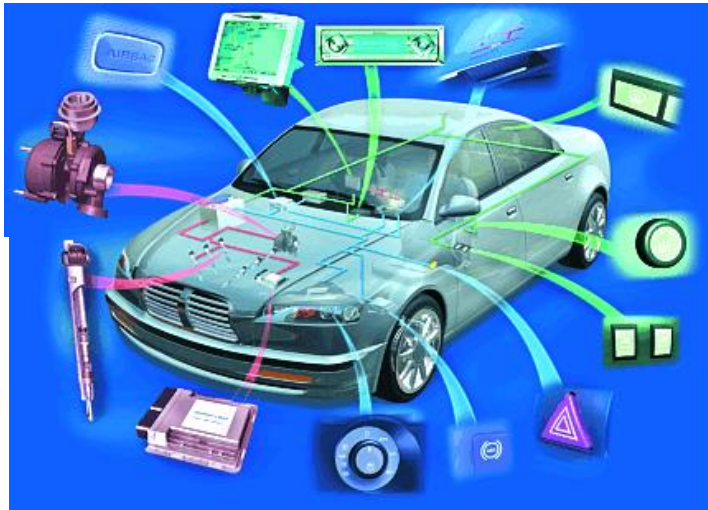




**Betty H.C. Cheng, PhD.**

*Department of Computer Science and Engineering*

Research Interests: Assurance Certification, V&V of AI and Machine Learning-Enabled Systems, Connected and Autonomous Vehicles, Mitigating Uncertainty, Automotive Cybersecurity, bio-inspired engineering.



Uncertainty and feature interaction mitigation for onboard systems

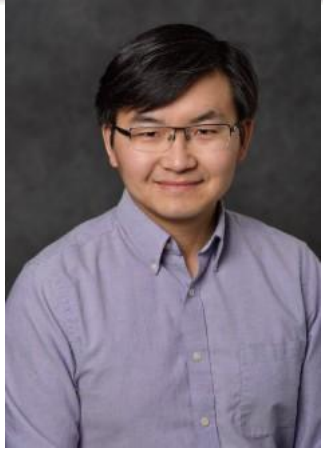


V&V for Autonomous Vehicles with AI and Machine Learning components



Cybersecurity for Connected and Autonomous Vehicles





**Xiaoming Liu, Ph.D.**

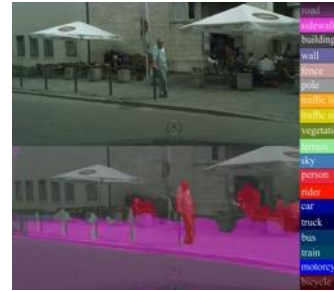
Professor

Department of Computer Science and Engineering

Research Interests: Computer vision, Machine learning, Deep learning, AI, *Perception for automated vehicle*



Computer Vision Lab



- Monocular depth estimation
- RGB/LiDAR fusion, RGB/Radar fusion for depth completion
- 2D object detection
- 3D object detection w. velocity estimation
- Semantic forecasting







Josh Siegel, Ph.D.

Assistant Professor

Department of Computer Science and Engineering

Research Interests: Connected and Automated Vehicles; Artificial Intelligence; Cybersecurity; Vehicle Diagnostics



Vibroacoustic Diagnostics



Efficient AI (Semantic Forecasting)



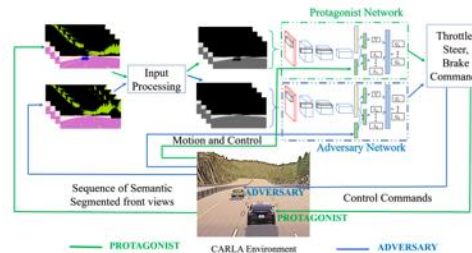
**System Error**

Possible causes:  
Wrong command sent  
Incorrect servo Proxy model  
Mechanical binding  
Over-current  
Position sensor failed



**System OK**

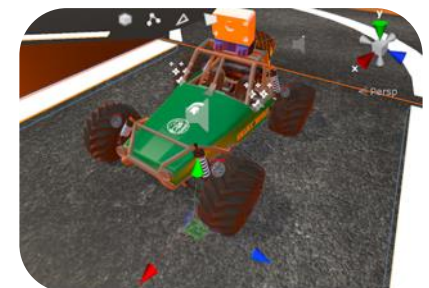
Intrusion Detection



Automated Defensive Driving



V2X Applications



Gamified Simulation (Human/AV Interaction)



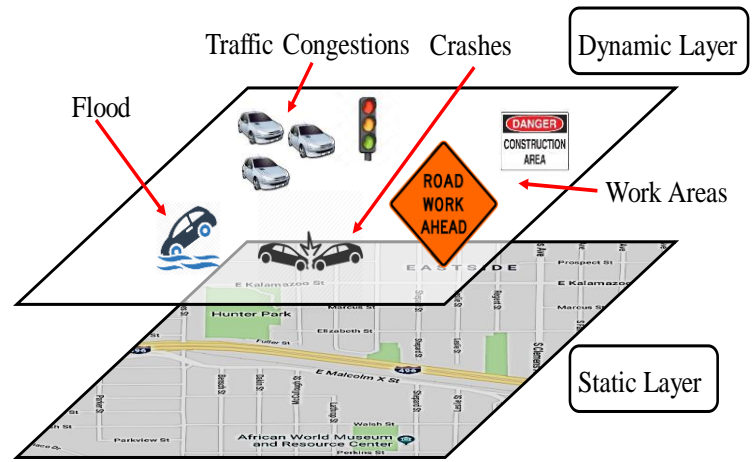


**Subir Biswas, Ph.D.**

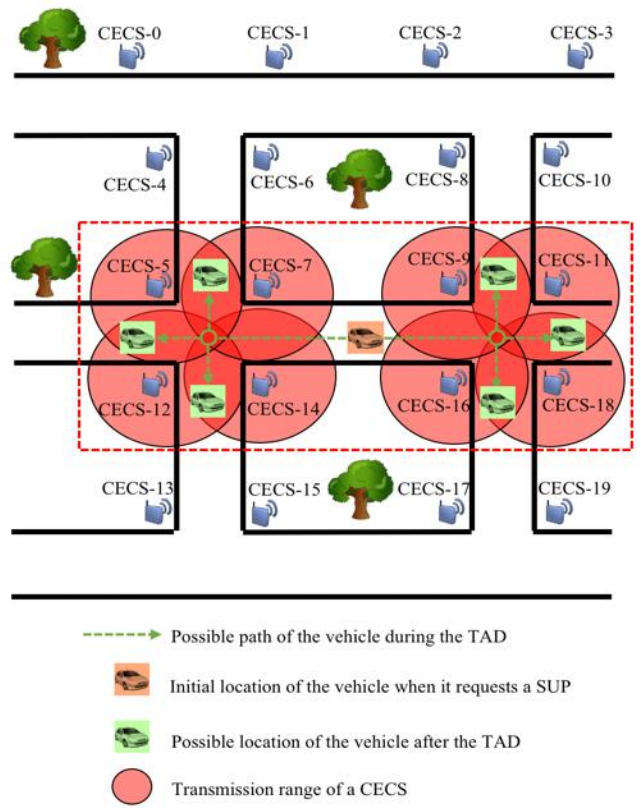
Professor

Department of Electrical and Computer Engineering

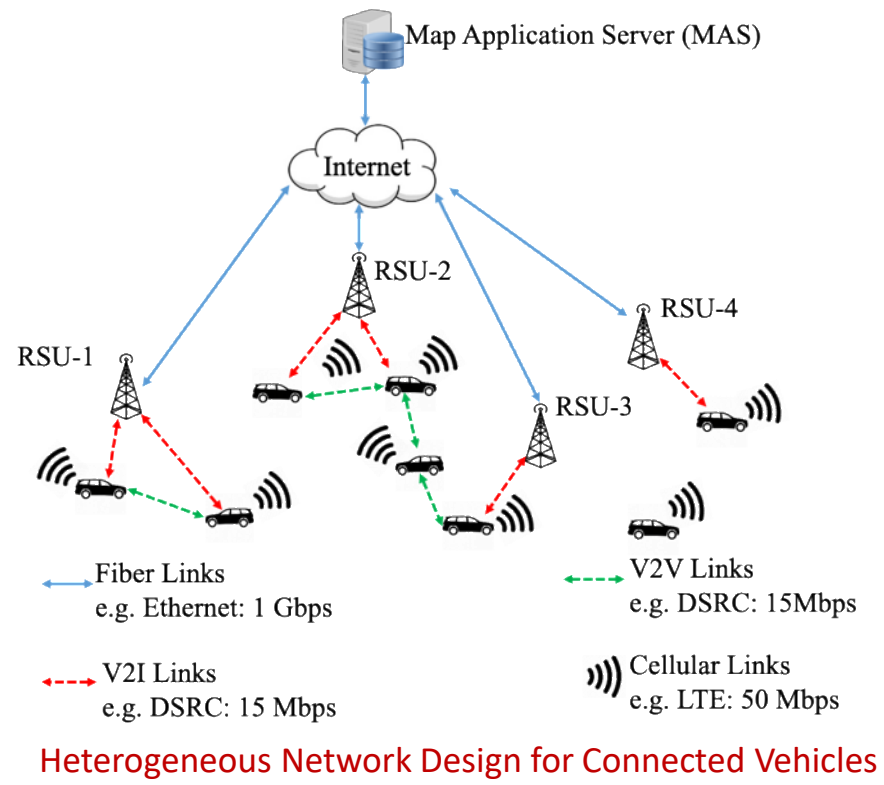
Research Interests: Vehicular Communication; V2V and V2I Data Management



Multi-layer Map Sharing over Heterogeneous Network



Road-side Data Caching for Improved Data Sharing



Heterogeneous Network Design for Connected Vehicles



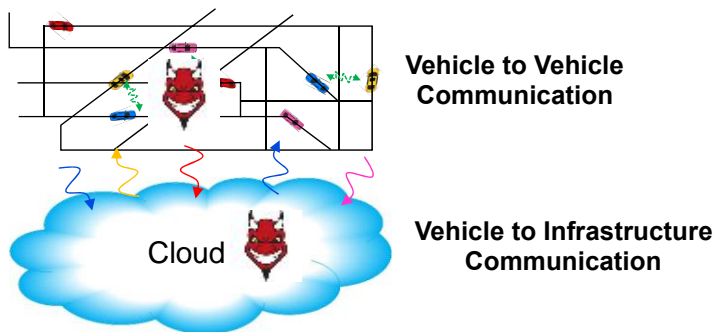
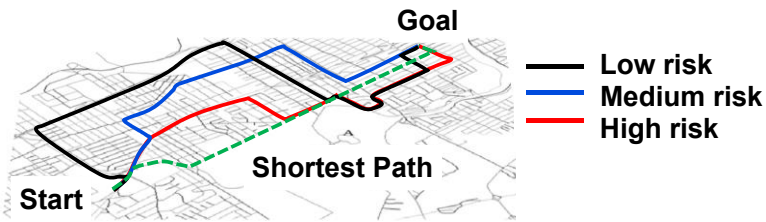


**Shaunak D. Bopardikar, Ph.D.**

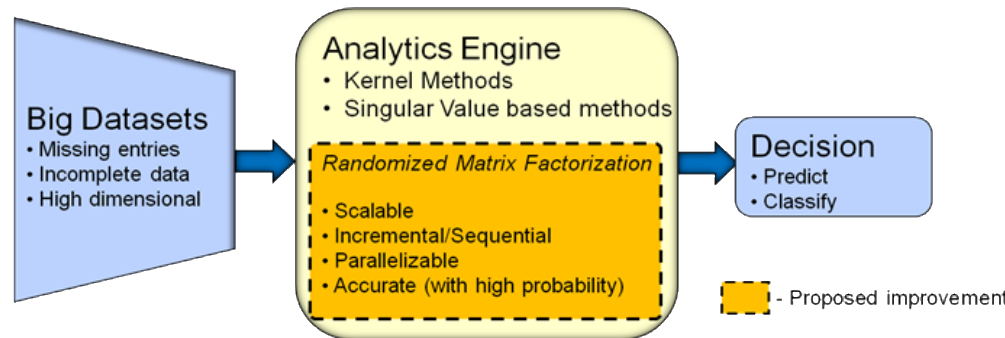
Assistant Professor

Department of Electrical and Computer Engineering

**Research Interests:** Secure and Efficient Autonomous Systems; Planning under uncertainty



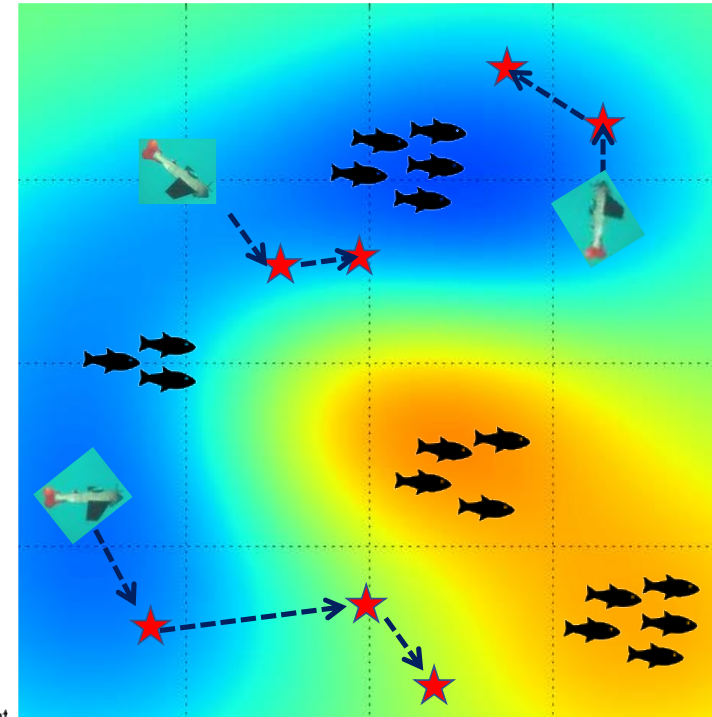
**Attack-resilient Mobile Networks**



**Fast computing approaches**



**Efficient and effective target tracking**







**Shanelle N. Foster, Ph.D.**

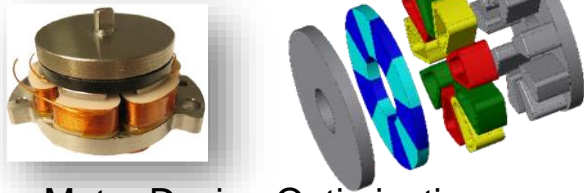
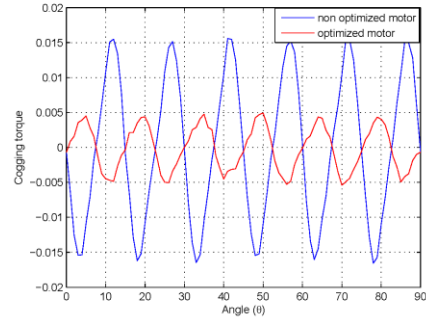
Assistant Professor

Department of Electrical and Computer Engineering

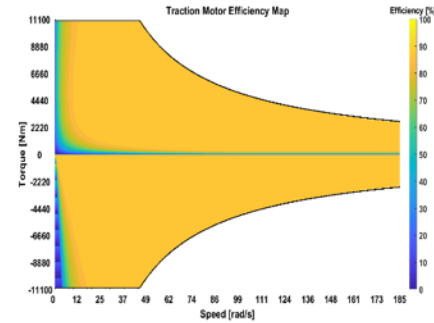
Research Interests: Electrical Machine and Drive Design Optimization; 3D Printed Electric Motors; Failure Diagnosis, Prognosis and Mitigation Strategies



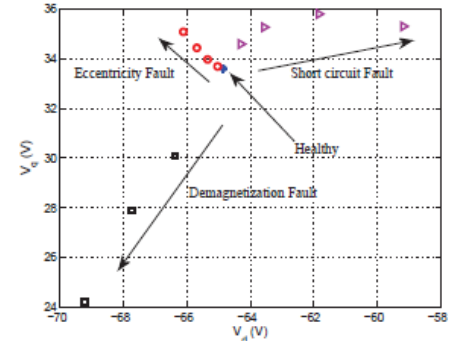
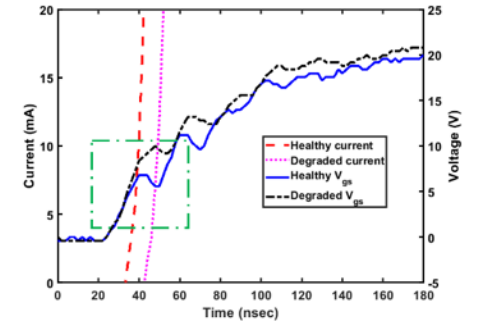
3D Printing of Magnetic Cores for Electrical Motors



Motor Design Optimization



Traction Motor for Zero-emission Locomotive



Fault Diagnosis Algorithms



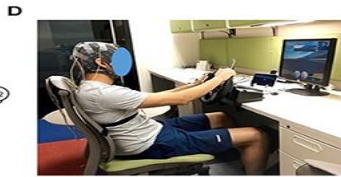
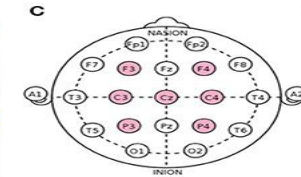


**Tongtong Li, Ph.D.**

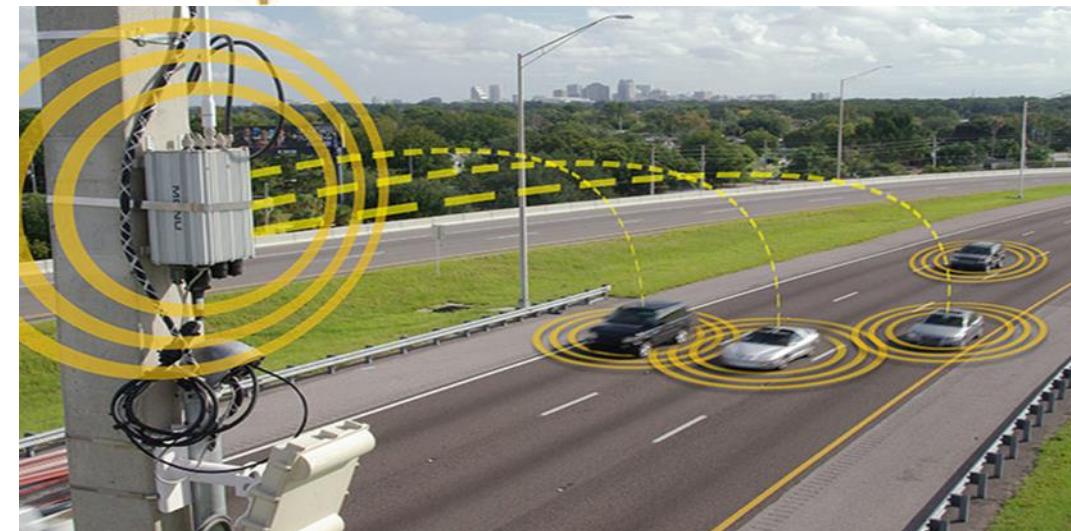
Professor

Department of Electrical and Computer Engineering

**Research Interests:** 5G-6G Wireless Communications and Networking; Wireless Security; Connected and Autonomous Vehicles; Driver Wellness Evaluation



National Science Foundation







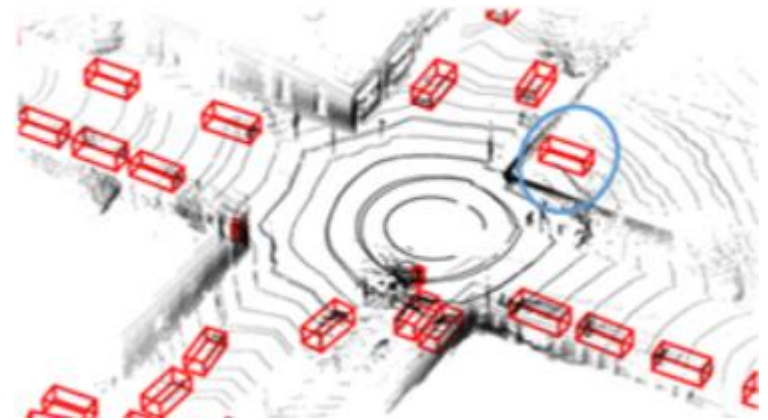
**Daniel Morris, Ph.D.**

Associate Professor

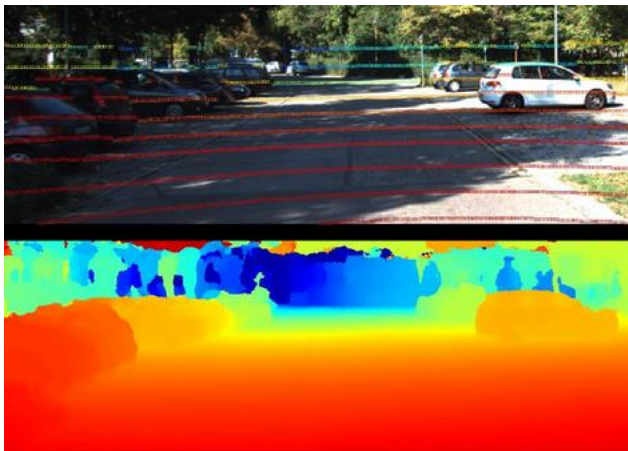
Department of Electrical and Computer Engineering

Research Interests: 3D Sensing, Sensor Fusion,

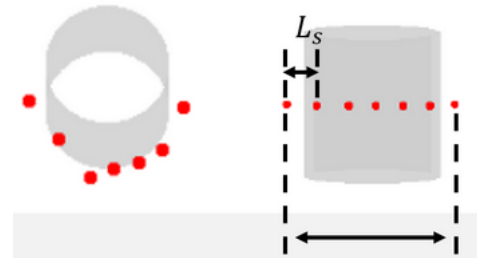
Object Detection and Tracking



Global track association for vehicle tracking



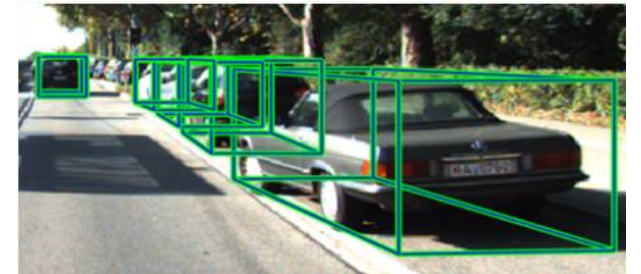
Lidar-camera depth completion



Accurate lidar-based 3D shape 3D estimation



Radar-camera fusion



Lidar-camera fusion for accurate object detection

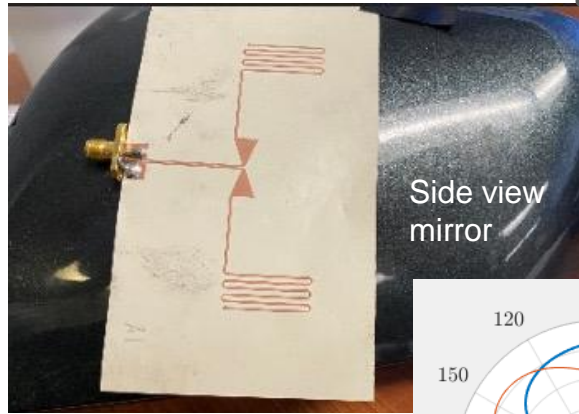
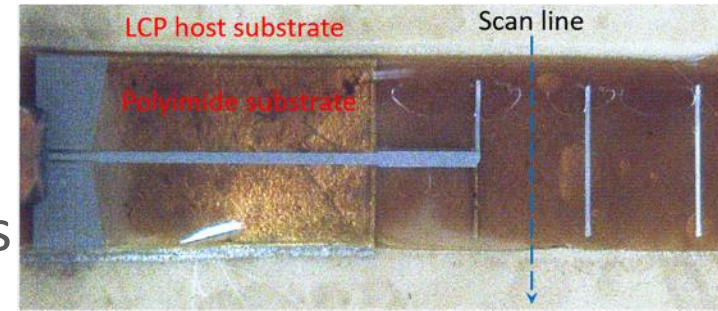




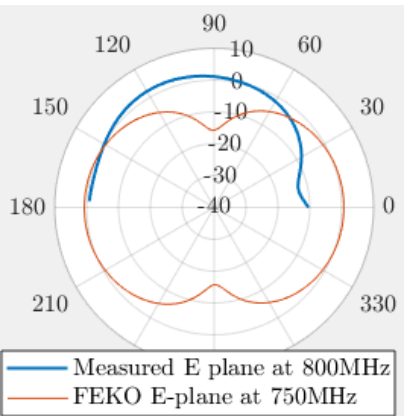


# John Papapolymerou, Ph.D.

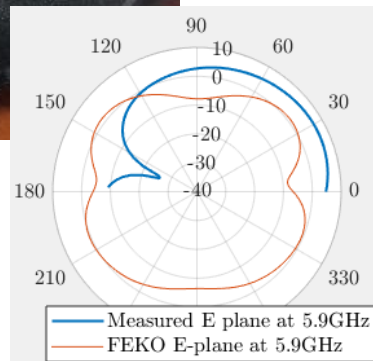
MSU Foundation Professor and Department Chair  
 Department of Electrical and Computer Engineering  
 Research Interests: RF/Microwave & mm-wave circuits and systems; Antennas; Radars and wireless sensors; Additive manufacturing for RF components & systems



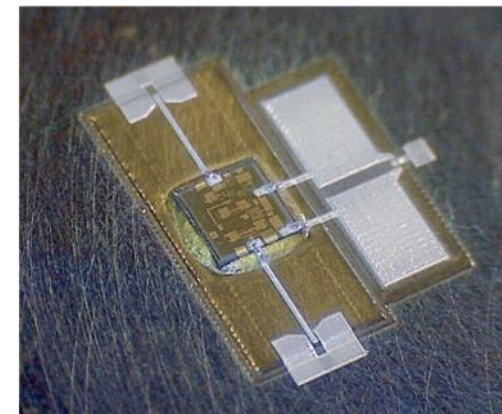
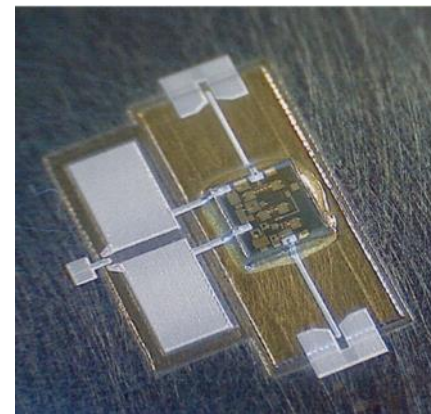
Additively Manufactured RF hardware for automotive radars & wireless communication systems (e.g. C-V2X and 5G)



Cellular and C-V2X



Conformal Lightweight Vehicular Antennas





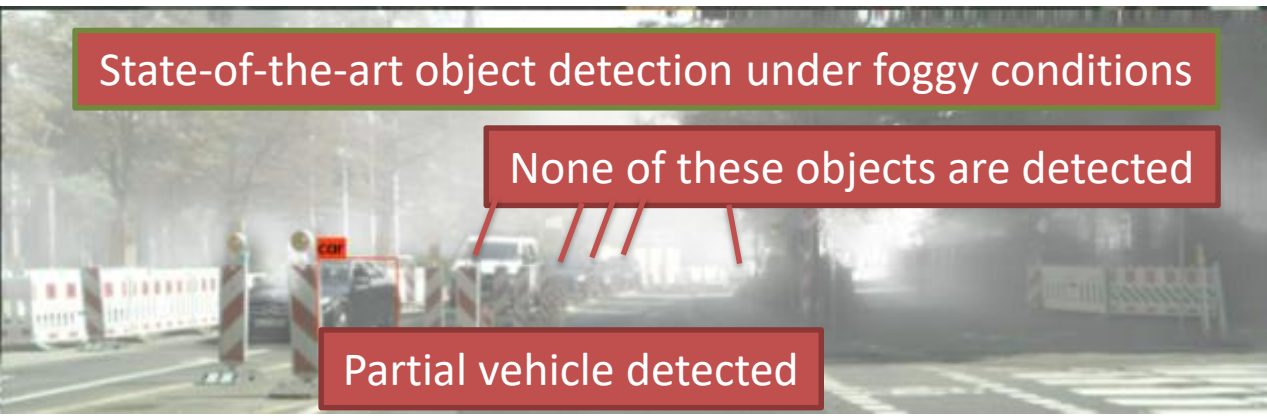
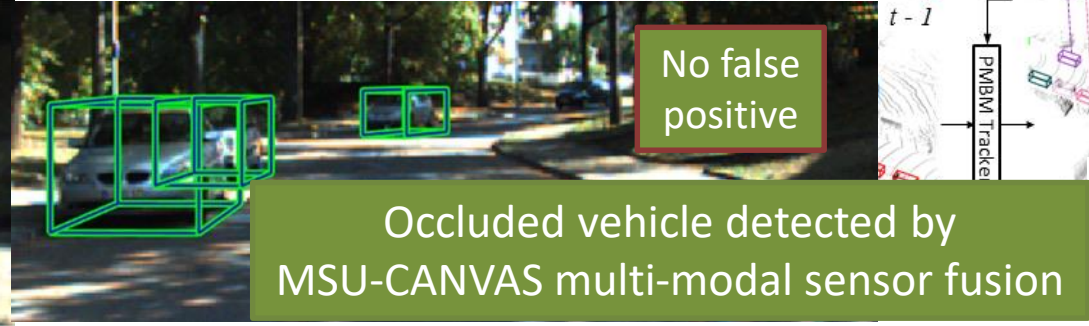
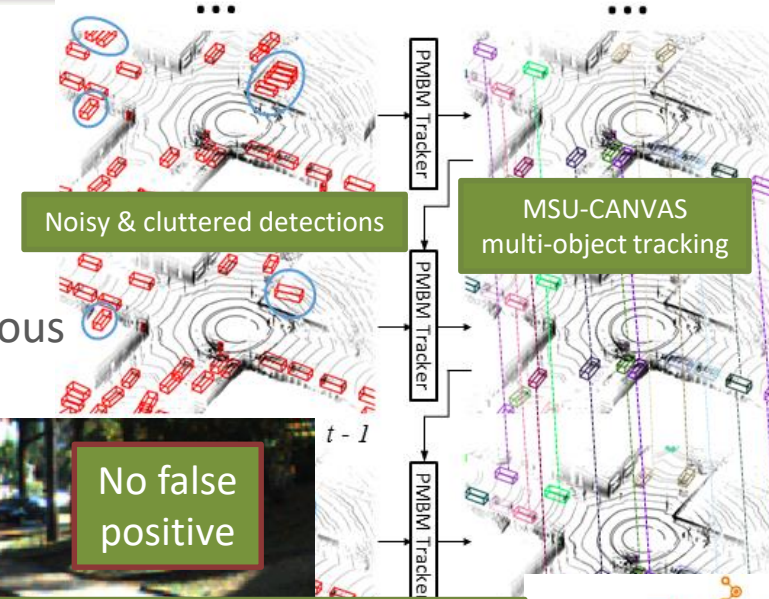


### Hayder Radha

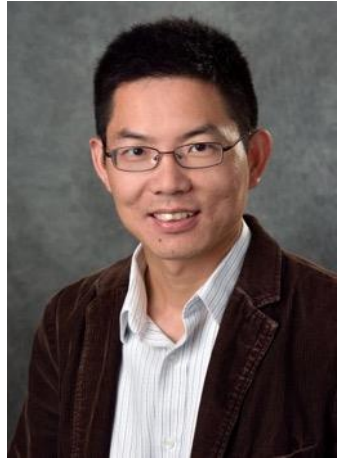
MSU Foundation Professor

Department of Electrical & Computer Engineering

Research Interests: Autonomous and Connected Vehicles; Multi-modal Sensor Fusion; Deep Learning Architectures & Algorithms for Autonomous Systems; Multi-object Tracking; Statistical Signal Processing





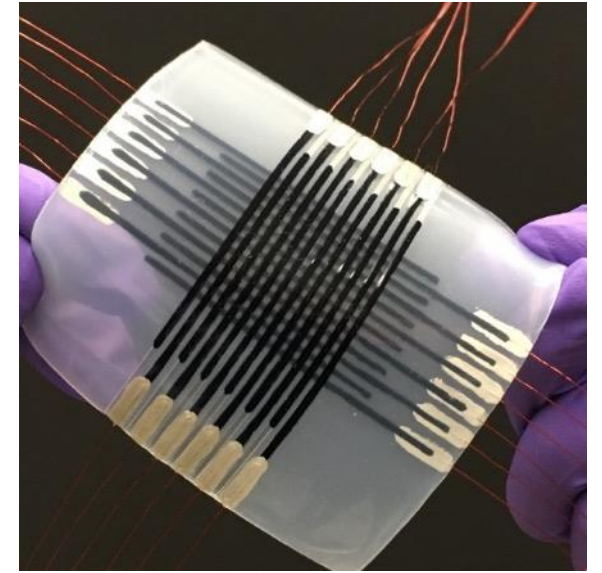


**Xiaobo Tan, Ph.D., Fellow of IEEE, ASME**

MSU Foundation Professor & Richard M. Hong Endowed Chair

Department of Electrical and Computer Engineering

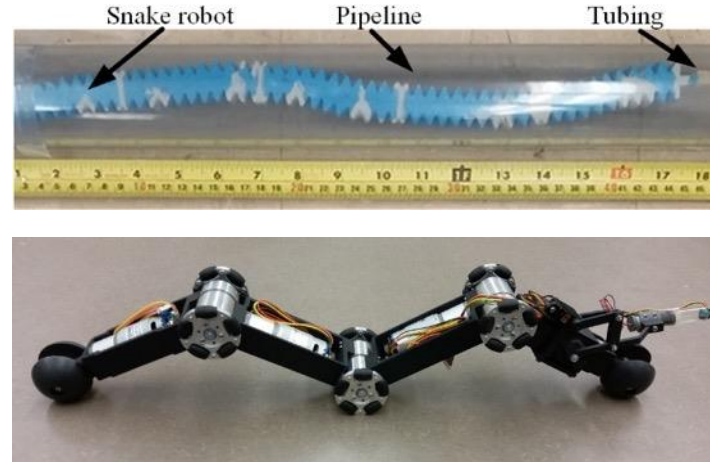
Research Interests: Control of Autonomous Systems, Underwater Robots, Soft Robots, Sensors and Actuators, Mobile Sensing



Gliding Robotic Fish



Autonomous Surface Vehicle



Soft and Rigid Snake Robots

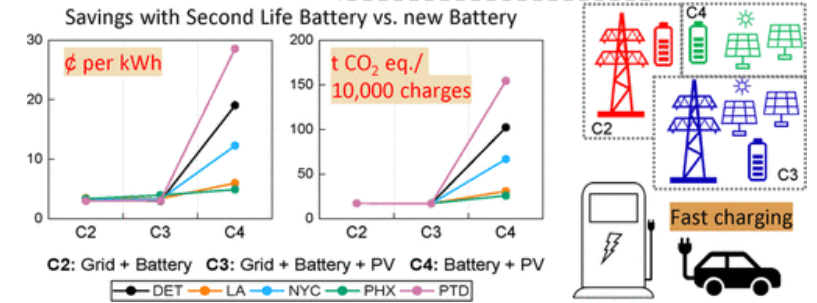


Soft Sensors and Actuators

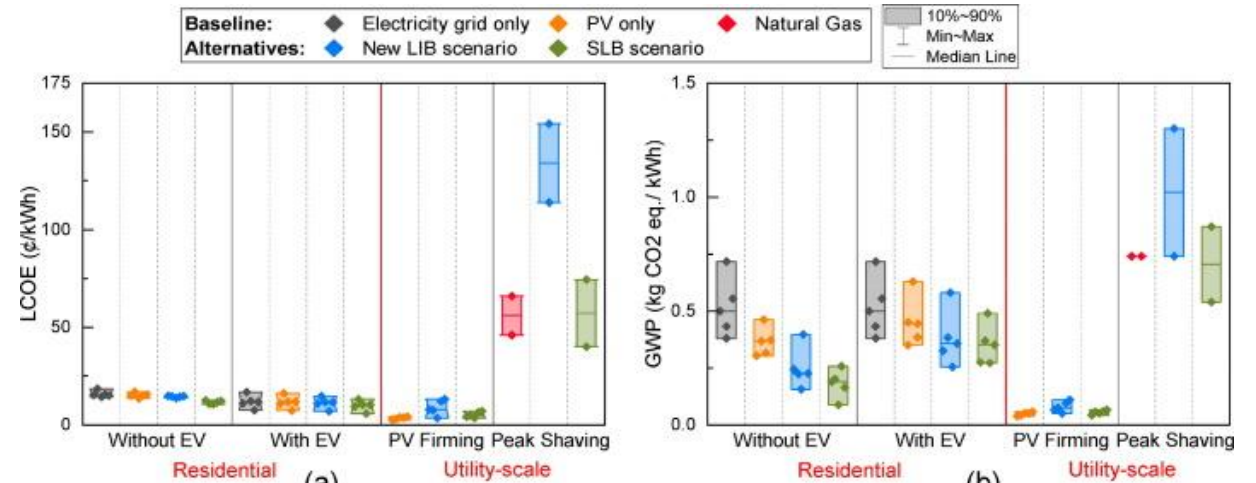




**Annick Anctil, Ph.D.**  
 Assistant Professor  
 Department of Civil and Environmental Engineering  
 Research Interests: Life-cycle assessment, Remanufacturing 2nd life battery from EV; Renewable energy system design; Interactive decision tool



Economic & environmental feasibility of 2<sup>nd</sup> life batteries for EV fast-charging



Interactive decision tool for battery storage, solar and EV charging

Cost and carbon footprint of second-life battery in residential and utility-level applications





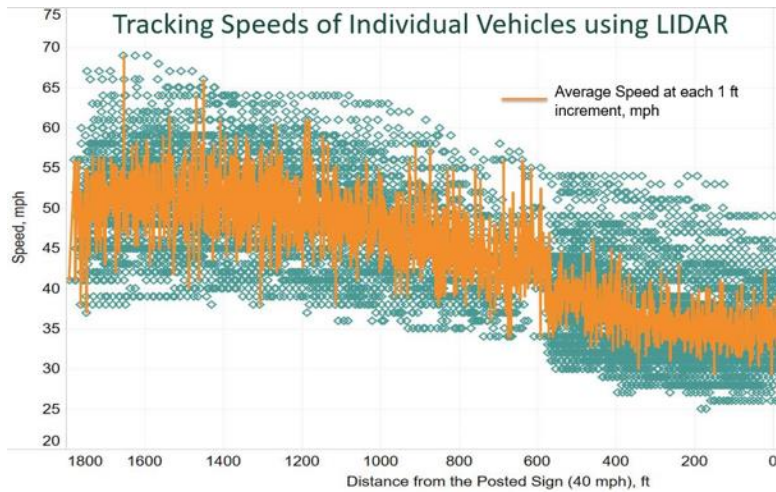


# Timothy J. Gates, Ph.D., P.E.

Associate Professor

Department of Civil and Environmental Engineering

Research Interests: Traffic Control Devices; Motorist Behavior; Road Safety; Statistical Methods; Traffic Operations; Peds/Bicyclists; Transportation Economics



Monitoring Vehicle Speed Profiles



Experimental Traffic Control Devices

## Using Technology to Manage Driver Behavior



U.S. Department of Transportation  
Federal Highway Administration



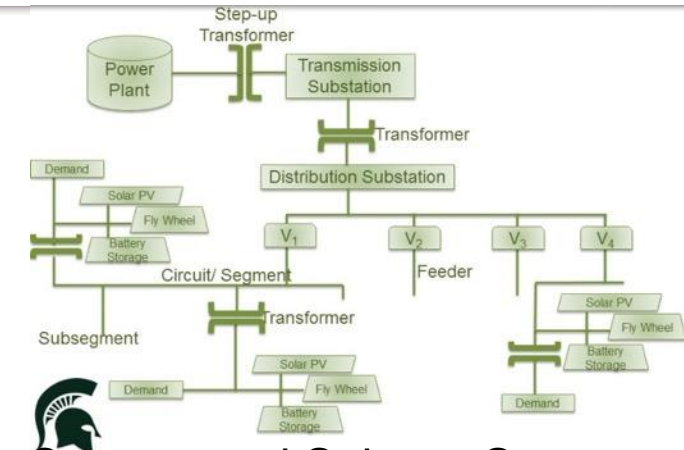


**Mehrnaz Ghamami, Ph.D.**

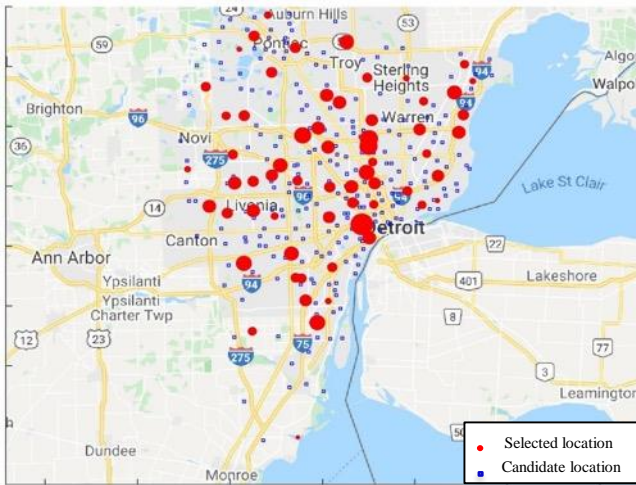
Assistant Professor

Department of Civil and Environmental Engineering

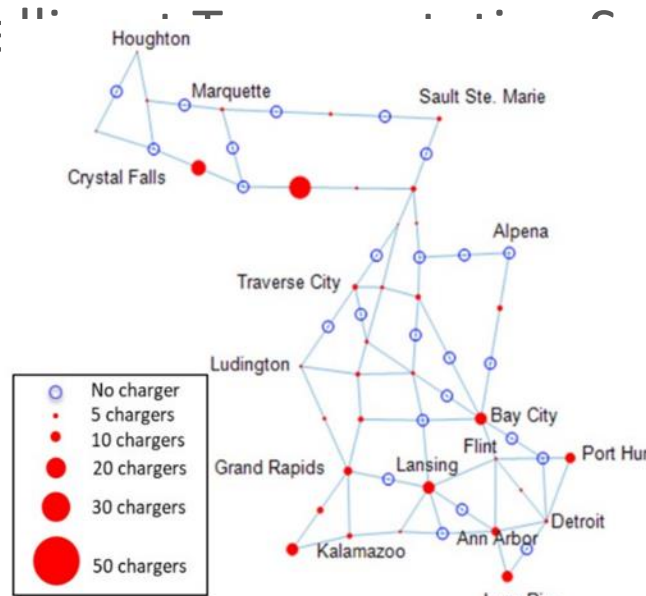
Research Interests: Sustainable Transportation, Transit Operations, and Intelligent Transportation Systems (ITS)



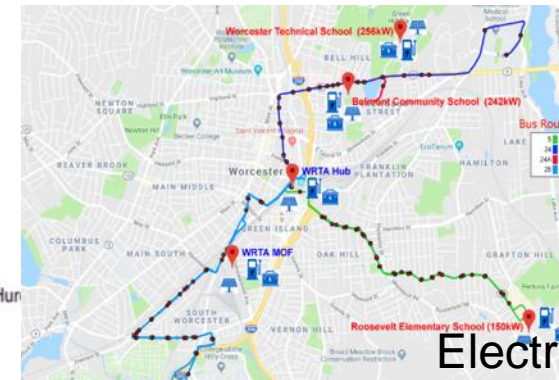
Storage and Solar to Support EV's DC Fast Charging



EV Charger Placement- Urban trips in Michigan



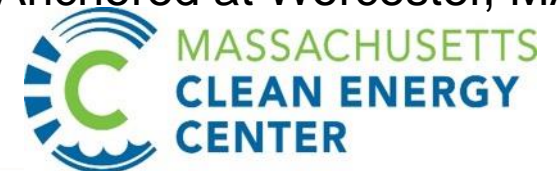
EV Charger Placement- Intercity trips in Michigan



Electric Buses- Transportation-Based Community Micro-grid Anchored at Worcester, MA



MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY





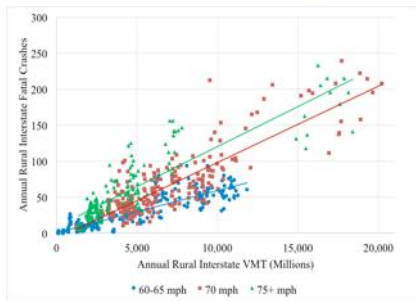
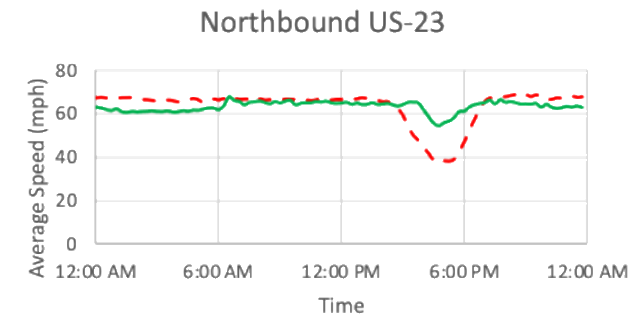
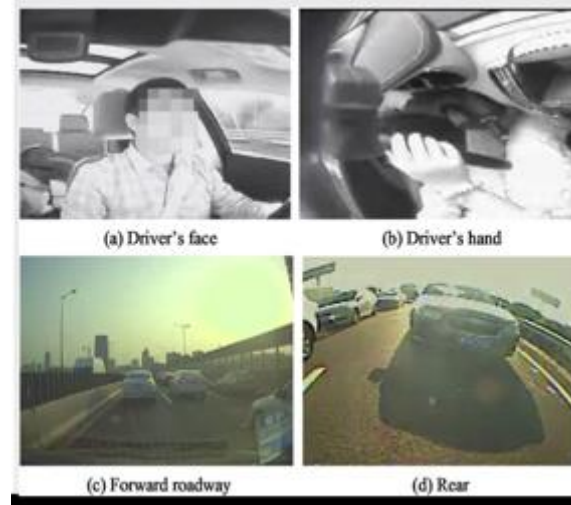
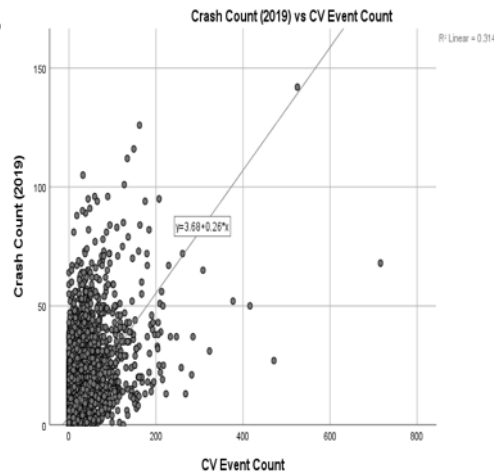
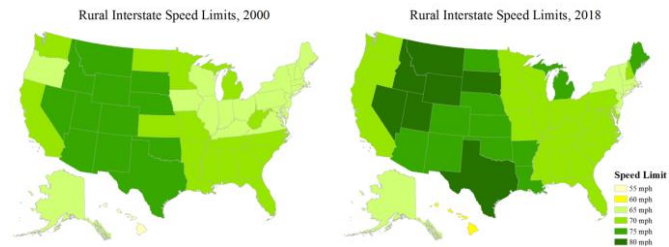


**Peter T. Savolainen, Ph.D., P.E.**

MSU Foundation Professor

Department of Civil and Environmental Engineering

Research Interests: Transportation Safety; Statistical and Econometric Methods; Traffic Operations; Connected and Autonomous



CV Data as Leading Predictors of Crashes



Naturalistic Driving



U.S. Department of Transportation  
Federal Highway Administration

Shoulder Use as a Temporary Lane



Speed Limit Policies



# Ali Zockaie, Ph.D.

Assistant Professor

Department of Civil and Environmental Engineering

Transportation Network Modeling; Mathematical Optimization; Sustainability; Connected and Autonomous Vehicles



Smart Campus Design (Electric Autonomous Shuttles)

Collision Avoidance and Mitigation Systems (Winter Maintenance Operations)



Large-scale simulation of CAVs



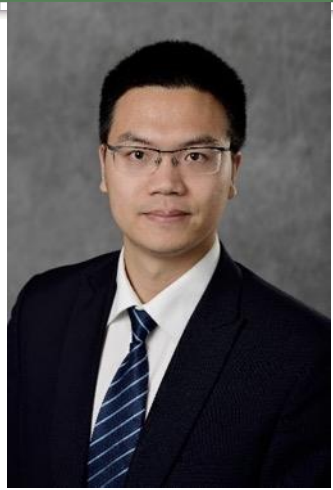
Green Transportation Modes for Freight Delivery



USTDA  
U.S. TRADE AND DEVELOPMENT AGENCY







**Zhaojian Li, Ph.D.**

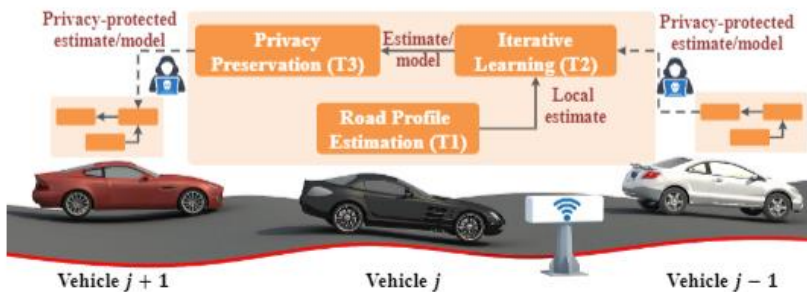
Assistant Professor

Department of Mechanical Engineering

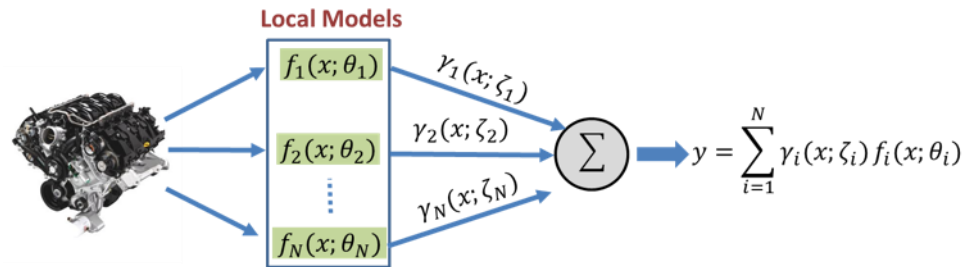
Research Interests: Connected and Autonomous Vehicles, Robotics, Control Theory, Vehicle Dynamics and Control

Robotic fruit harvesting

Privacy-preserved collaborative road information crowdsourcing



Online system identification and predictive control of nonlinear systems





## Tamara Reid Bush, Ph.D.

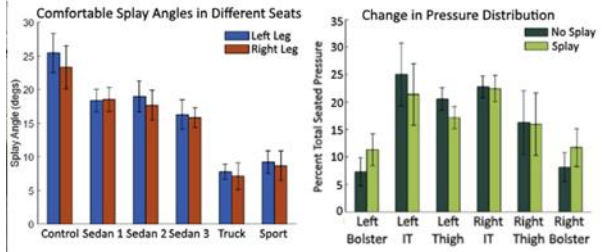
Associate Professor, Faculty Excellence Advocate  
 Mechanical Engineering Department

Research Interests: Seating Mechanics, Injury, Design for Disability and Micro-mobility



NSF Disability and Rehabilitation Engineering Program

DENSO North America Foundation



Human/ Vehicle Interactions



Designing to support persons with disabilities



E-scooter Injury Mechanics







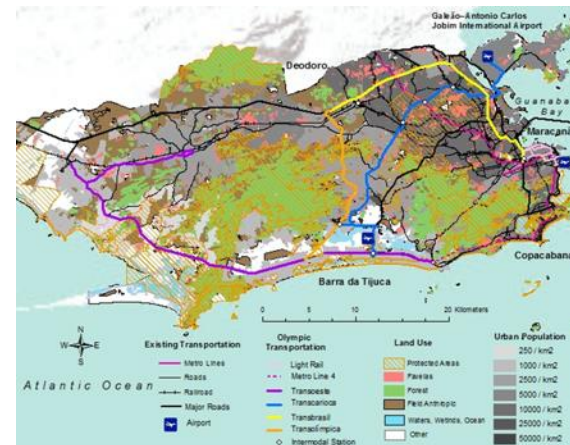
## Eva Kassens-Noor, Ph.D.

Associate Professor, School of Planning, Design, and Construction & Global Urban Studies Program

Adjunct Department of Geography, Environment and Spatial Sciences

Adjunct Department of Civil and Environmental Engineering

Research & Teaching Interests: Transportation, Artificial Intelligence such as AVs & domotics; Extreme Events such as Olympic Games and Pandemics; Learning



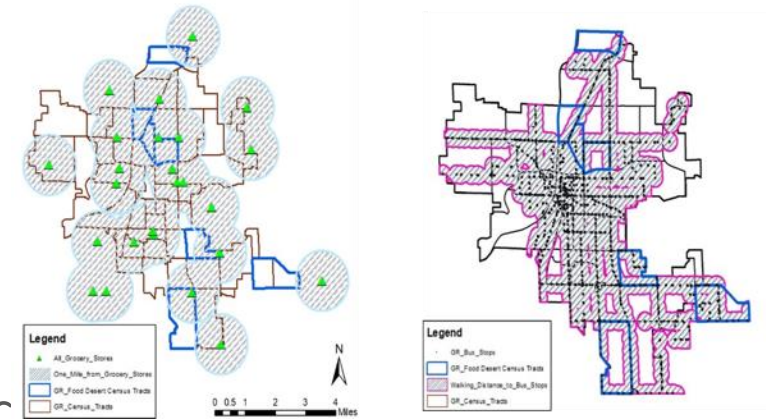


**Zeenat Kotval-K, Ph.D., AICP**

Assistant Professor

School of Planning, Design & Construction

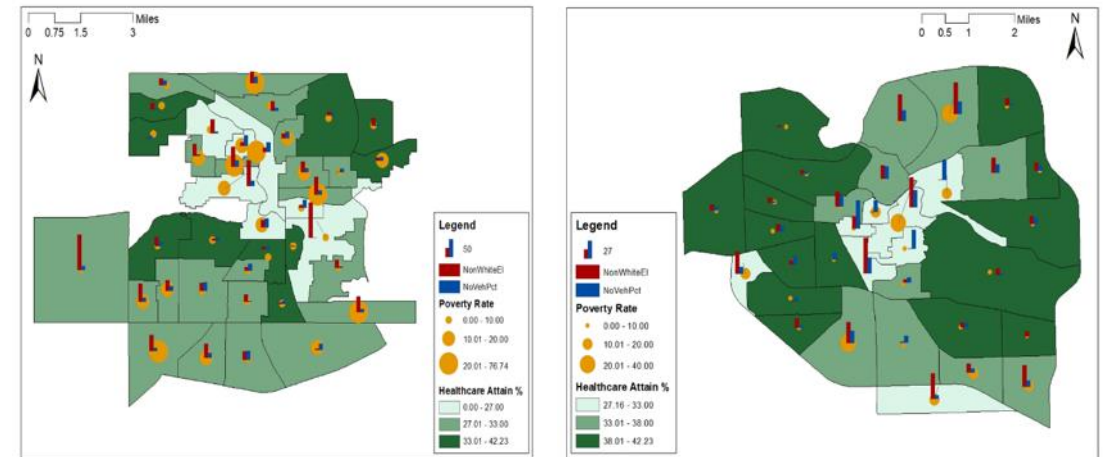
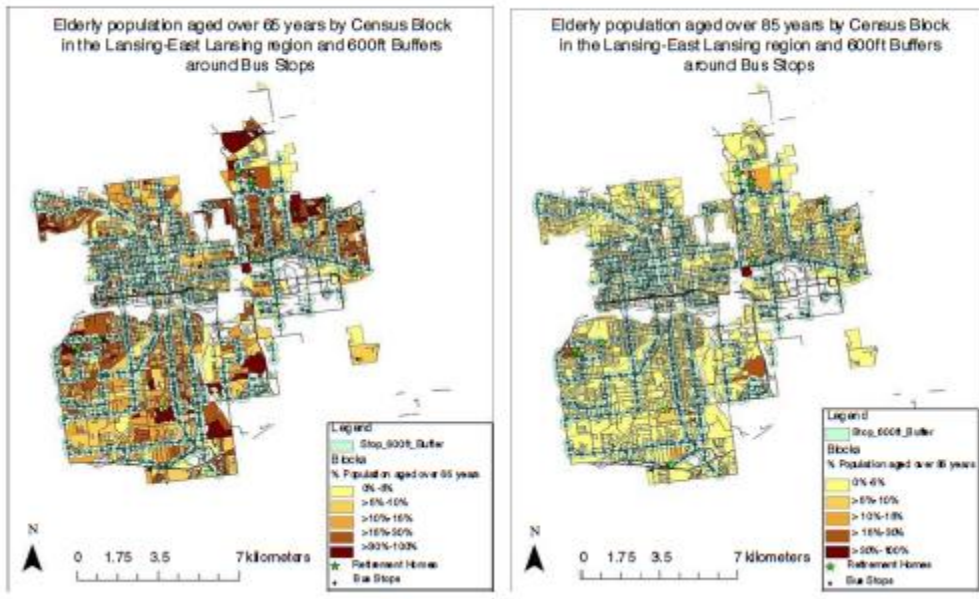
Research Interests: Travel Behavior, Health, Aging Population, & Food Systems



Access to Food & Public Transit in Grand Rapids, MI



Comparison of population 65 years and over and 85 years and over living within 600 feet of a bus stop



Poverty, Race, and Healthcare Attainment in Lansing and Ann Arbor





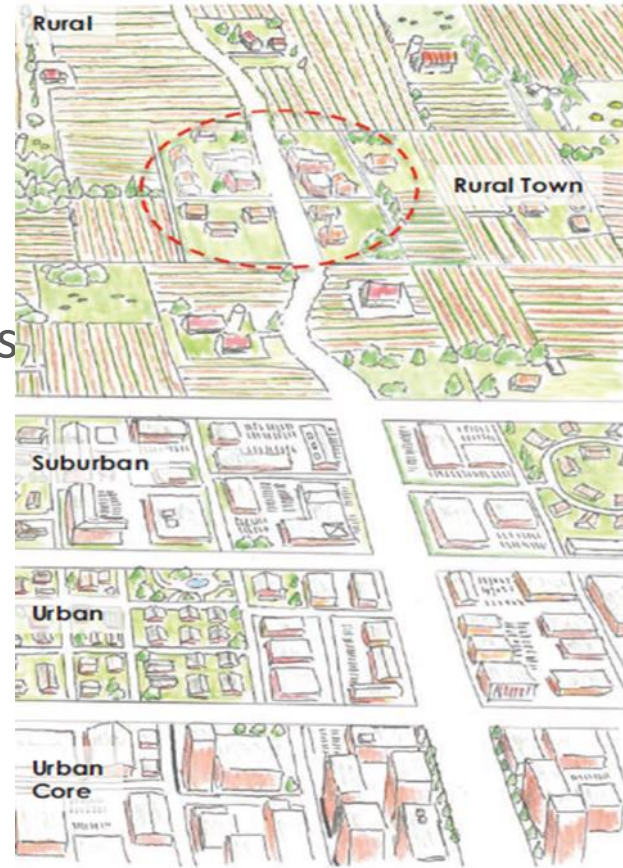


T. Teresa Qu, Ph.D., P.E.

Associate Professor

School of Planning, Design, and Construction

Research Interests: **Active Transportation**; **Accessible Transportation**; **Autonomous Vehicles for People with Disabilities**



Source: DAVID PAUL MORRIS / BLOOMBERG / GETTY

Micro-mobility



Best Practices in Walking/Biking

Context Sensitive Solutions/Design

Autonomous Vehicles for People with Disabilities

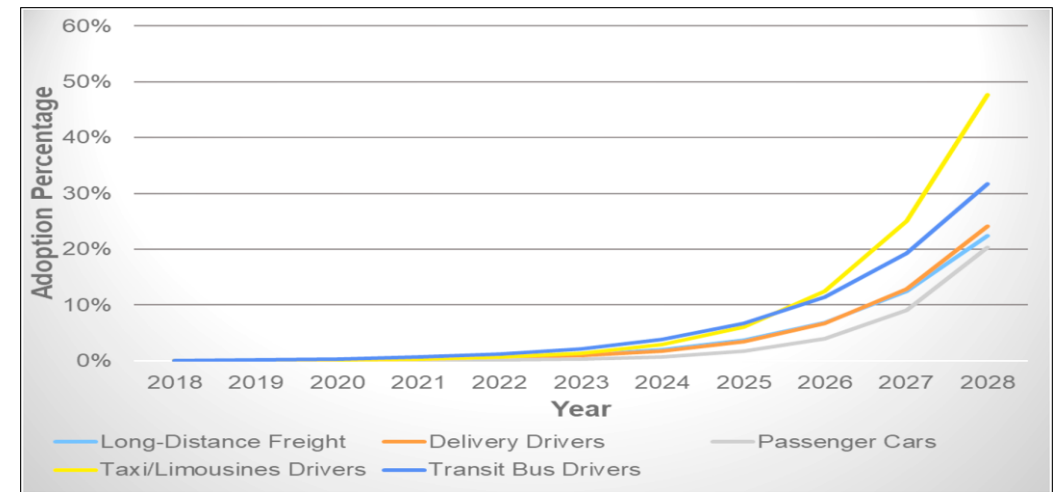


## Elizabeth Mack, Ph.D.

Associate Professor and Associate Chair

Department of Geography, Environment, and Spatial Sciences

Research Interests: Access and use of emerging technologies including autonomous vehicles and broadband enabled internet technologies







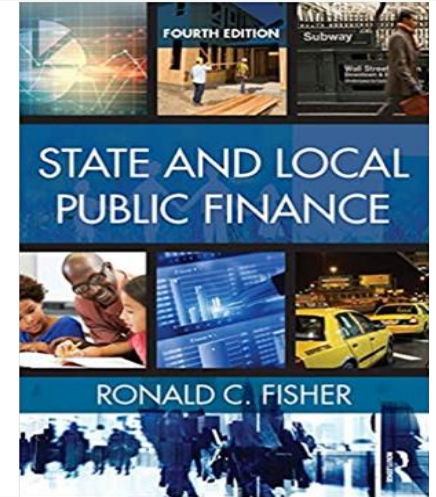
**Ronald Fisher, Professor of Economics**

Research: state and local government finance; taxation and public service provision; intergovernmental fiscal relations



**Ron Fisher** @RonCFisher · Mar 3

Autonomous vehicles and related transportation changes promise dramatic social effects, including for the finances of states and localities. See the Forum in the latest NTJ: [ntanet.org/NTJ/73/1/](https://ntanet.org/NTJ/73/1/)



*National Tax Journal*, March 2020, 73 (1), 235–258

<https://doi.org/10.17310/ntj.2020.1.07>

**GOVERNMENTAL EXPENDITURE IMPLICATIONS OF AUTONOMOUS VEHICLES**

Ronald C. Fisher

**TPI** Home About Articles Briefs Contribute Authors Topics Contact us Resources

**Fiscal Implications of the Coming Transportation Revolution**

15 June 2020

by Ronald Fisher



**Table 1**  
Potential Expenditure Effects Related to Autonomous Transportation

Category	Public Service	Expected Expenditure Effect
Immediate demand effects	Road use (vehicle-miles)	↑ or ↓
	Use of parking facilities	↓
	Use of the judiciary	↓
	Use of public transit	↑ or ↓
Production of public services	Road infrastructure	↑ or ↓
	Traffic enforcement	↑ or ↓
	Transportation regulation	↑
	Transit production	↓
	Waste collection production	↓
	Others	
Long-run indirect effects	Public health care	↓
	Unemployment insurance	↑
	Worker retraining	↑
	Welfare	↑



## Nicholas Wittner, J.D.

Professor in Residence

College of Law

Research Interests: Automated Vehicles and the Law

- Pioneering Work Developing Model Regulations and Regulations for Deployment of Highly Automated vehicles
- Groundbreaking “Automated Vehicles and the Law” Course Bringing Together Multi-Disciplinary Experts in Law, Government, Engineering
- 2018 and 2019 World Congress on Legal Issues of ADAS and AV Chaired by MSU Law Professor (Also Keynote Presentations)







Dr. Rabindra Ratan

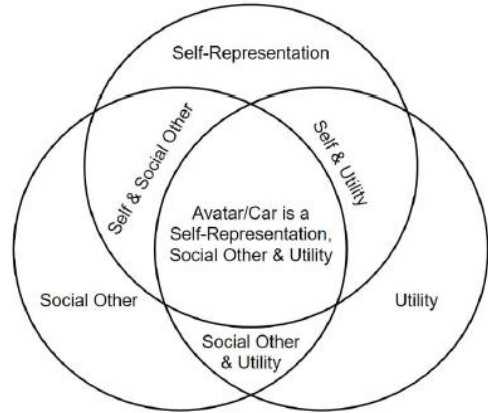


Figure 1. Venn diagram of avatars (or cars) as self-representations, social others, and/or utilities.

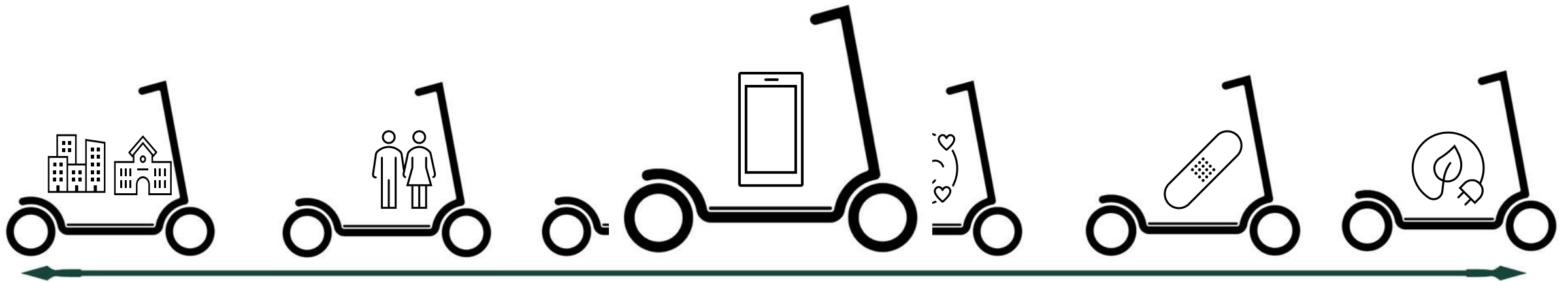
Ratan, 2019



Lee, Ratan, Park, 2019



Kelsey Earle



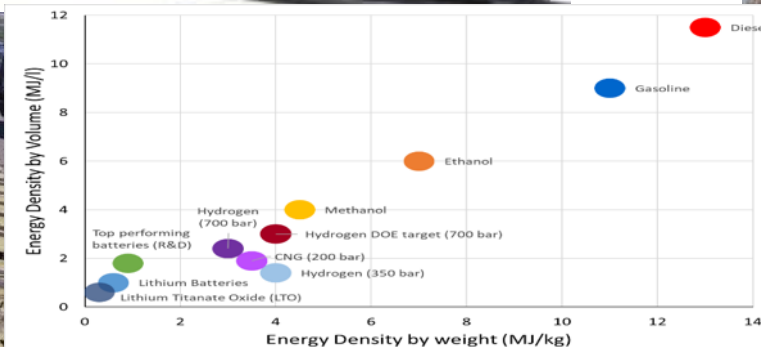
Funding provided by Gotcha – an e-scooter rental company

Scooter clip art <https://www.123rf.com/clipart-vector/scooter.html?sti=ldzaydz5uxz9r5rmjoi>



**Nick Little**, Director Railway Education  
 Center for Railway Research & Education  
 The Eli Broad College of Business

Research: Passenger & Freight Rail Innovation & Mobility;  
 Low- and Zero Emissions Motive Power; Shipper/Carrier  
 Relationships; North American Rail Intermodal Freight; Single Carload  
 Efficiency & Effectiveness





## Research Experiences for Undergraduates (REU) Site: Sociomobility

This annual program involves multidisciplinary projects that focus on *sociomobility* -- research at the intersection of engineering and the social sciences. These projects will:

- (1) examine social, political, legal, and economic concerns that may affect the widespread adoption of AVs;
- (2) assess issues related to social equity and the accessibility of AVs to groups with limited mobility alternatives, including adolescent, elderly, low-income, and disabled individuals; and
- (3) study the implications of AVs on public health, urban planning, workforce development, and the environment.

