr. Bryan Reimer

Massachusetts Institute of Technology
- Transportation Strategy Development
  Under Economic Uncertainty
  Prof. Joseph Sussman

Massachusetts Institute of Technology
- Travel Behavior of the Aging Boomers: Evidence from Naturally Occurring Retirement Communities (Phase IV)
  Prof. Christopher Zegras
  Prof. Eran Ben-Joseph

Massachusetts Institute of Technology
- Assessing Methods of Enhancing Older Driver Performance
  Bruce Mehler
  Anya Potter

Harvard Kennedy School
- Transparency in Transportation: User Power and Public Accountability
  Archon Fung
  David Luberoff, Executive Director

Harvard University
- Crisis Management in Transportation:
  Building Capacity through Exercises
  Dr. Arnold M. Howitt

University of Connecticut
- The Influence of Real-Time Rural Transit Tracking on Traveler Perception
  Prof. Nicholas Lownes
  Assistant Professor Adam M. Zofka, Ph.D.

University of Massachusetts Amherst
- Characterizing Traffic under Uncertain Disruptions:
  An Experimental Approach
  Dr. Song Gao

University of Massachusetts Amherst
- Stochastic Fundamental Diagram for Probabilistic Traffic Flow Modeling
  Prof. Daiheng Ni
  Prof. John Collura

University of Rhode Island
- Assessment of Older Driver Performance Under Low Level Alcohol Impairment
  Professor Mark Wood
  Professor Manbir Sodhi

This year, the New England Center is funding the following Education Project.

Harvard University
- Teaching Cases on Transportation & Global Warming
  Prof. Jose Gomez-Ibanez
Comparing traffic statistics from the United States and other countries shows some startling gaps in numbers. In Norway, every man, woman and child travels an average of 10 miles daily, while in the US this number is closer to 25. In 1970, both the US and The Netherlands saw 25 traffic fatalities per 100,000. In The Netherlands this number dropped by 20, whereas the US has only seen a decline of 10.

New England Center and University of Connecticut researcher Norman Garrick says many of these poor statistics can be attributed to street network properties, such as total number of lanes, on-street parking, bike lanes and intersections per square mile. Garrick, along with Wesley E. Marshall of the University of Colorado Denver, studied the fatality rates of California cities, running travel choice analyses as well as safety analyses based on geo-coding 230,000 accident records.

One particular change in street layout made a clear difference in accident statistics. The grid of pre-1950 was abandoned for cul-de-sacs with curvy roads and fewer intersections.

“There is no question that the Federal Housing Authority contributed to getting rid of the grid,” said Garrick, “Layout was considered monotonous, had little character, uneconomical, posed safety concerns.” But Garrick’s research found these safety concerns to be misguided. “The chances of being severely injured are 30% higher and the chances of being killed are 50% higher” in a non-grid system of roads, he said.

“Our results indicate that the highest risk of fatal or severe crashes occurs with very low street network density and safety outcomes improve as the intersection density increases,” Marshall and Garrick wrote in their article entitled, “Street network types and road safety: A study of 24 California cities”.

Garrick’s portrayal of changing street design.
Source: Norman Garrick
A slide presentation of the study can be found at: http://www.slideshare.net/CongressfortheNewUrbanism/norman-garrick-cnu-2009
New England Center Releases Findings on Park-Assist Technologies

Findings from New England Center research were released in a press release by Ford Motor Company and a feature article in Wired entitled, “Tech-Aided Parking Lowers Your Heart Rate”.

Using a specially equipped 2010 Lincoln MKS test vehicle, New England Center researchers teamed up with Ford Motor Company to measure and monitor physiological changes during and following the completion of driving challenges, including parallel parking and backing out of a concealed parking space.

Through biometric results as well as self-perception evaluations, the research measured the impact of new parking technologies on stress levels. A white paper describing the results of two experiments were released by the New England Center. The on-board technologies included Ford’s Active Park-Assist feature, which steers the vehicle when parallel parking. The feature was found to significantly reduce stress on drivers compared to manual parallel parking.

When using the Active Park Assist feature, there was a 12 beats per minute reduction in heart rate while parking, and an average 3.4 beats per minute reduction in anticipating parking, in comparison to manual parking.

“This represents an important step in enhancing the design of future technology, improving safety, minimizing stress and contributing to well-being,” said Bryan Reimer, one of the principal researchers for the project.

Researcher Bruce Mehler added that the future of in-car technologies depends heavily on the car being aware of driver state and responding to it.

“If you can detect change, then you can do something about it,” he said. New England Center researchers believe recognizing and addressing driver state will improve well-being behind the wheel and overall.

Links to the white paper, Wired article and press release, can be found at utc.mit.edu keyword: Ford press release.

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About the New England University Transportation Center

The New England University Transportation Center employs research and innovative technology to improve transportation system management. Its research and technology transfer serve as groundwork for progressive safety measures and for increasing the efficiency of the nation’s roads and mass transit systems.

The center’s research investigates how changes in the age distribution of the nation's population and changes in technology, infrastructure, global climate, economics and politics affect transportation systems. The New England Center will use this research to educate future transportation professionals and leaders responsible for tackling transportation challenges of today and tomorrow.

In addition to these education goals, the New England Center has a mission to influence the transportation agenda and develop and disseminate new methodology and tactics for strategic change. The New England Center is part of the national UTC program. Massachusetts Institute of Technology is the lead university in the consortium, which also includes Harvard University, and the state universities of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

The New England Center will use this research to educate future transportation professionals and leaders responsible for tackling transportation challenges of today and tomorrow.

About MIT’s Center for Transportation and Logistics

MIT’s Center for Transportation and Logistics is part of the Engineering Systems Division in the School of Engineering. The center is widely recognized as an international leader in the field of transportation and logistics.

The CTL facilitates a basic understanding of transportation systems planning, operations and management, and the center makes significant contributions to logistics modeling and supply-chain management for shippers, to technology and policy analysis for government, and to management, planning and operations for trucking, railroad, air and ocean carriers.

In addition to administering the Master of Engineering in Logistics program, the center helps coordinate the extensive transportation and logistics research conducted throughout MIT. At any given time, research initiatives typically number more than 100 and range from modest projects involving a single faculty member and a few students to large-scale international programs involving scores of people and a full-time research staff.

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