

GANDHIMATHI (MATHI) PADMANABAN

Ph.D. Candidate
University of Michigan-Dearborn

gmathi@umich.edu
Website - GitHub - LinkedIn

EDUCATION

- Apr 2026 **Ph.D., Industrial and Systems Engineering** - *University of Michigan-Dearborn, USA*
Dissertation: “Enhancing Transportation Safety: Research on Driver Behaviors Using Advanced Machine Learning”
Advisor: [Dr. Fred Feng](#)
- 2021 **M.S., Human Centered Design and Engineering** - *University of Michigan-Dearborn, USA*
Thesis: “[Computational Human Performance Modeling using Queuing Network in an Open-Source Platform](#)”
Advisor: [Dr. Fred Feng](#)
- 2013 **B.E., Computer Science and Engineering** - *Anna University, India*
Thesis: “Automated Detection of Modifications in Software Requirement Traceability Links”
Advisor: Prof. Ramachandran Alagarsamy
- Certifications:** Connected & Automated Transportation Certificate (*Dec 2025*); Rackham DEI Certificate (2025); Post Graduate Diploma in Computer Applications (2011)

PUBLICATIONS (4 PEER-REVIEWED; 2 UNDER REVIEW; 1 IN PREPARATION)

Peer-Reviewed Papers

- [Gandhimathi Padmanaban](#), Nathaniel P. Jachim, Hala Shandi, Lilit Avetisyan, Garrett Smith, Howrah Ham-moud, and Feng Zhou. “An Autonomous Driving System - Dedicated Vehicle for People with ASD and their Caregivers”. *AutomotiveUI '21 Adjunct: 13th International Conference on Automotive User Interfaces and Interactive Vehicular Applications*. Association for Computing Machinery, 2021, pp. 142–147. DOI: <https://doi.org/10.1145/3473682.3480282>.
- [Gandhimathi Padmanaban](#), Fred Feng, Edward Dai, Ankit Saini, Guopeng Hu, and Yanan Zhao. “A Comparative Analysis of Acceleration and Deceleration Profiles for Aggressive Driving Styles and Fuel Economy Test Cycles”. *WCX SAE World Congress Experience*. 2025. DOI: <http://dx.doi.org/10.4271/2025-01-8605>.
- [Gandhimathi Padmanaban](#), Rayane Moustafa, and Fred Feng. “A Geometry-Informed Computer Vision Method for Detecting and Examining Overtaking Vehicles From A Bicycle”. *TRB Annual Meeting (Accepted)*. 2026.
- Rayane Moustafa, [Gandhimathi Padmanaban](#), and Fred Feng. “Quantifying Drivers-Overtaking-Bicyclists with Surrogate Safety Measures Derived from High-Resolution Digital Lidar”. *TRB Annual Meeting (Accepted)*. 2026.

Papers Under Review & In Preparation

- “A Machine Learning Pipeline Framework to Identify Aggressive Driving Based on Vehicle Kinematics and Driver’s Pedal Operations”. *Under review*.
- “Geometry-Informed Distance Estimation from 2D Bounding Boxes for Vehicle Overtaking Analysis”. *Under Review*.
- “Does Vehicle Type Influence Cyclist Overtaking Behavior? A Fine-Grained Vehicle Detection and Geometry-Informed Analysis Framework”. *In Preparation*.

AWARDS AND GRANTS

- [Student Visionary Award](#) - International Forum on Research Excellence Conference(IfORE’ 25), Sigma Xi-The Scientific Research Honor Society, 2025
- [Upsilon Pi Epsilon \(UPE\) Scholarship](#) - Awarded for exceptional academic performance, extracurricular involvement, and leadership within the computing community, 2024

- [Global Finalist - NASA Space Apps Challenge](#), 2023
- [Irma M. Wyman Scholar](#), *Center for the Education of Women (CEW+)*, *University of Michigan*, 2020-2021 (\$11,500)
- Non-Resident Graduate Student Scholar, *University of Michigan-Dearborn*, 2020-2021 (\$13,000)
- Deloitte Hackathon Special Mention, 2017 | Syncfusion Hackathon 2nd Place, 2015 (INR 35,000)

TALKS AND PRESENTATIONS

Talks

- **[WOC] Code – University of Michigan Ann Arbor**, Feb 2024
[NASA SpaceApps Experience: DigitwiML – Open-Source Project to model Digital Twin of C.elegans in Space](#)
- **University of Michigan–Dearborn**, Sep 2021
Guest Talk: IMSE 501 Human Factors & Ergonomics

Conference Presentations

- **Transportation Research Board Annual Meeting**, Jan 2026 (*Poster-Upcoming*)
[A Geometry-Informed Computer Vision Method for Detecting and Examining Overtaking Vehicles From A Bicycle](#)
- **International Forum on Research Excellence (IFoRE' 25)**, Oct 2025 (*Workshop Session*)
[Hybrid Physics-Data Modeling for Sustainable Transportation: Bridging Classical Models and Modern AI](#)
- **Automotive User Interfaces (AutoUI) Conference**, Apr 2025 (*Paper Presentation*)
[A Comparative Analysis of Acceleration and Deceleration Profiles for Aggressive Driving Styles and Fuel Economy Test Cycles](#)
- **WCX SAE World Congress Experience**, Sep 2021 (*Paper Presentation*)
[An Autonomous Driving System – Dedicated Vehicle for People with ASD and their Caregivers](#)

RESEARCH SOFTWARE & OPEN SOURCE PROJECTS

- **DigitwiML**: Digital Twin modeling platform for C.elegans in space (NASA SpaceApps Project) - [GitHub](#)
- **Human Performance Modeling Tools**: Open-source queuing network simulation platform for computational human performance modeling (Python)
- **Geometry-informed overtaking tracker** - Computer Vision system for tracking of vehicle overtaking bicyclist (Python)

RESEARCH EXPERIENCE

2022–Now	Graduate Student Research Assistant - <i>University of Michigan-Dearborn, USA</i> Advisor/PI: Dr. Fred Feng
2011–13	Research Assistant - <i>Anna University, India</i> Advisor/PI: Prof. Ramachandran Alagarsamy

PROFESSIONAL EXPERIENCE (INDUSTRY)

2017–18	Development Lead/Consultant Deloitte (Offices of the US) – Bangalore, India
2015–17	Programmer Analyst Cognizant – Chennai, India
2013–15	Software Engineer Level-II Syncfusion – Chennai, India

TEACHING AND MENTORING

- 2024–Now **Certified Instructor** - *The Carpentries*
Hands-on Data Science & Programming Workshops (Python data analysis, visualization, Git).
[University of Tennessee Knoxville \(May 2025\)](#) | [CZI Foundation \(Nov 2024\)](#) | [University of Michigan \(Mar 2024\)](#)
- 2023–Now **Instructor & Mentor** - *WoCCode* - *University of Michigan-Ann Arbor*
Machine Learning and Python workshop: materials open-sourced. [Machine Learning Workshop \(Feb 2024\)](#) | [Summer 2023 Boot Camp](#)
- 2010–12 **Student Instructor / Teaching Assistant** - *Anna University, India*
Courses: Artificial Intelligence, Probability and Queuing Theory, Transforms and PDEs, Systems Software Laboratory

SERVICE AND LEADERSHIP

Leadership: President, [Upsilon Pi Epsilon Michigan Beta Chapter \(2024-2025\)](#) • Member: [SAE International \(AI in Simulation Task Force\)](#), [Sigma Xi](#), [Alpha Pi Mu](#), [Society of Industrial and Applied Mathematics](#), [ACM](#), [HFES](#)

Reviewer: [TRB Annual Meeting 2026](#), [ICIS 2025](#), [AutoUI 2024](#), [CHI 2024](#), [AMCIS 2024](#), [CUI 2024](#), [IMX 2024](#), [DIS 2024](#)

Community: [MIDAS AI Summit Student Volunteer \(2023,2025\)](#) • [WoC|CodeNova Hackathon Judge \(2025\)](#) • [WocCode Mentor](#) • [Certified Instructor](#) & [Lesson Maintainer](#) • [NASA SpaceApps](#) & [MHacks](#) Judge • [STEM High School Tutor \(2010-13\)](#)

TECHNICAL EXPERTISE

<i>AI/ML Methods</i>	Geometry-Informed Computer Vision, Deep Learning (CNN, RNN, Transformers), Supervised Learning, Ensemble Methods, Time Series Analysis, Bayesian Methods, Physics-Informed Machine Learning, Uncertainty Quantification and Calibration, Out-of-Distribution Detection
<i>Domains</i>	Transportation Safety, Driver Behavior Analysis, Driver-Bicyclist Interactions, Human Factors Engineering, Naturalistic Driving Studies
<i>Tools & Frameworks</i>	OpenCV, YOLOv5, RT-DETR, ByteTrack, Multi-Object Detection & Tracking, Multi-Modal Data Fusion, LiDAR
<i>Programming</i>	Expert: Python (TensorFlow, PyTorch, scikit-learn, OpenCV, pandas), Git, \LaTeX ; Proficient: Julia, R, MATLAB, C#, UI Frameworks, SQL; HPC: Great Lakes cluster (Slurm), Docker
<i>Research</i>	Experimental Design, Statistical Analysis, Scientific Writing, Peer Review, Institutional Review Board (IRB) Protocols, Cross-Validation, Academic Collaboration
<i>Foundations</i>	Optimization, statistical learning, multivariable calculus, mathematical modeling, geometric computer vision, vision transformers, multimodal/VLM (pretraining, attention, evaluation)