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

UMEC
URBAN MOBILITY & EQUITY CENTER

MORGAN STATE UNIVERSITY
THE NATIONAL 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

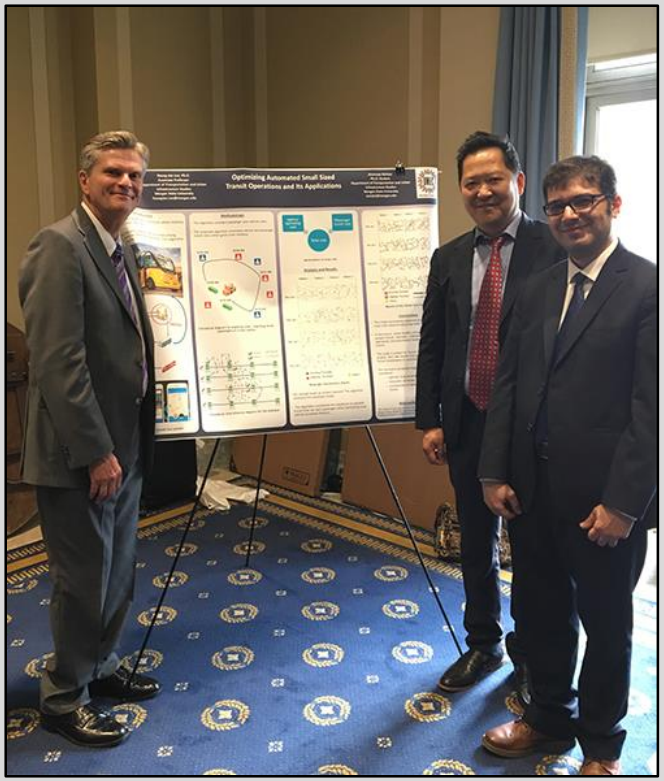
- Funded under the Fixing America's Surface Transportation (FAST) Act of 2015
- Awarded about $1.5M annually by the U.S. DOT in 2016 for five years
  - One of 20 Tier-1 Centers
  - One of two HBCUs
- A three-university consortium led by Morgan State University and including the University of Maryland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

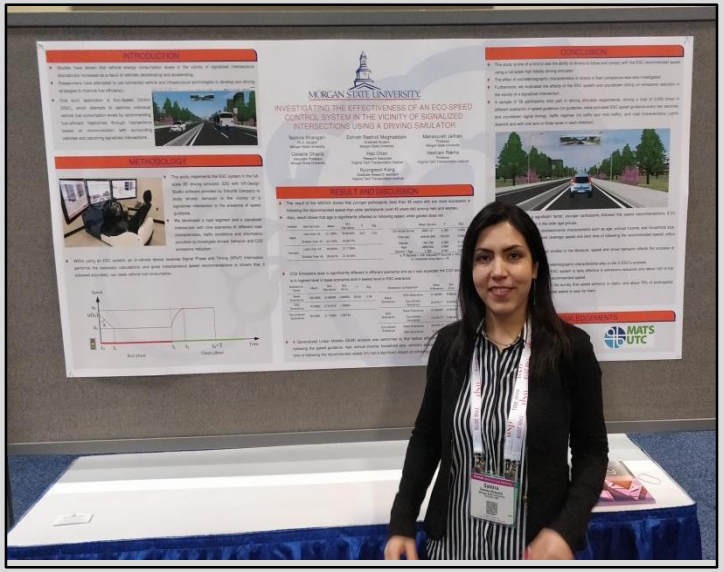
Our research has totaled more than $30 million

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

Our Innovative Technologies include:

An eye-tracking system determines exactly where a driver is looking.
If you're looking at your phone,
we're looking at you.

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.

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

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.

- Driver Behavior/Traffic Safety
- Consumer Behavior
- Infrastructure
- Advanced Traveler Information Systems
- Sustainability
- Connected & Autonomous Vehicles
- Transportation Planning & Modeling
- Equity

Driver Behavior/ Traffic Safety

Sampling of our Projects:

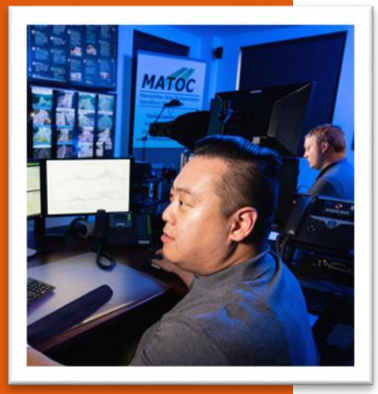
- Potential Effects of Composition and Structure of Dynamic Message Sign Messages on Driver Behavior and Their Decision to Use Freeway Incident Management (FTM) Routes
- Impact of Level of Service (LOS) on the Driver's Behavior on Arterials
- Investigating the Impact of Distracted Driving among Different Social-Demographic Groups
- Optimization of Emergency Traffic Patrols (ETP) Operations
- Shared Bus/Bike Lane Safety Analysis: Assessing Multimodal Access and Conflicts
- A Comparative Study of Pedestrian Crossing Behavior and Safety in Baltimore and Washington, D.C., Using Video Surveillance
- Integrated Optimization of Vehicle Speed Control and Traffic Signal Timing: System Development and Testing
- 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

Connected and Autonomous Vehicles

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

Advanced Traveler Information Systems



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

Equity

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

Sustainability

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

Transportation Planning and Modeling

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

Consumer Behavior

Infrastructure

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


DISTRACTED DRIVING
HANDS ON WHEEL
EYES ON ROAD

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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