

**Program Progress Performance Report
for the
New England University Transportation Center
Massachusetts Institute of Technology**

**Federal Grant DTRT13-G-UTC31
Grant Period: September 1, 2013 - September 30, 2017**

Reporting Period: October 2015 - March 2016

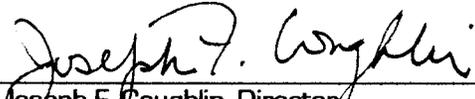
**Submitted to
US Department of Transportation
Office of the Assistant Secretary for Research and Technology (OST)
May 1, 2016**

Project Title
University Transportation Centers Program - Region 1

DUNS number
00-142-5594

EIN number
04-210-3594

Recipient Account No
6928838



Joseph F. Coughlin, Director
coughlin@mit.edu
617.253.4978

Massachusetts Institute of Technology
77 Massachusetts Avenue, E40-279
Cambridge, MA 02139

REPORTING CATEGORIES

1. Accomplishments

1A. Research Projects

Major goals as stated in New England UTC Prospectus

Research Goal

- To conduct research in technology applications and systems integration with related work in policy, planning and human factors that improve transportation safety as well as further our understanding and realization of livable communities to support mobility across the lifespan.
- To support peer-reviewed investigations that address safety and livability by exploring and furthering research, policy, and practice in the application of ubiquitous intelligence, use of big data, and improved human performance

Following is the list of the 37 research projects under this grant, and their current status:

Project No.	PI	Project Title	Status
MITR25-1	Abou-Zeid Ben-Akiva	Capturing the Relationship between Social Interaction and Travel Behavior Using Smart Phones	active
MITR25-2	Caplice Caballero	High-Resolution Urban Freight Modeling in Cambridge, MA	active
MITR25-3	Coughlin	Assessing Navigatability and Livability of Public Transportation Systems	active
MITR25-4	Ellis Lavalliere	Transportation Workforce Health and Wellbeing	active
MITR25-5	D'Ambrosio	Understanding the Adoption of and Education about New Auto Technologies among Older Adults	active
MITR25-6	Frazzoli	Modeling the Impact of One-Way Car Sharing: An integrated data- and optimization-driven approach	active

MITR25-7	Goentzel	Fusing Structured and Unstructured Transportation Data for Decision-Making in Crisis	active
MITR25-8	Gonzalez	Coupled Mobility Networks: A Data Driven Approach	active
MITR25-9	Isaacson	Out and About in New England: Maintaining Active Life styles in Later Life	active
MITR25-10	Lee	Effectiveness of Various Information Channels on User Training and Learning in Automobiles	active
MITR25-11	Osorio	Optimal Road Traffic Operations for an Increasingly Autonomous and Connected Vehicle Fleet	active
MITR25-12	Pentland Shmueli	Incentivizing Safer Driving Using Peer-Pressure	active
MITR25-13	Reimer Dobres	Assessing the Effect of Typography on In-Vehicle Glance-Like Reading Across the Lifespan	active
MITR25-14	Salvucci Murga	MALL Transit and Wider Economic Benefit Assessment	completed
MITR25-15	Sussman	Hub Stations As Catalysts for Regional Growth: The Case of New York Penn Station	active
MITR25-16	Trancik	From Trip Data to the Energy Requirements of Personal Vehicle Travel	active
MITR25-17	Zegras Pereira	Scenario Discovery for Resilient Urban Systems (or, The Future is "Big Data")	active
MITR25-18	Zhao	Humanizing Travel: How E-hail Apps Transform Stakeholder Relationships in Taxi Services	active
HVDR25-19	Glaeser	Transportation Stimulus Spending and Long Term Unemployment	active

HVDR25-20	Gomez-Ibanez Fagan	The Experience with Managed Toll Lanes	active
HVDR25-21	Howitt	Recreating Livable Communities after Catastrophe: Managing the Recovery from Japan's Earthquake, Tsunami, and Nuclear Disaster of 2011	active
HVDR25-22	Mayne	The Politics of Transport Policy in the Greater Copenhagen Region, Part 2	active
HVDR25-23	Shoag	The Local Effects of the American Recovery and Reinvestment Act on Economic Activity and Traffic Safety	active
UMAR25-24	Christofa Knodler	Operational and Emission Analyses of Roundabouts under Varied Vehicle and Pedestrian Demands	active
UMAR25-25	Fisher Knodler Zafian	Evaluating the Effect of Google Glass on Driver Distraction	active
UMAR25-26	Gao	Routing Policy Choice Models in Stochastic Time-Dependent Networks: The Stockholm Case Study	active
UMAR25-27	Gonzales	Route Choice in Congested Grid Networks	active
UMAR25-28	Knodler Fisher	A Driving Simulator Evaluation of Driver Distraction and Traffic Control Device Comprehension for At-Grade Railroad Crossings	active
UMAR25-29	Krishnamurty	An Innovative Design to Retrofit Seatbelts in Motorcoaches	active
UMAR25-30	Ni Wang	Supplementary Vehicle Positioning to Connected Vehicles	active
UCNR25-31	Atkinson-Palombo Garrick	A Multi-Scalar Model to Identify the Causes of Decreased Vehicle Miles Traveled (VMT) in the United States	active
UCNR25-32	Garrick Atkinson-Palombo	Factors Contributing to the Decrease in Traffic Fatality Rates for Young People in America	active

UCNR25-33	Ivan Ravishanker Townsend	Social Network Effects on Attitudes about Pedestrian Street Crossing Behavior	active
UCNR25-34	Konduri Dalal	Exploration of Human Psychological Factors Underlying Mobile Phone Usage Behaviors while Driving	active
UCNR25-35	Lownes	Clustering Algorithms for Transit Network Design	active
UMER25-36	Garder	Deficient Bridges and Safety Information	active
UMER25-37	Rubin Garder	Automated Vehicles: Economic Incentives for Environmental Benefits and Safety	active

Accomplishments under the New England UTC's research goal

Research Offers Guidance for Establishing Parking Standards October 1, 2015

A majority of American cities specify minimum parking requirements in local zoning codes, even in areas served by a variety of travel options. Little work has been done to understand how aggregate parking supplies compare to requirements in urban areas or to evaluate the potential impacts of meeting parking requirements in these places. Research project UCNR24-28 (The Impact of Parking Policies on the Long-term Vitality of American Cities) tracks changes in parking supplies and the built environment in six urban business districts between 1960 and 2000. It also offers a summary of parking requirements in each city and compares those requirements to actual supplies. The research performed demonstrates that parking requirements can only be met through a combination of costly parking infrastructure and considerable commitments of land. By quantifying existing parking supplies in urban areas and evaluating the potential impacts of increasing those supplies, this work offers guidance and justification for establishing parking standards that conform to long-term transportation and development goals.

The Critical Retirement Cost many Advisers aren't Discussing with Clients October 12, 2015

Speaking to InvestmentNews, New England UTC Director Joseph Coughlin contributes some thoughts on "[The Critical Retirement Cost many Advisers aren't Discussing with Clients.](#)" When advisers think about the top expenditures for clients in or near retirement, many may not consider transportation. They should. Transportation is the second-highest expenditure for Americans age 65 and older, behind housing and just ahead of health care, and is something advisers need to factor into a financial plan.

A Clearer Picture of How Highway Construction Supports Jobs

Research project HVDR25-19 evaluates how effective Recovery Act highway infrastructure spending was at creating construction jobs and boosting overall employment growth in the wake of the 2008 recession. We employed a newly constructed dataset containing the

detailed site locations and the locations of contractors' offices for all highway construction projects funded by the Recovery act to confront several challenges that have arisen in previous attempts to evaluate the employment effects of stimulus spending. Our clearest finding is that road construction projects have little to no impact on employment by employers in the locale of the project, whether defined as the county or broader commuting zone of the project.

Cascading Survey of Stated Pedestrian Behavior Pilot-Tested Online

The research team for Project UCNR25-33 (Social Network Effects on Attitudes about Pedestrian Street Crossing Behavior) has prepared and pilot-tested an online cascading survey of individual attitudes and behavior regarding crossing urban streets as a pedestrian at signalized intersections.. We hired a contractor, Intellitics, Inc., to prepare the online version of the survey to be conducted using the proposed cascade sampling framework. The survey was piloted with colleagues and acquaintances of a faculty member at Manchester Community College (MCC) in Manchester, Connecticut. We have written SAS code to download the survey data and texts from discussions (collected by Intelletics and made available as google docs) into csv files ready for analysis.

Project MITR25-4

Transportation Workforce Health and Wellbeing

To begin understanding and addressing the challenges associated with the aging transportation workforce, a literature review has been conducted. Data analysis is ongoing and has begun by analyzing data surrounding well-being of transportation workers compared to other industries. Our analysis has found that transportation workers report lower levels of work environment well-being than other industries; therefore, further analysis is being done to understand what contributes to these differences.

Project MITR25-5

Understanding the Adoption of and Education about New Auto Technologies among Older Adults:

Data collection with 302 drivers between the ages of 50 and 69 is complete. Data collection was conducted in the metro-Chicago and metro-Boston areas in spring 2015. People viewed a video that described seven different new auto technologies. While watching the video they reacted to it using a moment-to-moment handheld dial controller. They also completed pre- and post-test questionnaires and a conjoint analysis. Analysis of the data is continuing as we draft a paper for submission for publication and prepare to present results from the study at the Human-Computer Interaction International Conference 2016 in July in Toronto.

Project MITR25-10

Effectiveness of Various Information Channels on User Training and Learning in Automobiles

The identification of metrics and development of an online experiment was accomplished. Based on a survey of literature on technology adoption, consumer education, user experience and automotive interfaces, metrics for measuring user perceptions, attitudes and behavioral intentions at various points during user's exposure to new information have been identified, defined and written into a questionnaire. An online experiment has been designed using the questionnaire designed with the metrics and measures identified.

Project UMAR25-28

A Driving Simulator Evaluation of Driver Distraction and Traffic Control Device Comprehension for At-Grade Railroad Crossings

A first-of-its-kind rail simulation model has been fully constructed in a virtual driving environment. The precisely constructed scenarios carefully sequence the movement and placement of virtual objects in the presence of railroad crossings to test driver attention, visual detection and the effect of distraction. After several pilot subjects, the scenarios are

operating as intended and the research results are forthcoming. Over 60 participants will be recruited for this phase of the project.

How the New England UTC's research results have been disseminated

National Public Radio Station Shares Study

WNPR, the Hartford, CT-based National Public Radio station, learned about Project UCNR25-33 (Social Network Effects on Attitudes about Pedestrian Street Crossing Behavior) through one of the cascading invitations from the MCC participants and contacted co-PI Townsend about the study. Townsend and Ravishanker participated in an interview and the reporter shared Ivan's and Ravishanker's previous research that led to the need for the current work. The report was originally published by WNPR on February 16, 2016 and later re-blogged at Zoned: A blog about land use, transportation, and the built environment in Connecticut and elsewhere.

Project MITR25-10

Effectiveness of Various Information Channels on User Training and Learning in Automobiles

The online experiment mentioned above, which contains user education and training materials, will be distributed to a nationwide sample of adult drivers across the United States. As participants of the online experiment, they will have a chance to learn more about available in-vehicle technologies and think about how they perceive different features.

Project MITR25-17

Scenario Discovery for Resilient Urban Systems (or, The Future is "Big Data")

We presented our vehicle ownership modeling analysis at TRB in January 2016 at a session on incorporating uncertainty in models. Our modeling progress has continuously been shared with MAPC, the Boston MPO (CTPS) and the city of Boston (particularly interested in our model analysis of sea level rise). The model inputs and basic forecasts are also being incorporated into a major mid-term assignment for a graduate-level land use-transportation planning class taught by the PI (Zegras) this Spring Semester.

Project UMAR25-27

Route Choice in Congested Grid Networks

Findings of the research have been presented in three presentations at the 95th Annual Meeting of the Transportation Research Board. The audience at the conference included transportation researchers as well as representatives from industry and public agencies. The results presented included core theoretical contributions to modeling equilibrium choices made by a population of heterogeneous individuals as well as applications to pressing transportation problems of morning congestion and peaks in paratransit system demand. The paratransit paper initiated a conversation about the feasibility of charging time-varying prices for ADA paratransit services, which can theoretically improve the quality of service for users while keeping operating costs from increasing.

Project UMAR25-29

An Innovative Design to Retrofit Seatbelts in Motorcoaches

The developments are described in recent articles on the UMass campus website, the website of American Society of Mechanical Engineers, and in local newspapers, such as MassLive, the Greenfield Recorder, and the Springfield Republican. During the NSF I-Corps program, the commercialization potential was presented at nine different stages of the customer discovery process to program directors, instructors and other participants. During that time in October, an update of this project was presented to over twenty attendees at NTSB in Washington DC. Since then, a combination of both the technical progress and

market potential has been presented to key identified and invited stakeholders in the motor coach industry at: the ABA Marketplace in Louisville in January, the UMA Expo in Atlanta in February, and the DATTCO expo in CT in March.

Plans during the next reporting period to accomplish the New England UTC's research goal

No change on our major goals contained within our approved Application.

1B. Education Projects

Education & Workforce Goal

- To introduce transportation to all levels of education: K-12, undergraduate, graduate and continuing education.
- To place graduates into transportation fields.
- To provide current and developing methods, tools and insights to today's transportation workforce to support their capacity to build, operate and manage a safe and efficient transportation system.

Following is the list of the 2 education projects under this grant, and their current status:

Project No.	PI	Project Title	Status
HVDE25-38	Howitt	Teaching Case Study on Korea Ferry Disaster of April 2014	active
HVDE25-39	Davis Altshuler	Transforming Urban Transport: a Set of Case Studies	active

Accomplishments under the New England UTC's education goal

Harvard University Teaching Case Study featured in UTC Spotlight newsletter

A summary of the case study (from education project HVDE25-38) was written by Dr. Howitt and featured in the January 2016 edition of the *UTC Spotlight* newsletter. A full draft of the case study has been prepared, and during this reporting period it was readied for fact-checking and final review in preparation for publication. It was used as curriculum, in draft form, for a fall semester graduate-level course offered by the project P.I. at the Harvard Extension School.

http://www.rita.dot.gov/utc/sites/rita.dot.gov.etc/files/utc_spotlights/pdf/spotlight_0116_1.pdf.

Cole Fitzpatrick named 2015 UTC Student of the Year November 25, 2015

Cole Fitzpatrick is a Ph.D. candidate at The University of Massachusetts, Amherst where his work focuses on roadway safety and human factors. He was awarded the 2015 UTC Outstanding Student of the Year Award by the New England University Transportation Center at MIT for several reasons. He combines research, academic performance, professional contributions both within and outside of academia, and leadership characteristics. His work on driver behavior spans several topics of interest to the transportation and policy communities, including the maintenance of roadways and their surrounds, driver distraction, and individual safety. His research, academic record, professional experience and student leadership in the field of transportation studies all contributed to him receiving this award.



In 2014, Mr. Fitzpatrick was awarded, an NSF Innovation Corps grant. This led to him receiving a fellowship in 2015 from the UMass Isenberg School of Business to continue this work. He also served as the UMass Institute of Transportation Engineers (ITE) Student Chapter President during 2014-15. In addition to receiving the Outstanding Student Paper Award from the ITE Northeastern District, UMass was named ITE Student Chapter of the Year in the Northeastern District. Mr. Fitzpatrick's leadership extended beyond ITE as he also served on the Graduate Student Senate in the Civil and Environmental Engineering Department. This leadership experience led to him being selected as an Eno Fellow, and attend the Eno Future Leaders Development Conference where he had the opportunity to learn about the top transportation issues facing Capitol Hill, and meet Secretary Anthony Foxx.

Project MITR25-15

Hub Stations As Catalysts for Regional Growth: The Case of New York Penn Station

Rebecca Heywood, a dual Master of Science in Transportation/ Master of City Planning student will submit her thesis in June 2016 for both degrees marking a major milestone in our research on this project. Working with her and under the supervision of Professor Sussman is Daniel Mascoop who will receive his Bachelor degrees in both Civil and Environmental Engineering and Urban Studies and Planning Transport, also in June 2016. It is expected that Mascoop will continue to advance this research into the immediate future.

Project HVDR25-21

Recreating Livable Communities after Catastrophe: Managing the Recovery from Japan's Earthquake, Tsunami, and Nuclear Disaster of 2011

Professor Howitt, has disseminated research results for this reporting period by incorporating lessons learned from Japan's recovery into the curriculum for two graduate-level management courses he teaches at the Harvard Extension School and into a suite of Harvard Kennedy School Executive Education programs for senior practitioners from a range of disciplines, but primarily representing public safety, emergency management, and homeland security. In addition, research findings were highlighted at a conference co-organized by Professor Howitt ("Accelerating Disaster Recovery"), which was held on January 22, 2016 at Harvard University and included political leaders, academics, and practitioners with experience in disaster recovery from around the world.

1C. Technology Transfer Projects

Technology Transfer Goal

- To increase the awareness and level of information concerning transportation issues facing New England.
- To further our well-established technology transfer and outreach activities.
- To engage the public and private transportation sectors throughout the New England Region and the nation.

Following is the list of the 2 technology transfer projects under this grant, and their current status:

Project No.	PI	Project Title	Status
MITT25-43	Coughlin	MIT Centralized Technology Transfer Initiatives	active
UMAT25-44	Collura	UMass Centralized Technology Transfer Initiatives	active

Accomplishments under the New England UTC's technology transfer goal

Project UMAT25-44

UMass Centralized Technology Transfer Initiatives

The focus of this initiative is on workforce development. A major activity included the preparation of a research needs statement (RNS). The significance of this RNS is that it is intended to identify workforce development strategies to help build career pathways in surface transportation for youth, second career professionals, veterans, and encore careerists. The RNS has been submitted to the TRB Education and Training Committee for their review and support. Another major activity includes working with the MBTA to establish middle school and high school outreach programs in the Springfield area in coordination with the construction of the MBTA Rail Car Assembly Plant being designed and constructed by the Chinese National Railroad. The significance of this activity is that it will make young people aware of the career paths in the transit industry. The World is Our Classroom, a local outreach program has been engaged to work with local Chicopee and Springfield, MA schools. A third activity includes the development of an engineering design and construction documents for the Aviation Center at the Westover Air Reserve Base in Chicopee. The significance with this activity is that the Center will provide training to former military air traffic controllers who are on a career pathway to become gainfully employed as civilian air traffic controllers. A \$3 million proposal was prepared and submitted to the Buehler Foundation to procure a 360 degree air traffic control simulator which will be used for training purposes.

2. Products

Journal publications

Ahangari, H., Atkinson-Palombo, C., Garrick, N.W., "Progress Towards Zero, An International Comparison: Improvements in Traffic Fatality from 1990 to 2010 for Different Age Groups in the USA and 15 of its Peers", *Journal of Safety Research*, April 2016.

Amirgholy, M., Gonzales, E.J. (2015). Demand responsive transit systems with time dependent demand: User equilibrium, system optimum, and pricing. *Transportation Research Part B*, doi:10.1016/j.trb.2015.11.006.

Daniel Shoag and Erich Muehlegger "Cell Phones and Motor Vehicle Fatalities" *Procedia Engineering* 78, p. 173-177, September 2014 (also available on Science Direct).

Daniel Shoag and Erich Muehlegger "Commuting Times and Land Use Regulations", *Procedia Engineering* (2015) .488-493 (also available on Science Direct).

Garceau, T., Atkinson-Palombo, C., and Garrick, N., Peak Car Travel in the United States: A Two-Decade Long Phenomenon at the State Level *Transportation Research Record*, (Accepted 03/15).

Garceau, T., Atkinson-Palombo, C., and Garrick, N., Peak Travel and the Decoupling of Vehicle Miles Travelled and Gross Domestic Product: A Synthesis of the Literature, *Transportation Research Record: Travel Behavior* (2014), 1, 2412, 41-48.

Han, Y. and C. Zegras. Exploring Model Uncertainty and Behavior Uncertainty– A Temporal Transferability Assessment of Vehicle Ownership Models for Boston Metropolitan Area. Accepted for publication in the *Transportation Research Record*.

Miotti, M., Supran, G., Kim, E. & Trancik, J.E. Personal vehicle technologies evaluated against climate change mitigation targets. *In review*.

Needell, Z. A., McNerney, J., Chang, M. T., Miotti, M. & Trancik, J. E. TripEnergy: Estimating POV energy consumption given limited travel survey data. *In Preparation*.

Needell, ZA; McNerney, J; Chang, M; Trancik, JE, Potential for widespread electrification of personal vehicle transportation in the United States, in revision (Nature Energy)

Books, dissertations, or one-time publication

Amirgholy, M. (2016). Modeling Choice Problems with Heterogeneous User Preferences in the Transportation Network. Ph.D. Thesis. University of Massachusetts, Amherst
Davis, Diane and Flores Dewey, Onesimo. "Strategies for Constructive Change." *Volvo Research and Educational Foundations*, July 6, 2015:
<http://www.vref.se/publications/researchbriefs/researchbriefsmac/strategiesforconstructivechange.5.76b58ed114e4e6438c26fbee.html>

Ding-Mastera, J. (2016) Adaptive Route Choice in Stochastic Time-Dependent Networks: Routing Algorithms and Choice Modeling. Ph.D. Dissertation. University of Massachusetts, Amherst, MA.

Garceau, T. PhD Dissertation on “Vehicle Miles Travelled: An Analysis of Trends and Implications”, August 2015.

Garceau, T. PhD Dissertation on “Vehicle Miles Travelled: An Analysis of Trends and Implications”, August 2015.

Hamed Ahangari. PhD Dissertation on “A Comprehensive Comparative Assessment of Road Safety in Developed Countries”, August 2015. PhD Conferred. PhD Student, Hamed Ahangari accepted a position as Post-Doctoral Fellow at UConn starting 11/16.

Han, Yafei. 2015. Temporal Transferability Assessments of Vehicle Ownership Models and Trip Generation Models for Boston Metropolitan Area. Masters Thesis, MIT, June 2015.

Needell, ZA (Advisor: Trancik, JE), Technology Evaluation for Personal Vehicle Travel: Electric Vehicle Energy Requirements Under Real-world Use, M.S. in Transportation, MIT
Posada, Pablo. 2015. Location, Location, Location Choice Model. Masters Thesis, MIT, June 2015.

Other publications, conference papers and presentations

Amirgholy, M., Gonzales, E.J. (2016). An analytical solution to the morning commute problem for a single bottleneck with heterogeneous commuter preferences: User equilibrium, system optimum, and pricing. Paper Number 16-5834. *Transportation Research Board 95th Annual Meeting*, 10–14 January, Washington, D.C.

Amirgholy, M., Gonzales, E.J. (2016). Efficient frontier of route choices under travel time variability. Paper Number 16-5800. *Transportation Research Board 95th Annual Meeting*, 10–14 January, Washington, D.C.

Amirgholy, M., Gonzales, E.J. (2016). Operation and management strategies for demand responsive transit systems with time-dependent demand. Paper Number 16-4579. *Transportation Research Board 95th Annual Meeting*, 10–14 January, Washington, D.C.

Arnold M. Howitt. January 2016. “Case Study of Maritime Disaster Yields Learning Tool,” *UTC Spotlight*, available at http://www.rita.dot.gov/utc/sites/rita.dot.gov.utc/files/utc_spotlights/pdf/spotlight_0116_1.pdf

Arnold M. Howitt. January 22, 2016. “Accelerating Disaster Recovery: Strategies, Tensions, and Obstacles,” conference presentation at Harvard University, Cambridge, MA [participated on two panels: “Tensions in Disaster Recovery” and “Governance of Disaster Recovery”]
Caballero & Ponce (2016). High-Resolution Urban Freight Modeling, presented at the 2016 MIT SCALE (Supply Chain and Logistics Excellence) Latin America Conference hosted at the MIT campus in Cambridge, MA, on March 21-22, 2016.

Caballero & Ponce (2016). High-Resolution Urban Freight Modeling. Accepted. To be presented at POMS (Production and Operations Management Society) 27th Annual Conference that will take place in Orlando, FL, on May 6-9, 2016.

Central Connecticut State University 3/23/15: Research Talk on Peak Car Travel Explaining Peak Car Travel: Analyzing State-Level Patterns to Identify Factors Related to Driving Reductions in the United States. *Association of American Geographers 2015 Annual Meeting*, Chicago, IL [Apr. 2015].

Han, Y. and C. Zegras. Exploring Model Uncertainty and Behavior Uncertainty– A Temporal Transferability Assessment of Vehicle Ownership Models for Boston Metropolitan Area. Accepted for presentation at the Annual Meeting of the Transportation Research Board, January 2016.

Khalighi, F., Hajiseyedjavadi, F., Christofa, E., and Knodler, M. 2016. Emission Impact of Pedestrians at Roundabouts. 5th International Conference on Roundabouts, 5-7 May, Green Bay, WI. [submitted]

Lavallière, M. (2014). Survey on the Multigenerational Workforce. Paper presented at the Energy Technology Workshop Ensuring Energy Delivery, Cambridge (MA).

Lavallière, M. (2015, February 12-13). The "Aging" readiness of industries: challenges and opportunities. Paper presented at the International Symposium on Occupational Safety and Hygiene SHO2015, Guimarães, Portugal.

Miotti, M., Supran, G., Kim, E. & Trancik, J.E. Personal Vehicles Evaluated Against Climate Change Mitigation Targets. Poster Session Presented at: MIT Transportation Showcase; February 17 2016; Cambridge MA.

Miotti, M., Supran, G., Kim, E. & Trancik, J.E. Personal Vehicles Evaluated Against Climate Change Mitigation Targets. Poster Session Presented at: Energy Efficiency & Renewable Energy (EERE) Day at MIT; March 17 2016; Cambridge MA.

Miotti, M., Supran, G., Kim, E. & Trancik, J.E. Using a parameterized LCA to evaluate over 120 current passenger vehicle models against climate change mitigation targets. Presentation at: LCA XV; October 7 2015; Vancouver, Canada.

Peak Car Travel in the United States: Two-Decade Long Phenomenon at the State Level. *Transportation Research Board 94th Annual Meeting*, Washington, D.C., poster presentation P15-6155 (Jan. 13, 2015).

Peak Car Travel in the United States: Two-Decade Long Phenomenon at the State Level. *Transportation Research Board 94th Annual Meeting*, Washington, D.C., lectern session 15-3449 (Jan. 14, 2015).

Rayle, Lisa and Flores, Onesimo. (Mar 7, 2016). "How Lyft Taught Uber to Break the Rules." Medium https://medium.com/@lisa_one/how-lyft-taught-uber-to-break-the-rules-dfccc044384#.f738xqub7

Samuel, S., Zafian, Y., Nicholas, C.A., Zhang, J., Knodler, M., and Fisher, D.L. (January 2016). Do Traffic Warnings on Heads-Mounted Displays Improve Latent Hazard Anticipation? A Simulator Study. *Proceedings of the 95th Annual Meeting of Transportation Research Board*. Washington, D.C.

T., Samuel, S., Zafian, T., Nicholas, C.A., Zhang, J., Knodler, M., Jr., and Fisher, D.L. (May 2016). Can Secondary Traffic Alerts Improve the Latent Hazard Anticipation Ability of Novice and Experienced Drivers? *Accepted for the 7th International Conference on Applied Human Factors and Ergonomics (AHFE) 2016* to be held in Orlando, FL, July 2016

Transportation Nudges: Experiments in Improving Urban Mobility, December 7, 2015, Boston University, Boston, MA. TUT-POL Poster Presentation.

Websites or other Internet sites

<http://edesign.ecs.umass.edu/projects/an-economical-retrofit-seat-belt-design-upgrade-for-motor-coaches/>.

<http://lastmile.mit.edu/cartokm2/index.php>

<http://mdgis.github.io/>

<http://mfc.mit.edu/strategically-adaptive-sustainable-mobility-systems>

<http://mie.umass.edu/news/retrofit-seat-belts-buses-are-going-places-fast>

<http://research.gsd.harvard.edu/tut/>

<http://wnpr.org/post/survey-how-do-you-cross-connecticut-street#stream/O>

<http://zonedct.org/post/139439323383/survey-how-do-you-cross-a-connecticut-street>

<https://happymobility.org>

Media

The Washington Post, The American Decline in Driving Actually Began Way Earlier Than You Think.

<http://www.washingtonpost.com/blogs/wonkblog/wp/2015/01/16/the-american-decline-in-driving-actually-began-way-earlier-than-you-think/>

WNPR, Zoned: A blog about land use, transportation, and the built environment in Connecticut and elsewhere

Technologies or techniques

Project MITR25-1

Capturing the Relationship between Social Interaction and Travel Behavior Using Smart Phones

We have developed a conceptual approach to the collection of social interaction information within the framework of a travel survey platform that we call the Future Mobility Sensing (FMS). FMS is a smartphone-based system that tracks users' trips and activities and detects certain trip attributes such as the mode. Users can visualize their travel and activities as an activity diary on a website where they also have the option to validate their trips and answer further questions (prompted recall survey). The FMS has initially been developed as part of the Future Urban Mobility project of the MIT-Singapore Alliance for Research and Technology (SMART) and is under continuous development as part of other projects as well including this UTC project. We are in the process of modifying the FMS app as well as the www.happymobility.org website to incorporate these changes.

In addition, we have developed an interface to collect social media information from users. A Facebook app has been developed such that when an FMS user gives his authorization, we will be able to collect information such as number of friends, public pages that the user has liked as well as characteristics of the pages. This information can help us better understand the impact of social media on people's activity and travel decisions.

Project UMAR25-29

An Innovative Design to Retrofit Seatbelts in Motorcoaches

The technologies and techniques that result from this project focus on those that provide the most effective guidelines to the safe and economical implementation of seatbelts on motorcoaches. To this end, the development of needed techniques was initiated in several main areas. Bus structure was assessed by discussion with representatives from the three largest motorcoach manufacturers of Motor Coach Industries, Prevost, and Van Hool. This leads to a systematically safe process to design and implement installations. Discussions with 114 stakeholders during the I-Corps program identified the viable techniques to implement the actual installations within the industry's existing supply chain in the most safe and economically competitive manner. Meanwhile, advanced modeling and simulation techniques have optimized the design of the product and its installation. All of these techniques increase the likely number of installations, which will further improve safety and economic competitiveness of the motor coach industry by the increase in seatbelt availability.

Inventions, patent applications, and licenses

Project MITR25-16

From Trip Data to the Energy Requirements of Personal Vehicle Travel

The research team has continued developing and applying TripEnergy: a model of personal vehicle energy consumption across the U.S. that is faithful to vehicle performance, individual driving patterns, and nationwide travel trends. This has resulted in M.I.T. Case No. 18210, "TripEnergy," which is currently being evaluated for patent protection or open source protection.

Other products

Nothing to report.

3. Participants & Other Collaborating Organizations

Organizations that have been involved as partners

The Boston Area MPO, CTPS, 10 Park Plaza #2150, Boston, MA 02116
City of Cambridge. Department of Traffic, Parking and Transportation, Cambridge, MA
Collaborative research: students to collect data
Collaborative research: researches and students exchange.
Eastern Communication Association, Pittsburgh, PA
The Hartford Center for Mature Market Excellence at The Hartford Financial Services Group, Hartford, CT
Healthways
Instituto Tecnológico y de Estudios Superiores Monterrey, Mexico City, Mexico.
Kettering Foundation, Dayton, OH

The LIRR, New Jersey Transit, Amtrak, NY City Department of Transportation, Regional Planning Association, Metro North Railroad. Northeast Corridor Commission, MTA Capital Construction, New York City Transit, United States Department of Transportation, Transit Center, North Jersey Transportation Planning Authority, Port Authority of New York and New Jersey.

The Metropolitan Area Planning Council (MAPC), 60 Temple Pl #6, Boston, MA 02111.
Tel-Aviv University – Collaborative Research
Universidad Politécnica de Madrid, Madrid, Spain
University of Connecticut Civil and Environmental Engineering
University of Connecticut Geography Department
Volvo Research and Educational Foundations (VREF). Göteborg, Sweden.

Other collaborators or contacts that have been involved

Central Square Businesses Association, Cambridge MA.
East Japan Railway Company, Tokyo, Japan
Empire State Development Corporation
London School of Economics
Dr. Lars Leden, Luleå University, Sweden
Masdar Institute of Science and Technology, Abu Dhabi, UAE
Municipal Arts Society
NURail UTC, housed at UIUC
Rutgers University
Universidad Politécnica de Madrid, UPM, Madrid, Spain.

Our former postdoc on the project, Victor Rocco, has moved on to a position at the Catholic University of Chile, Department of Transport Engineering and Logistics, from where he continues to collaborate on the land use modeling part of the project. (Project MITR25-17)

4. Impact

The impact on the development of the principal disciplines of the program

Project MITR25-1

Capturing the Relationship between Social Interaction and Travel Behavior Using Smart Phones

Overall, the FMS technology has been recognized as state of the art for smartphone based travel surveys, and are being applied and/or extended for data collection in several transportation related research projects. These include context-specific stated preferences survey for new transport modes or services (in collaboration with Ford and University College of London), happy traveller survey, truck drivers' survey, and event-driven on-phone transit satisfaction survey (with Singapore Land Transport Authority).

Project MITR25-16

From Trip Data to the Energy Requirements of Personal Vehicle Travel

The research addresses a still open question in transportation and climate policy about the suitability of different vehicle powertrain technologies for widespread adoption and emissions reduction, especially given that the success of these various technologies depends on both their abilities to successfully meet divers travel needs of households across the U.S. and their performance under that use.

Project UMAR25-25

Evaluating the Effect of Google Glass on Driver Distraction

The results demonstrate that head-mounted displays can actually increase the likelihood of driver behaviors that are known to reduce crashes. The reports in the literature to date of head-mounted displays have focused for the most part on their distracting potential. We have shown that they can also have a safety benefit, especially for younger drivers. This can lead researchers in surface transportation human factors to explore broader, beneficial uses to drivers of head-mounted displays to promote traffic safety.

Project UCNR25-31

A Multi-Scalar Model to Identify the Causes of Decreased Vehicle Miles Traveled (VMT) in the United States

The work conducted under this project has been impactful in identifying that the downward trend in VMT in the US is not a recent phenomenon. In fact, when VMT data are analyzed at the state level, it is evident that VMT decreases date back as far as twenty years, beginning with the state of Washington. This is very important because policy-makers have been interpreting this phenomenon as something that happened recently, and adopting a "wait-and-see" approach. VMT is an important determinant of many policy-oriented issues, most importantly funding. The pre-existing notion was that VMT and economic growth were positively correlated—so the more VMT, the more growth and vice versa. Our research shows that economic growth is able to take place within an environment of declines in VMT which suggests that the entire way that VMT metrics are used in policy need to be rethought.

Project HVDE25-38

Teaching Case Study on Korea Ferry Disaster of April 2014:

A summary of the case was written by Dr. Howitt and featured in the January 2016 edition of the *UTC Spotlight* newsletter exposing transportation professionals and students to a host of issues, including [1] the adequacy and incentives of safety regulatory regimes in the transportation sector [2] safety procedures and emergency preparedness associated with ferry transportation, and [3] the effectiveness of rescue methods.

(http://www.rita.dot.gov/utc/sites/rita.dot.gov.etc/files/utc_spotlights/pdf/spotlight_0116_1.pdf),

The impact on other disciplines

Project HVDR25-21

Recreating Livable Communities after Catastrophe: Managing the Recovery from Japan's Earthquake, Tsunami, and Nuclear Disaster of 2011

The project P.I. incorporated findings from the research conducted during this reporting period in several lectures and presentations to students and researchers representing a mix of disciplines, exposing them to public policy considerations of transportation infrastructure recovery and post-disaster land-use. This includes the inclusion of lessons learned on Japan's recovery experience into the curriculum for two graduate-level management courses he teaches at the Harvard Extension School and in a suite of Harvard Kennedy School Executive Education programs for senior practitioners from a range of disciplines, but primarily representing public safety, emergency management, and homeland security. In addition, research findings were highlighted at a conference co-organized by Professor Howitt ("Accelerating Disaster Recovery"), which was held on January 22, 2016 at Harvard University and included political leaders, academics, and practitioners with experience in disaster recovery from around the world.

Project UMAR25-27

Route Choice in Congested Grid Networks

The research addresses problems that fall at the intersection of transportation engineering, economics, management science, and finance. As such, the project has sparked interest from researchers from outside of the conventional transportation engineering field, and is fostering communications that may lead to future collaborations. There is particular interest from faculty working with concepts of efficient frontiers, portfolio theory, and option theory in financial applications who now see some potential value in the transportation domain.

Project UCNR25-33

Social Network Effects on Attitudes about Pedestrian Street Crossing Behavior

This project has won recognition by the oldest professional scholarly association in the United States devoted to the discipline of Communication: the Eastern Communication Association. Prof. Townsend applied for the competitively-selected Applied Urban Communication Research Grant to aid in the dissemination of the survey and to enable travel to conventions to share the results.

Project HVDE25-38

Teaching Case Study on Korea Ferry Disaster of April 2014

The case study was included as curriculum in the Harvard Extension School course *MGMT 5090: Crisis Management and Emergency Preparedness*, exposing graduate students in the management field to (1) the adequacy and incentives of safety regulatory regimes in the transportation sector (2) safety procedures and emergency preparedness associated with ferry transportation, and (3) the effectiveness of rescue methods.

The impact on the development of transportation workforce development

Project MITR25-4

Transportation Workforce Health and Wellbeing

We are collaborating with Canadian colleagues to evaluate if there are any differences between the transportation workforces in the United States and Canadian industries. This would give us increased confidence in our US based work and would give us insights into the nature of interventions in these workforces.

Project UMAR25-29

An Innovative Design to Retrofit Seatbelts in Motorcoaches

One of the co-inventors, who recently completed a Bachelor's degree in Mechanical Engineering, has advanced to work at an internship in Germany at BMW. The experience gained by that student while working on this project helped with the development of that person's career in transportation. This person also completed an extensive report of their work for this project on which a current student is building. The added business of retrofitting is expected to create more jobs in the industry in proportion to the number of installations ordered.

Project HVDE25-39

TUT – Transforming Urban Transport and the Role of Political Leadership

We have developed curriculum materials that can be used in graduate-level courses in such fields as transportation, planning, and public management, which can teach the findings of our cases as well as allow for further research. We also expect that our research and final products will provide exposure to political leaders and their involvement in transforming their city's transportation but also how future leaders, teachers, students, and others can transform transportation in the future.

The impact on physical, institutional, and information resources at your university or other partner institutions

Nothing to report

The impact on technology transfer

Project MITR25-16

From Trip Data to the Energy Requirements of Personal Vehicle Travel

A successful application to ARPA-E built off of the results of this project, with our TripEnergy tool providing crucial functionality towards a metropolitan area-wide transportation simulation and optimization framework that is intended to become a working commercial product. This project will optimally allocate monetary rewards to travelers in the Boston metro area to reduce system-wide energy consumption and improve transportation network performance.

The impact on society beyond science and technology

Project MITR25-4

Transportation Workforce Health and Wellbeing

Although the social interaction questions are not fully integrated into FMS yet, the base FMS technology has led to the initiation of a start-up company, Mobile Market Monitor, that customizes and licenses the software for smartphone based travel surveys.

5. CHANGES/PROBLEMS

No change.

Additional information regarding Products and Impacts

Outputs

Project MIR25-12

Incentivizing Safer Driving Using Peer-Pressure project

The research team has managed to recruit Metropoline (<http://www.metropoline.com/>), the 3rd largest public transportation company in Israel, operating above 500 busses throughout Israel, as a partner for conducting the experiment. Metropoline uses an IVDR system provided by Traffilog (<https://traffilog.com/website/>). Participants in the experiment will be 47-54 drivers that are operating bus lines 29 & 39 (same urban routes).

Outcomes

Nothing to report

Impacts

Nothing to report