Center
The Urban Mobility & Equity Center
at Morgan State University
The Urban Mobility & Equity Center (UMEC) is a federally funded Tier-1 University Transportation Center.

The National Transportation Center (NTC) is a university-based research center that conducts research for state and federal agencies.
History of the NTC

- Established by Congress under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991
- Authorized in 1998 by the Transportation Equity Act for the 21st Century (TEA-21); reauthorized again in 2005 by the Safe, Accountable, Flexible, Efficient Transportation Equity Act - a Legacy for Users (SAFETEA-LU)
- More than 30 years ago started the Maryland Department of Transportation/MSU Graduate School Internship Program, which became a national model and a pipeline to employment
  - over 650 Graduate and Undergraduate Interns
- Started the Summer Transportation Institute in 1998, introducing high school students to the transportation field
  - over 600 students
- Brought $30M and Completed 87 research projects
History of UMEC

- Funded under the Fixing America's Surface Transportation (FAST) Act of 2015
- Awarded about $1.5M annually by the U.S. DOT in 2016 for five years
  - One of 20 Tier-1 Centers
  - One of two HBCUs
- A three-university consortium led by Morgan State University and including the University of Maryland and Virginia Tech
- To date has completed 18 research projects; 16 more are underway
Our research has totaled more than $30 million
Who has funded our research?

- U.S. Department of Transportation (USDOT)
- Maryland Department of Transportation (MDOT)
  - Maryland State Highway Administration (SHA)
  - Maryland Highway Safety Office (MHSO)
  - Maryland Transit Administration (MTA)
- Baltimore City
- Federal Motor Carrier Safety Administration (FMCSA)
- Mid-Atlantic Transportation Sustainability University Transportation Center Region 3 (MATS-UTC)
- Mid-Atlantic University Transportation Center Region III (MAUTC)
- Maryland Transportation Institute (MTI)
- University of Maryland National Transportation Center
- Greater Baltimore Urban League (GBUL)
Our research is presented at conferences and appears in peer-reviewed journals.

And presented to the U.S. Congress
An eye-tracking system determines exactly where a driver is looking. If you’re looking at your phone, we’re looking at you.

Morgan’s structures and materials lab includes a shake table that goes up to 8.0 on the Richter scale.

Two full-size driving simulators and a bicycle simulator at Morgan State’s Safety and Behavioral Analysis Center allow us to research driver behavior and connected and autonomous vehicles.
SABA Center
https://www.youtube.com/watch?v=vskfGxwMGd0
Morgan’s structures and materials lab includes a shake table that goes up to 8.0 on the Richter scale.
Our research projects focus on several areas that are critical for future transportation needs and technologies.
Sampling of our Projects:

- Potential Effects of Composition and Structure of Dynamic Message Sign Messages on Driver Behavior and Their Decision to Use Freeway Incident Management (FTM) Routes
- Impact of Level of Service (LOS) on the Driver’s Behavior on Arterials
- Investigating the Impact of Distracted Driving among Different Social-Demographic Groups
- Optimization of Emergency Traffic Patrols (ETP) Operations
- Shared Bus/Bike Lane Safety Analysis: Assessing Multimodal Access and Conflicts
- A Comprehensive Study on CMV Safety Using ITS in Work Zones on Freeways and Arterials
- Driver Behavior Post Cannabis Consumption – A Driving Simulator Study in Collaboration with the Montgomery County Police
- A Comprehensive Engineering Analysis of Motorcycle Crashes in Maryland
Sampling of our Projects:

- Development of Multimodal Traffic Signal Control
- Connected Vehicle Technologies for Efficient Urban Transportation
- Next Generation Transit Signal Priority with Connected Vehicle Technology
- Driver’s Interactions with Advanced Vehicles in Various Traffic Mixes and Flows – Phase I: Driver Behavior Study and Parameters Estimation
- Applications of Connected Vehicle Infrastructure Technologies to Enhance Transit Service Efficient and Safety
- Investigating the Effect of Connected Vehicles (CV) Route Guidance on Mobility and Equity
- Driver's Distraction Reduction using Automated Vehicle Technology
- Optimal Automated Demand Responsive Feeder Transit Operation and Its Impact
Sampling of our Projects:

- Quantifying the Impact of On-Street Parking Information on Congestion Mitigation
- Developing Optimal Peer-to-Peer Ridesharing Strategies
- Potential Effects of Composition and Structure of Dynamic Message Sign (DMS) Messages on Driver Behavior and Their Decision to Use Freeway Incident Management (FITM) Routes
- Quantifying Travel Time Reliability Perception and Developing Disaggregate Behavior Models Under Information Provision Using Integrated Driving/Traffic Simulation
- Exploring Travelers’ Behavior in Response to Variable Message Signs (VMS) Using a Driving Simulator
Sampling of our Projects:

- The Effect of COVID-19 on Mobility and Equity: A Case Study on Transit Users in Baltimore, MD
- Understanding Access to Grocery Stores in Food Deserts in Baltimore City
- Innovative Methods for Delivering Fresh Foods to Underserved Populations
- E3: Evaluating Equity in Evacuation
- Demand Responsive Delivery of Food in Baltimore City Food Deserts
- Investigating the Effect of Connected Vehicles (CV) Route Guidance on Mobility and Equity
- Equitable Complete Streets: Data and Methods for Optimal Design Implementation
Sampling of our Projects:

- Electric Vehicle Ownership Factors, Preferred Safety Technologies and Commuting Behavior in the United States
- Eco-Speed Control for Hybrid Electric Buses in the Vicinity of Signalized Intersections
- Developing an Eco-Cooperative Adaptive Cruise Control System for Electric Vehicles
- Developing and Testing an Advanced Hybrid Electric Vehicle Co-Cooperative Adaptive Cruise Control System at Multiple Signalized Intersections
Sampling of our Projects:

- Quantifying Travel Time Reliability Perception and Developing Disaggregate Behavior Models under Information Provision Using Integrated Driving/Traffic Simulation
- Optimized Development of Urban Transportation Networks
- Traffic State Prediction: A Traveler Equity and Multi-modal Perspective
- Managing the Impacts of Different AV/CV Penetration Rates on Recurrent Congestion from the Perspective of Traffic Management: A Case Study of MD-100
- Optimal Automated Demand Responsive Feeder Transit Operation and Its Impact
- E-Bikes Effect on Mode and Route Choice: A Case Study of Richmond, Va., Bikeshare
Sampling of our Projects:

- Measuring User Acceptance of and Willingness to pay for CVI Technology
- Drivers Willingness to Pay Progressive Rate for Street Parking
- Innovative Methods for Delivering Fresh Foods to Underserved Populations

Sampling of our Projects:

- Sustainable Design of Concrete Bus Pads to Improve Mobility in Baltimore City
We ensure our research is relevant by being involved in the community, hosting events and serving as a resource.
To create the next generation of researchers

Our 23-year-old Summer Transportation Institute for high school students
Introduces students to transportation and engineering

Teaches STEM concepts needed for these fields
Students in our MDOT/MSU Graduate School Internship Program take charge of projects and responsibilities at the state agencies involved in transportation.
These programs create a more diverse workforce
Accomplishments Since 2015

• About $8M of funding
• 61 Peer-Review Journal Publications
• One Book and 2 Book Chapters
• 33 Conference Presentations
• 5 Provisional Patents and 3 Intellectual Property Disclosure Forms
• 79 MDOT Interns
• Summer Transportation Program
  • 108 High School Students
  • 32 Middle School Students (2017-2018)
  • 20 Teachers (2017-2018)
Potential Collaborations with the BMC/BRTB

- Internship
- Research
Thank You!

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