massDOT
Massachusetts Department of Transportation

Transportation Research Quarterly

Providing highlights of MassDOT's transportation research activities and other helpful information **Winter 2021**

Focused on Research

A comprehensive transportation system must serve diverse demands and protect the safety of all users. This issue of Transportation Research Quarterly showcases several MassDOT research projects that focus on the transportation and public health connection and alternative transport options such as tools to improve transit services, curb space management strategies, and designated roadway space for bicyclists. In addition, I would like to call your attention to six poster presentations which are originated from MassDOT research projects at the upcoming virtual 2021 TRB Annual Meeting technical sessions.

Steve Woelfel, Deputy Executive Director, Office of Transportation Planning

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Six MassDOT Research Projects will be Presented at the Virtual 2021 TRB Annual Meeting

MassDOT's research projects aim to address our agency's needs and provide practical solutions to the most salient transportation problems that we face. These problems are oftentimes not unique to MassDOT, and thus the scientific investigation approaches and the research findings are relevant to stakeholders both inside and outside of MassDOT. We encourage MassDOT research project champions and principal investigators to disseminate our joint research efforts through various transportation professional channels, including TRB meetings and publications. This year, six presentations originated from MassDOT research projects were chosen by several TRB committees to be presented at the TRB 2021 Annual Meeting. The table below lists the titles and session numbers and times. Please register with the 2021 TRB Annual Meeting to attend sessions by accessing them through the online program.

Presentation Title	Session	Time
Integrating Unmanned Aircraft Systems into Highway Bridge Inspection Procedures	1160	1/26/2021, 10-11:30am
Bike Boxes: A Review of Design Guidelines Across the US and Impacts on Safety	1209	1/26/2021, 2:30-4pm
Continuous Approximation Model for Hybrid Flexible Transit Systems in Rural Areas	1233	1/26/2021, 2:30-4pm
Incorporating Health-related Criteria for Project Scoring in Massachusetts	1276	1/27/2021, 10-11:30am
Improving Pedestrian Infrastructure Inventory in Massachusetts Using Mobile LiDAR	1307	1/27/2021, 2:30-4pm
A Review of Post-Fire Inspection Procedures for Concrete Tunnels	1391	1/28/2021, 1-2:30pm

Ongoing Research Highlights

Future of Commonwealth's Curb

There are diverse and quickly-evolving demands for use of curb space in municipalities of all sizes across the Commonwealth, such as rideshare, transit, micro-mobility, and pedestrians. The question is how to identify designs and policies for curbside lane management that are appropriate for a variety of contexts across the Commonwealth. This research will assist MassDOT to develop a forward-looking reference guide that identifies potential strategies for curbside lane design and management based on context such as population density, traffic volumes, transit operations, and demand patterns. Read the project cut sheet for further information.

Principal Investigator: Eric Gonzales, UMass Amherst
Project Champion: Derek Shooster, MassDOT OTP
Project Manager: Nicholas Zavolas, MassDOT OTP

Flexible Transit in Rural Areas

Public transit services typically operate fixed routes with a published schedule, which can be inefficient and costly for low-density rural and suburban areas. This study examines the cost-effectiveness of different forms of flexible transit service, including pilots by Regional Transit Authorities (RTA) in Massachusetts, and synthesizes the needs and best practices related to data collection, management, and reporting. The experiences of RTAs will be compared and combined with the results of model-based, theoretical analysis to make recommendations for future flexible transit implementations in the Commonwealth. Read the project cut sheet for further information.

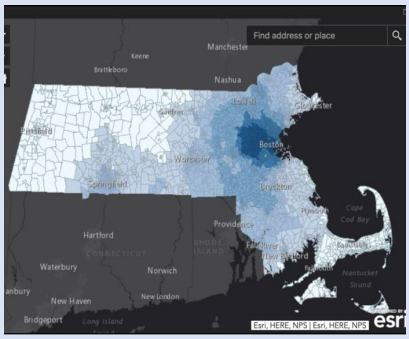
Principal Investigators: Eric J. Gonzales & Eleni Christofa, UMass Amherst
Project Champion: Abril Novoa-Camino, MassDOT Rail & Transit
Project Manager: Michael Flanary, MassDOT OTP

Effectiveness of Bike Boxes in Massachusetts

How do bike boxes affect bicyclist behavior and improve safety, especially in reducing right-hook collisions? This study collects and analyzes bicyclist behavior data at selected intersections with and without bike boxes, and then correlates observed behavior data with bike box design characteristics and historical crash data. Ultimately, it will shed light on the effectiveness of different types of bike boxes in improving safety, and to help MassDOT identify bike box design characteristics and update general feature guidelines that are more effective in improving bicyclist and motorist safety. Read the project cut sheet for further information.

Principal Investigators: Eleni Christofa & Chengbo Ai, UMass Amherst
Project Champion: Andrew Wilkins, MassDOT Highway
Project Manager: Michael Flanary, MassDOT OTP

Measuring Accessibility to Improve Public Health



Following the successful completion of an FY2019 research project "Public Health Assessment of Transportation Projects," this upcoming FY2021 project will examine the gaps in accessibility to high quality jobs, healthcare facilities, recreational facilities, educational opportunities, and food resources. The end products will include a documentation of where these accessibility gaps exist and a comprehensive guidebook of strategies for addressing the root causes for these gaps and mitigating their effects. The work will also support MassDOT's existing accessibility initiatives and data dashboards to continue monitoring accessibility gaps and inequities that affect public health.

Principal Investigator(s): Eleni Christofa & Eric Gonzales, UMass Amherst
Project Champion: Derek Krevat, MassDOT OTP
Project Manager: Drew Pflaumer, MassDOT OTP

A Look at Who We are – Team Highlights

Each MassDOT research project is supported by a team comprised of a Project Champion, a Principal Investigator and a Project Manager. Often, the research project team will also include staff from the UMass Transportation Center (UMTC) who provide general support services to the Principal Investigator. Highlighted below are the key members of the "Measuring Accessibility to Improve Public Health" project team.

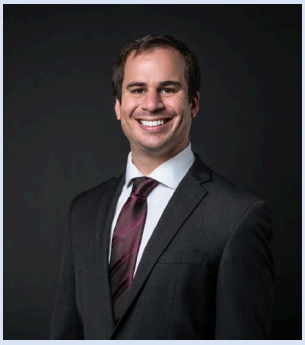
Project Manager – Drew Pflaumer

A MassDOT Research Project Manager (PM) is responsible for the administrative management and overall coordination of an assigned research project.

Drew Pflaumer is a transportation planner with the Research Section at the Office of Transportation Planning. He joined MassDOT in November 2019 after approximately five years in Rhode Island working for the Office of Statewide Planning, the Rhode Island Public Transit Authority, and as a municipal planner. Drew earned his Master of Urban Planning degree at Ball State University in 2015 before moving to New England. In his spare time Drew can be found riding his bike to destinations near and far.

You may contact him at Drew.Pflaumer@dot.state.ma.us.

Project Champion –Derek Krevat



A Project Champion (PC) is a MassDOT subject matter expert, the proponent of a funded research project, and the technical advisor for project development, completion and implementation.

Derek serves as the statewide program coordinator for the Massachusetts Safe Routes to School Program and as a Regional Planning Coordinator. Additionally, Derek is leading a number of initiatives to apply destination accessibility metrics to MassDOT projects through the use of software, data, and tools related to destination accessibility. Derek holds master's degrees in Regional Planning and Public Policy from UMass Amherst.

Principal Investigator – Dr. Eleni Christofa

The Principal Investigators (PI) are responsible for submitting an interest statement, developing a detailed research scope if selected, and conducting research activities per project scope.

Dr. Eleni Christofa is an Associate Professor of Civil and Environmental Engineering at UMass Amherst. Eleni holds a BS in civil engineering from the National Technical University of Athens, Greece and a PhD in civil engineering from the University of California, Berkeley. She led the research team on the "Public Health Assessment of Transportation Projects" research project preceding the current project and served as a PI for nine other MassDOT research projects. Her research centers on public health & equity and she is an active member of the TRB Committee on Transportation and Public Health and Editorial Board.

Principal Investigator – Dr. Eric Gonzales

The Principal Investigators (PI) are responsible for submitting an interest statement, developing a detailed research scope if selected, and conducting research activities per project scope.

Dr. Eric Gonzales is an is an Associate Professor of Civil and Environmental Engineering at UMass Amherst. Eric holds a BS in civil engineering from Carnegie Mellon and a PhD in civil engineering from the University of California, Berkeley. He is also an experienced PI having previously worked on eight MassDOT research projects. Eric is a member of the American Society of Civil Engineers Public Transport Committee as well as the TRB Committee on Innovative Public Transportation Services and Technologies. He previously served as the Secretary of the TRB Committee on Paratransit.

News and Events

Technical Sessions & Exhibits: January 21–22 and 25–29

The Transportation Research Board 2021 Annual Meeting is a virtual event over a series of days throughout January 2021. The technical sessions and exhibits will be held during January 21-22 and 25-29. Traditionally, the TRB Annual meeting has occurred in person and spans over just one week in January. The virtual nature of this year allows for a greater number of MassDOT staff to participate. Since MassDOT is a sponsor of TRB, registration is free to all MassDOT staff. We encourage you to talk to your supervisor about attending some parts of the virtual event that are relevant to your job responsibilities or are of interest to you. Please follow the link below for registration and interactive online program.

Visit TRB 2021 Annual Meeting Website **Create a free MyTRB Account to access complimentary TRB resources**

NCHRP NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

New Topic Submittals for the FY 2022 NCHRP 20-05 Synthesis Program are due by midnight on February 17, 2021

Submit a proposal through NCHRP Synthesis Topic Submission Portal.

Nominate MassDOT Subject Matter Experts for FY2022 NCHRP Problem Statement Review

Each year, the Research Section coordinates and submits our agency's review of candidate NCHRP problem statements, and the results from all 50 states serve as the basis for the AASHTO Research & Innovation Committee's funding decisions. If you are interested in nominating yourself or your staff to review NCHRP problem statements, please contact Nicholas Zavolas.

Visit NCHRP website to learn more about NCHRP, how their projects are generated, and ongoing and completed research.

New England Transportation Consortium (NETC)

Problem Statement Submittals for FY2022 NETC Program are due by midnight on January 22, 2021

View online submission instructions.

NETC is a research cooperative between the state transportation agencies of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Resources and expertise are pooled for projects of regional concern. The annual problem statement solicitation is exclusive to member state DOT employees. The Consortium's Advisory Committee, comprised of member state DOT representatives, review and select problem statements that will be developed into Scopes of Work for funded projects. Member state DOT SMEs jointly guide research investigation and disseminate results within their respective agencies.

Visit NETC website for the Consortium structure, procedures, and ongoing and completed research efforts.

massDOT Massachusetts Department of Transportation

U.S. Department of Transportation Federal Highway Administration

AASHTO

TRB TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

NCHRP NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Research Resources

In Progress MassDOT Research

Project Title	Start Date
Translating Data Generated by the Transit App into Insights on Transportation Use in Greater Boston	November 2018
Improving Load Rating Procedures for Steel Beam Ends with Deteriorated Stiffeners	June 2019
Construction and Materials Best Practices for Concrete Sidewalks – Phase I	October 2019
Impacts of Flashing Yellow Permissive Left-Turn Indications in Massachusetts	January 2020
Post-Fire Damage Inspection of Concrete Structures	February 2020
Development of Comprehensive Inspection Protocols for Deteriorated Steel Beam Ends	February 2020
Flexible Transit Services in Rural Areas	February 2020
Effectiveness of Bike Boxes in Massachusetts	March 2020
A Pavement Marking Inventory and Condition Assessment Method Using Mobile Lidar	March 2020
Implementing the AASHTO Mechanistic-Empirical Pavement Design Guide (Phase I)	April 2020
Understanding the Asset Management Systems Utilized by Municipalities in Massachusetts	April 2020
Energy Consumption, Cost and Emissions of MBTA Rapid Transit Vehicles	May 2020
Exploring Short-Sea Shipping as an Alternative to Non-Bulk Freight Trucking in Southeastern, MA	May 2020
Impact of Advanced Driver System on Road Safety	June 2020
3D Printing Application for Transportation Infrastructure and Maintenance	June 2020
Future of Commonwealth's Curb	July 2020
Detecting Subsurface Voids using UAS Infrared Thermal Imaging	November 2020

Recently Completed MassDOT Research

Project Title	Completion Date
Characterization of Reclaimed Asphalt Pavement for HMA Surface Courses in Massachusetts	August 2020
Compost Blankets for Erosion Control and Vegetation Establishment	May 2020
Public Health Assessment for Transportation Projects	March 2020
Unmanned Aerial Systems in Surface Transportation	December 2019
Commuter Bus Demand, Incentives for Modal Shift, and Impact on GHG Emissions (Part II)	December 2019
Estimating Future Changes in 100-year Floods on the Connecticut and Merrimack Rivers	November 2019
Improving Pedestrian Infrastructure Inventory in Massachusetts Using Mobile LiDAR	September 2019
Risk Factors for Older Pedestrian Injuries and Fatalities in MA	August 2019
Optimizing ADA Paratransit Operations with Taxi and Ride Share Programs	May 2019
Traffic Flow Improvements: Quantifying the Influential Regions and Long-Term Benefits	March 2019
Evaluation and Enhancement of MassDOT Traveler Information Programs	March 2019

Additional Resources

Transportation Research and Information Database (TRID) is a comprehensive bibliographic database containing more than 1.2 million records of transportation research.

Research in Progress (RiP) Database contains information on more than 13,000 current or recently completed federally-funded transportation research projects.

University of Massachusetts Transportation Center (UMTC) provides research and training services to MassDOT under an Interdepartmental Service Agreement.

AASHTO Publications include the most accepted technical guides, specifications, and manuals of the industry.

Contact Us

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