

Ziran Wang

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SUMMARY

Currently lead the Digital Twin Lab as an Assistant Professor and direct the Institute for Control, Optimization and Networks as an Assistant Director at Purdue University, and previously led the Digital Twin research at Toyota Motor North America as a Principal Researcher. Published more than 80 refereed papers in premier journals and conference proceedings and filed more than 50 patent applications worldwide. Serve as the Founding Chair of the IEEE technical committee on Internet of Things in Intelligent Transportation Systems, and associated editor of six academic journals. Research achievements were demonstrated at the Consumer Electronic Show (CES) in Las Vegas, featured by mainstream media including ABC, CBS, and FOX, and acknowledged by the US Department of Transportation Dissertation Award and seven best paper awards. Research interests include autonomous vehicles, intelligent transportation, digital twins, human-autonomy teaming, and embodied AI.

EMPLOYMENT

Purdue University, College of Engineering (West Lafayette, IN)

- Assistant Professor, Elmore Family School of Electrical and Computer Engineering (by courtesy) *May 2025 – Present*
- Assistant Professor, Lyles School of Civil and Construction Engineering *Jul. 2022 – Present*
- Assistant Director, Institute for Control, Optimization and Networks *Jul. 2022 – Present*

Toyota Motor North America R&D, InfoTech Labs (Mountain View, CA)

- Principal Researcher (Supervisors: Dr. Prashant Tiwari & Dr. John Kenney) *Jul. 2021 – Jun. 2022*
- Research Scientist (Supervisor: Dr. Prashant Tiwari) *Jul. 2019 - Jun. 2021*
- Research Intern (Mentors: Dr. BaekGyu Kim & Dr. Kyungtae Han) *Jun. 2018 - Sep. 2018*

EDUCATION

Ph.D. in Mechanical Engineering

Sep. 2015 - Jun. 2019

University of California, Riverside

Advisor: Dr. Matthew Barth, Distinguished Professor and Associate Dean, Electrical and Computer Engineering

Dissertation: Developing Agent-Based Distributed Cooperative Vehicle-Infrastructure Systems in the Connected and Automated Vehicle Environment

B.E. in Mechanical Engineering and Automation

Sep. 2011 - Jun. 2015

School of Automation, Beijing University of Posts and Telecommunications

HONORS & AWARDS

- Best Paper Award, the Transportation Research Board Committee on Vehicle-Highway Automation (ACP30) *Jan. 2025*
- Best Paper Award, the 2024 ASME International Design Engineering Technical Conferences (IDETC) *Aug. 2024*
- Best Paper Award, the 2024 IEEE Intelligent Vehicles Symposium T-IV & IV Joint Workshop *Jun. 2024*
- IEEE-ITSM Outstanding Survey Paper Award, *IEEE Intelligent Transportation Systems Magazine* *Jun. 2023*
- First Prize in the 2021 "Shape the Future of ITS" Competition, IEEE Intelligent Transportation Systems Society *May 2022*
- Arch T. Colwell Merit Award (i.e., best paper in 2021), SAE International *Jan. 2022*
- Best Application Award, 2021 IEEE International Conference on Digital Twins and Parallel Intelligence (DTPI) *Sep. 2021*
- Vincent Bendix Automotive Electronics Engineering Award (i.e., best paper in 2019), SAE International *Feb. 2020*
- U.S. Department of Transportation National Center for Sustainable Transportation (NCST) Dissertation Award *Jun. 2018*
- Best Student Research Paper Award, *Los Angeles Environmental Forum* *Aug. 2017*
- UCR Dean's Distinguished Fellowship Award *Fall 2015 - Spring 2017*

REFEREED PUBLICATIONS

Journal Publications

[J29] Advanced Sensor Configurations for High-Speed Autonomous Racing Vehicles

- Manuel Mar, Vishnu P. Chellapandi, Liangqi Yuan, Ziran Wang, and Eric Dietz
- *IEEE Journal of Selected Areas in Sensors*, Mar. 2025

[J28] Digital Ethics in Federated Learning

- Liangqi Yuan, Ziran Wang, and Christopher G. Brinton
- *IEEE Internet Computing*, Nov. 2024

[J27] Decentralized Federated Learning: A Survey and Perspective

- Liangqi Yuan, Ziran Wang, Lichao Sun, Philip Yu, and Christopher G. Brinton
- *IEEE Internet of Things Journal*, May 2024

[J26] Receive, Reason, and React: Drive as You Say with Large Language Models in Autonomous Vehicles

- Can Cui, Yunsheng Ma, Xu Cao, Wenqian Ye, and Ziran Wang
- *IEEE Intelligent Transportation Systems Magazine*, Apr. 2024

[J25] Towards the Next Level of Vehicle Automation through Cooperative Driving: A Roadmap from Planning and Control Perspective

- Haoran Wang, Yongwei Feng, Yonglin Tian, Ziran Wang, Jia Hu, and Masayoshi Tomizuka
- *IEEE Transactions on Intelligent Vehicles*, Feb. 2024

[J24] Driver Digital Twin for Online Recognition of Distracted Driving Behaviors

- Yunsheng Ma, Runjia Du, Amr Abdelraouf, Kyungtae Han, Rohit Gupta, and Ziran Wang
- *IEEE Transactions on Intelligent Vehicles*, vol. 9, no. 2, Feb. 2024

[J23] Eco-Approach at an Isolated Actuated Signalized Intersection: Aware of the Passing Time Window

- Jia Hu, Shuoyuan Li, Haoran Wang, Ziran Wang, and Matthew J. Barth
- *Journal of Cleaner Production*, Jan. 2024

[J22] REDFormer: Radar Enlightens the Darkness of Camera Perception with Transformers

- Can Cui, Yunsheng Ma, Juanwu Lu, and Ziran Wang
- *IEEE Transactions on Intelligent Vehicles*, vol. 9, no. 1, Jan. 2024

[J21] Design of Next-Generation Automotive Systems: Challenges and Research Opportunities

- Jitesh Panchal and Ziran Wang
- *Journal of Computing and Information Science in Engineering*, vol. 23, no. 6, Dec. 2023

[J20] Federated Learning for Connected and Automated Vehicles: A Survey of Existing Approaches and Challenges

- Vishnu P. Chellapandi, Liangqi Yuan, Christopher G. Brinton, Stanislaw H. Żak, and Ziran Wang
- *IEEE Transactions on Intelligent Vehicles*, Nov. 2023

[J19] Federated Transfer-Ordered-Personalized Learning for Driver Monitoring Application

- Liangqi Yuan, Lu Su, and Ziran Wang
- *IEEE Internet of Things Journal*, vol. 10, no. 20, Oct. 2023

[J18] Metamobility: Connecting Future Mobility with the Metaverse

- Haoxin Wang, Ziran Wang, Dawei Chen, Qiang Liu, Hongyu Ke, and Kyungtae Han
- *IEEE Vehicular Technology Magazine*, vol. 18, no. 3, Sep. 2023

[J17] Driver Digital Twin for Online Prediction of Personalized Lane Change Behavior

- Xishun Liao, Xuanpeng Zhao, Ziran Wang, Zhouqiao Zhao, Kyungtae Han, Rohit Gupta, Matthew J. Barth, and Guoyuan Wu
- *IEEE Internet of Things Journal*, vol. 10, no. 15, Aug. 2023, pp. 13235–13246

[J16]Planning for Automated Vehicles with Human Trust

- Shili Sheng, Erfan Pakdamanian, Kyungtae Han, Ziran Wang, John Lenneman, David Parker, and Lu Feng
- *ACM Transactions on Cyber-Physical Systems*, vol. 6, no. 4, Oct. 2022, pp. 1–21

[J15]Gaussian Process-Based Personalized Adaptive Cruise Control

- Yanbing Wang, Ziran Wang, Kyungtae Han, Prashant Tiwari, and Daniel B. Work
- *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, no. 11, Nov. 2022, pp. 21178–21189

[J14]Mobility Digital Twin: Concept, Architecture, Case Study, and Future Challenges

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- *IEEE Internet of Things Journal*, vol. 9, no. 8, Sep. 2022, pp. 17452–17467

[J13]Game Theory-Based Ramp Merging for Mixed Traffic with Unity-SUMO Integrated Simulation

- Xishun Liao, Xuanpeng Zhao, Ziran Wang, Kyungtae Han, Prashant Tiwari, Matthew J. Barth, and Guoyuan Wu
- *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 52, no. 9, Sep. 2022, pp. 5746–5757

[J12]The Role of Digital Twins in Connected and Automated Vehicles

- Chris Schwarz and Ziran Wang
- *IEEE Intelligent Transportation Systems Magazine*, vol. 14, no. 6, Jan. 2022, pp. 41–51

[J11]Co-Simulation Platform for Modeling and Evaluating Connected and Automated Vehicles in Mixed Traffic

- Xuanpeng Zhao, Xishun Liao, Ziran Wang, Kyungtae Han, Prashant Tiwari, Matthew J. Barth, and Guoyuan Wu
- *SAE International Journal of Connected and Automated Vehicles*, vol. 5, no. 4, Apr. 2022

[J10]Vision-Cloud Data Fusion for ADAS: A Lane Change Prediction Case Study

- Yongkang Liu, Ziran Wang, Kyungtae Han, Zhenyu Shou, Prashant Tiwari, and John H. L. Hansen
- *IEEE Transactions on Intelligent Vehicles*, vol. 7, no. 2, Jun. 2022, pp. 210–220

[J9]Digital Twin-Assisted Cooperative Driving at Non-Signalized Intersections

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- *IEEE Transactions on Intelligent Vehicles*, vol. 7, no. 2, Jun. 2022, pp. 198–209

[J8]Cooperative Ramp Merging Design and Field Implementation: A Digital Twin Approach Based on Vehicle-to-Cloud Communication

- Xishun Liao, Ziran Wang, Xuanpeng Zhao, Kyungtae Han, Prashant Tiwari, Matthew J. Barth, and Guoyuan Wu
- *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, no. 5, May 2022, pp. 4490–4500

[J7]Eco-Approach and Departure along Signalized Corridors (**Best Paper Award**)

- Guoyuan Wu, Peng Hao, Ziran Wang, Yu Jiang, Kanok Boriboonsomsin, Matthew J. Barth, Michael McConnell, Shuwei Qiang, and John Stark
- *SAE International Journal of Sustainable Transportation, Energy, Environment, & Policy*, vol. 1, no. 2, 2021

[J6]Driver Behavior Modeling Using Game Engine and Real Vehicle: A Learning-Based Approach

- Ziran Wang, Xishun Liao, Chao Wang, David Oswald, Guoyuan Wu, Kanok Boriboonsomsin, Matthew J. Barth, Kyungtae Han, BaekGyu Kim, and Prashant Tiwari
- *IEEE Transactions on Intelligent Vehicles*, vol. 5, no. 4, Dec. 2020, pp. 738–749

[J5]Cooperative Eco-Driving along Multiple Signalized Intersections in a Partially Connected and Automated Vehicle Environment

- Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *IEEE Transactions on Intelligent Transportation Systems*, vol. 21, no. 5, May 2020, pp. 2029–2038

[J4]A Survey on Cooperative Longitudinal Motion Control of Multiple Connected Automated Vehicles (**Best Paper Award**)

- Ziran Wang, Yougang Bian, Steven E. Shladover, Guoyuan Wu, Shengbo E. Li, and Matthew J. Barth
- *IEEE Intelligent Transportation Systems Magazine*, vol. 12, no. 1, 2020, pp. 4–25

[J3]Cooperative Ramp Merging System: Agent-Based Modeling and Simulation Using Game Engine (**Best Paper Award**)

- Ziran Wang, Guoyuan Wu, Kanok Boriboonsomsin, Matthew J. Barth, Kyungtae Han, BaekGyu Kim, and Prashant Tiwari
- *SAE International Journal of Connected and Automated Vehicles*, vol. 2, no. 2, May 2019, pp. 115–128

[J2]Cluster-Wise Cooperative Eco-Approach and Departure Application for Connected and Automated Vehicles along Signalized Arterials

- Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *IEEE Transactions on Intelligent Vehicles*, vol. 3, no. 4, Dec. 2018, pp. 404–413

[J1]Developing a Distributed Consensus-Based Cooperative Adaptive Cruise Control (CACC) System for Heterogeneous Vehicles with Predecessor Following Topology

- Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *Journal of Advanced Transportation*, vol. 2017, Article ID 1023654, Aug. 2017

Conference Proceedings

[C52]RampCast II: A Dual-Interface V2X Framework for Reliable Traffic Information Delivery

- Abin Mathew, Junlong Peng, Jue Zhou, Ziran Wang, Feng Li, James Sturdevant, Edward Cox, and Yaobin Chen
- *IEEE 28th International Conference on Intelligent Transportation Systems (ITSC)*, Gold Coast, Australia, Nov. 2025

[C51]A Multi-Fidelity Risk-Based Testing Framework for Evolving AI Systems: An Autonomous Driving Study

- Zichong Yang, Jitesh Panchal, and Ziran Wang
- *IEEE 28th International Conference on Intelligent Transportation Systems (ITSC)*, Gold Coast, Australia, Nov. 2025

[C50]NuPlanQA: A Large-Scale Dataset and Benchmark for Multi-View Driving Scene Understanding in Multi-Modal Large Language Models

- Sung-Yeon Park, Can Cui, Yunsheng Ma, Ahmadreza Moradipari, Rohit Gupta, Kyungtae Han, and Ziran Wang
- *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hangzhou, China, Oct. 2025

[C49]On Learning Closed-Loop Probabilistic Multi-Agent Simulator

- Juanwu Lu, Gupta Rohit, Ahmadreza Moradipari, Kyungtae Han, Ruqi Zhang, and Ziran Wang
- *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hangzhou, China, Oct. 2025

[C48]On-Board Vision-Language Models for Personalized Autonomous Vehicle Motion Control: System Design and Real-World Validation

- Can Cui, Zichong Yang, Yupeng Zhou, Junlong Peng, Sung-Yeon Park, Cong Zhang, Yunsheng Ma, Xu Cao, Wenqian Ye, Yiheng Feng, Jitesh Panchal, Lingxi Li, Yaobin Chen, and Ziran Wang
- *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hangzhou, China, Oct. 2025

[C47]Video Token Sparsification for Efficient Multimodal LLMs in Autonomous Driving

- Yunsheng Ma, Amr Abdelraouf, Rohit Gupta, Ziran Wang, and Kyungtae Han
- *IEEE Intelligent Vehicles Symposium*, Cluj-Napoca, Romania, Jun. 2025

[C46]STAMP: Scalable Task- and Model-Agnostic Collaborative Perception

- Xiangbo Gao, Runsheng Xu, Jiachen Li, Ziran Wang, Zhiwen Fan, and Zhengzhong Tu
- *The 13th International Conference on Learning Representations (ICLR)*, Singapore, Apr. 2025

[C45]Learning Autonomous Driving Tasks via Human Feedbacks with Large Language Models

- Yunsheng Ma, Can Cui, Xu Cao, Wenqian Ye, Kai Mei, and Ziran Wang
- *The 2024 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, Miami, FL, Nov. 2024

[C44] Large Language Models for Autonomous Driving: Real-World Experiments

- Can Cui, Zichong Yang, Yupeng Zhou, Yunsheng Ma, Juanwu Lu, Lingxi Li, Yaobin Chen, Jitesh Panchal, and Ziran Wang
- *IEEE 27th International Conference on Intelligent Transportation Systems (ITSC)*, Edmonton, Canada, Sep. 2024

[C43] Delay-Aware Multi-Agent Reinforcement Learning for Cooperative Adaptive Cruise Control with Model-based Stability Enhancement

- Jiaqi Liu, Ziran Wang, Peng Hang, and Jian Sun
- *IEEE 27th International Conference on Intelligent Transportation Systems (ITSC)*, Edmonton, Canada, Sep. 2024

[C42] A Multi-Fidelity Approach to Testing and Evaluation of AI-Enabled Systems (Best Paper Award)

- Robert J. Seif, Zichong Yang, Ziran Wang, Laura Freeman, and Jitesh Panchal
- *ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC)*, Washington, DC, Aug. 2024

[C41] LaMPilot: An Open Benchmark Dataset for Autonomous Driving with Language Model Programs

- Yunsheng Ma, Can Cui, Xu Cao, Wenqian Ye, Peiran Liu, Juanwu Lu, Amr Abdelraouf, Rohit Gupta, Kyungtae Han, Aniket Bera, James Matthew Rehg, and Ziran Wang
- *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Seattle, WA, Jun. 2024

[C40] Quantifying Uncertainty in Motion Prediction with Variational Bayesian Mixture

- Juanwu Lu, Can Cui, Yunsheng Ma, Aniket Bera, and Ziran Wang
- *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Seattle, WA, Jun. 2024

[C39] MAPLM: A Real-World Large-Scale Vision-Language Benchmark for Map and Traffic Scene Understanding

- Xu Cao, Tong Zhou, Yunsheng Ma, Wenqian Ye, Can Cui, Kun Tang, Zhipeng Cao, Kaizhao Liang, Ziran Wang, James Matthew Rehg, and Chao Zheng
- *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Seattle, WA, Jun. 2024

[C38] ViT-DD: Multi-Task Vision Transformer for Semi-Supervised Driver Distraction Detection (Best Workshop Paper Award)

- Yunsheng Ma and Ziran Wang
- *IEEE Intelligent Vehicles Symposium*, Jeju Island, South Korea, Jun. 2024

[C37] Digital Twin-Based Cooperative Driving at Roundabouts for Connected and Automated Vehicles

- Zihao Li, Shuaijie Li, Amr Abdelraouf, Rohit Gupta, Kyungtae Han, Onur Altintas, and Ziran Wang
- *2024 Forum for Innovative Sustainable Transportation Systems (FISTS)*, Riverside, CA, Feb. 2024

[C36] MACP: Efficient Model Adaptation for Cooperative Perception

- Yunsheng Ma, Juanwu Lu, Can Cui, Sicheng Zhao, Xu Cao, Wenqian Ye, and Ziran Wang
- *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, Waikoloa, HI, Jan. 2024

[C35] Drive as You Speak: Enabling Human-Like Interaction with Large Language Models in Autonomous Vehicles

- Can Cui, Yunsheng Ma, Xu Cao, Wenqian Ye, and Ziran Wang
- *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshops*, Waikoloa, HI, Jan. 2024

[C34] A Survey on Multimodal Large Language Models for Autonomous Driving

- Can Cui, Yunsheng Ma, Xu Cao, Wenqian Ye, Yang Zhou, Kaizhao Liang, Jintai Chen, Juanwu Lu, Zichong Yang, Kuei-Da Liao, Tianren Gao, Erlong Li, Kun Tang, Zhipeng Cao, Tong Zhou, Ao Liu, Xinrui Yan, Shuqi Mei, Jianguo Cao, Ziran Wang, Chao Zheng
- *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshops*, Waikoloa, HI, Jan. 2024

[C33] A Survey of Federated Learning for Connected and Automated Vehicles

- Vishnu P. Chellapandi, Liangqi Yuan, Stanislaw H. Źak, and Ziran Wang
- *IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, Sep. 2023

[C32] Radar Enlighten the Dark: Enhancing Low-Visibility Perception for Automated Vehicles with Camera-Radar Fusion

- Can Cui, Yunsheng Ma, Juanwu Lu, and Ziran Wang
- *IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, Sep. 2023

[C31] CEMFormer: Learning to Predict Driver Intentions from In-Cabin and External Cameras via Spatial-Temporal Transformers

- Yunsheng Ma, Wenqian Ye, Xu Cao, Amr Abdelraouf, Kyungtae Han, Rohit Gupta, and Ziran Wang
- *IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, Sep. 2023

[C30] Peer-to-Peer Federated Continual Learning for Naturalistic Driving Action Recognition

- Liangqi Yuan, Yunsheng Ma, Lu Su, and Ziran Wang
- *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop*, Vancouver, Canada, Jun. 2023

[C29] M²DAR: Multi-View Multi-Scale Driver Action Recognition with Vision Transformer

- Yunsheng Ma, Liangqi Yuan, Amr Abdelraouf, Kyungtae Han, Rohit Gupta, Zihao Li, and Ziran Wang
- *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop*, Vancouver, Canada, Jun. 2023

[C28] Driver Monitoring-Based Lane-Change Prediction: A Personalized Federated Learning Framework

- Runjia Du, Kyungtae Han, Rohit Gupta, Sikai Chen, Samuel Labi, and Ziran Wang
- *IEEE Intelligent Vehicles Symposium*, Anchorage, AK, Jun. 2023

[C27] GAPFORMER: Fast Autoregressive Transformers meet RNNs for Personalized Adaptive Cruise Control

- Noveen Sachdeva, Ziran Wang, Kyungtae Han, Rohit Gupta, and Julian McAuley
- *IEEE 25th International Conference on Intelligent Transportation Systems*, Macau, China, Oct. 2022

[C26] A Study on Learning and Simulating Personalized Car-Following Driving Style

- Shili Sheng, Erfan Pakdamanian, Kyungtae Han, Ziran Wang, and Lu Feng
- *IEEE 25th International Conference on Intelligent Transportation Systems*, Macau, China, Oct. 2022

[C25] Personalized Car Following for Autonomous Driving with Inverse Reinforcement Learning

- Zhouqiao Zhao, Ziran Wang, Kyungtae Han, Rohit Gupta, Prashant Tiwari, Guoyuan Wu, and Matthew J. Barth
- *2022 IEEE International Conference on Robotics and Automation*, Philadelphia, PA, May 2022

[C24] Online Prediction of Lane Change with a Hierarchical Learning-Based Approach

- Xishun Liao, Ziran Wang, Xuanpeng Zhao, Zhouqiao Zhao, Kyungtae Han, Prashant Tiwari, Matthew J. Barth, and Guoyuan Wu
- *2022 IEEE International Conference on Robotics and Automation*, Philadelphia, PA, May 2022

[C23] Personalized Adaptive Cruise Control via Gaussian Process Regression

- Yanbing Wang, Ziran Wang, Kyungtae Han, Prashant Tiwari, and Daniel B. Work
- *IEEE 24th International Conference on Intelligent Transportation Systems*, Indianapolis, IN, Sep. 2021

[C22] Digital Twin Simulation of Connected and Automated Vehicles with the Unity Game Engine (**Best Application Award**)

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- *2021 IEEE International Conference on Digital Twin and Parallel Intelligence*, Beijing, China, Jul. 2021

[C21] Trust-Based Route Planning for Autonomous Vehicles

- Shili Sheng, Erfan Pakdamanian, Kyungtae Han, Ziran Wang, John Lenneman and Lu Feng
- *12th ACM/IEEE International Conference on Cyber-Physical Systems (ICCP)*, May 2021

[C20] Motion Estimation of Connected and Automated Vehicles under Communication Delay and Packet Loss of V2X Communications

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- *SAE World Congress Experience 2021*, Virtual Conference, Apr. 2021

[C19]A Game Theory Based Ramp Merging Strategy for Connected and Automated Vehicles in the Mixed Traffic: A Unity-SUMO Integrated Platform

- Xishun Liao, Xuanpeng Zhao, Guoyuan Wu, Matthew J. Barth, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- *Transportation Research Board 100th Annual Meeting*, Virtual Conference, Jan. 2021

[C18]Augmented Reality-Based Advanced Driver-Assistance System for Connected Vehicles

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC 2020)*, Virtual Conference, Oct. 2020

[C17]Long-Term Prediction of Lane Change Maneuver through a Multilayer Perceptron

- Zhenyu Shou, Ziran Wang, Kyungtae Han, Yongkang Liu, Prashant Tiwari, and Xuan Di
- *2020 IEEE Intelligent Vehicles Symposium*, Virtual Conference, Oct. 2020

[C16]Sensor Fusion of Camera and Cloud Digital Twin Information for Intelligent Vehicles

- Yongkang Liu, Ziran Wang, Kyungtae Han, Zhenyu Shou, Prashant Tiwari, and John H. L. Hansen
- *2020 IEEE Intelligent Vehicles Symposium*, Virtual Conference, Oct. 2020

[C15]Optimal Control-Based Eco-Ramp Merging System

- Zhouqiao Zhao, Guoyuan Wu, Ziran Wang, and Matthew J. Barth
- *2020 IEEE Intelligent Vehicles Symposium*, Virtual Conference, Oct. 2020

[C14]A Digital Twin Paradigm: Vehicle-to-Cloud Based Advanced Driver Assistance Systems

- Ziran Wang, Xishun Liao, Xuanpeng Zhao, Kyungtae Han, Prashant Tiwari, Matthew J. Barth, and Guoyuan Wu
- *IEEE 91st Vehicular Technology Conference (VTC2020-Spring)*, Virtual Conference, May 2020

[C13]Cooperative Ramp Merging with Vehicle-to-Cloud Communications: A Field Experiment

- Xishun Liao, David Oswald, Ziran Wang, Guoyuan Wu, Kanok Boriboonsomsin, Matthew J. Barth, Kyungtae Han, BaekGyu Kim, and Prashant Tiwari
- *Transportation Research Board 99th Annual Meeting*, Washington D.C., Jan. 2020

[C12]End-to-End Vision-Based Adaptive Cruise Control (ACC) Using Deep Reinforcement Learning

- ZhenSong Wei, Yu Jiang, Xishun Liao, Xuewei Qi, Ziran Wang, Guoyuan Wu, Peng Hao, and Matthew J. Barth,
- *Transportation Research Board 99th Annual Meeting*, Washington D.C., Jan. 2020

[C11]Early Findings from Field Trials of Heavy-Duty Truck Connected Eco-Driving System

- Ziran Wang, Yuan-Pu Hsu, Alexander Vu, Francisco Caballero, Peng Hao, Guoyuan Wu, Kanok Boriboonsomsin, Matthew J. Barth, Aravind Kailas, Pascal Amar, Eddie Garmon, and Sandeep Tanugula
- *IEEE 22nd International Conference on Intelligent Transportation Systems*, Auckland, New Zealand, Oct. 2019

[C10]The State-of-the-Art of Coordinated Ramp Control with Mixed Traffic Conditions

- Zhouqiao Zhao, Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *IEEE 22nd International Conference on Intelligent Transportation Systems*, Auckland, New Zealand, Oct. 2019

[C9]Lookup Table-Based Consensus Algorithm for Real-Time Longitudinal Motion Control of Connected and Automated Vehicles

- Ziran Wang, Kyungtae Han, BaekGyu Kim, Guoyuan Wu, and Matthew J. Barth
- *2019 American Control Conference*, Philadelphia, PA, Jul. 2019

[C8]Agent-Based Modeling and Simulation of Connected and Automated Vehicles Using Game Engine: A Cooperative On-Ramp Merging Study

- Ziran Wang, BaekGyu Kim, Hiromitsu Kobayashi, Guoyuan Wu, and Matthew J. Barth
- *Transportation Research Board 98th Annual Meeting*, Washington D.C., Jan. 2019

[C7]Eco-Approach and Departure along Signalized Corridors

- Guoyuan Wu, Peng Hao, Ziran Wang, Kanok Boriboonsomsin, and Matthew J. Barth

- *Transportation Research Board 98th Annual Meeting*, Washington D.C., Jan. 2019

[C6]A Review on Cooperative Adaptive Cruise Control (CACC) Systems: Architectures, Controls, and Applications

- Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *IEEE 21st International Conference on Intelligent Transportation Systems*, Maui, Hawaii, Nov. 2018

[C5]Distributed Consensus-Based Cooperative Highway On-Ramp Merging Using V2X Communications

- Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *SAE Technical Paper*, 2018-01-1177, Apr. 2018

[C4]Cluster-Wise Cooperative Eco-Approach and Departure Application along Signalized Arterials

- Ziran Wang, Guoyuan Wu, Peng Hao, and Matthew J. Barth
- *IEEE 20th International Conference on Intelligent Transportation Systems*, Yokohama, Japan, Oct. 2017

[C3]Intra-Platoon Vehicle Sequence Optimization for Eco-Cooperative Adaptive Cruise Control

- Peng Hao, Ziran Wang, Guoyuan Wu, Kanok Boriboonsomsin, and Matthew J. Barth
- *IEEE 20th International Conference on Intelligent Transportation Systems*, Yokohama, Japan, Oct. 2017

[C2]Developing a Platoon-Wide Eco-Cooperative Adaptive Cruise Control (CACC) System

- Ziran Wang, Guoyuan Wu, Peng Hao, Kanok Boriboonsomsin, and Matthew J. Barth
- *2017 IEEE Intelligent Vehicles Symposium*, Redondo Beach, CA, Jun. 2017

[C1]Developing a Distributed Consensus-Based Cooperative Adaptive Cruise Control (CACC) System

- Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- *Transportation Research Board 96th Annual Meeting*, Washington D.C., Jan. 2017

OTHER PUBLICATIONS

Book Chapters

[B4]Cloud and Edge Computing for Connected and Automated Vehicles

- Qi Zhu, Bo Yu, Ziran Wang, Jie Tang, Qi Alfred Chen, Zihao Li, Xiangguo Liu, Yunpeng Luo, Lingzi Tu
- *Foundations and Trends in Electronic Design Automation*, vol. 14, no. 1 – 2, pp. 1 – 170, Now Publishers, Inc.

[B3]Driver Behavior-Aware Cooperative Ramp Merging for Intelligent Vehicles

- Xishun Liao, Xuanpeng Zhao, Ziran Wang, Matthew J. Barth, Guoyuan Wu, and Kyungtae Han
- *Towards Human-Vehicle Harmonization*, vol. 3, pp. 193 – 210, De Gruyter

[B2]Enhancing Driver Visual Guidance Through Mobility Digital Twin

- Ziran Wang, Yongkang Liu, and John. H. L. Hansen
- *Towards Human-Vehicle Harmonization*, vol. 3, pp. 95 – 104, De Gruyter

[B1]New Simulation Tools for Training and Testing Automated Vehicles

- Jiaqi Ma, Chris Schwarz, Ziran Wang, Maria Elli, German Ros, and Yiheng Feng
- *Road Vehicles Automation*, vol. 7, pp. 111 – 119, Springer

Technical Reports

[R2]Development of Eco-Friendly Ramp Control for Connected and Automated Electric Vehicles

- Guoyuan Wu, Zhouqiao Zhao, Ziran Wang, and Matthew J. Barth
- *National Center for Sustainable Transportation, U.S. Department of Transportation*, NCST-UCR-RR-20-04, Jan. 2020

[R1]MOVESTAR: An Open-Source Vehicle Fuel and Emission Model based on USEPA MOVES

- Ziran Wang, Guoyuan Wu, and George Scora
- *arXiv Preprint arXiv: 2008.04986*, URL: <https://github.com/ziranw/MOVESTAR-Fuel-and-Emission-Model>, Aug. 2020

PATENTS

[P51] Personalized Takeover Prediction with Driver Tactile Inputs

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Runjia Du
- U.S. patent application 18363671, Filed Aug. 2023

[P50] Personalized Speed Limiter

- Rohit Gupta, Ziran Wang, Runjia Du, and Kyungtae Han
- U.S. patent application 18085868, Filed Dec. 2022

[P49] Systems and Methods for Active Road Surface Maintenance with Cloud-Based Mobility Digital Twin

- Ziran Wang, Rohit Gupta, and Kyungtae Han
- U.S. patent application 17992364, Filed Nov. 2022

[P48] System and Method for Controlling a Cruise Control System of a Vehicle Using the Moods of One or More Occupants

- Rohit Gupta, Ziran Wang, Kyungtae Han, Paul Li, Satoshi Nagashima, Pujitha Gunaratne, and Hazem Abdelkawy
- U.S. patent application 17992026, Filed Nov. 2022

[P47] Method and System for Personalized Adaptive Cruise Control with Transformers and RNNs

- Ziran Wang, Rohit Gupta, and Kyungtae Han
- U.S. patent application 17936655, Filed Oct. 2022 | U.S. patent 12187279, Granted Jan. 2025

[P46] Systems and Methods for Modeling Personalized Car-Following Driving Styles with Model-Free Inverse Reinforcement Learning

- Ziran Wang, Rohit Gupta, and Kyungtae Han
- U.S. patent application 17936459, Filed Sep. 2022

[P45] Systems and Methods for Simulating Connected and Automated Vehicles with Digital Twin

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Runjia Du
- U.S. patent application, Filed Jul. 2022

[P44] Systems and Methods for Lane-Change Prediction with Federated Learning

- Runjia Du, Ziran Wang, Rohit Gupta, and Kyungtae Han
- U.S. patent application, Filed Jul. 2022

[P43] Senior “Aging” Glaucoma Pedestrian Detection Metaverse ADAS

- Rohit Gupta, Paul Li, Ziran Wang, Kyungtae Han, and Satoshi Nagashima
- U.S. patent application, Filed Jul. 2022

[P42] Software Driven User Profile Personalized Adaptive Cruise Control

- Rohit Gupta, Ziran Wang, and Kyungtae Han
- U.S. patent application 17872469, Filed Jul. 2022

[P41] Cloud-Based Mobility Digital Twin for Human, Vehicle, and Traffic

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17744452, Filed May 2022

[P40] Medical Emergency Detection In-vehicle Caretaker

- Akila Ganlath, Paul Li, Rohit Gupta, Ziran Wang, Satoshi Nagashima, Kyungtae Han, and Nejib Ammar
- U.S. patent application 17725297, Filed Apr. 2022

[P39] Personalized Vehicle Lane Change Maneuver Prediction

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17715011, Filed Apr. 2022

[P38] Systems and Methods for Predicting Driver Visual Impairment with Artificial Intelligence

- Rohit Gupta, Zhouqiao Zhao, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17586593, Filed Jan. 2022 | U.S. patent 12071141, Granted Aug. 2024

[P37]Personalized Adaptive Cruise Control based on Steady-State Operation

- Zhouqiao Zhao, Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17578330, Filed Jan. 2022

[P36]Personalized Vehicle Operation for Autonomous Driving with Inverse Reinforcement Learning

- Zhouqiao Zhao, Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17572486, Filed Jan. 2022

[P35]Method and System for Personalized Car Following with Transformers

- Ziran Wang, Zhouqiao Zhao, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17567504, Filed Jan. 2022 | U.S. patent 12083883, Granted Sep. 2024

[P34]Apparatus and Method for Cooperative Escape Zone Detection

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17509711, Filed Oct. 2021

[P33]Cooperative Artificial Intelligent Assisted Driving

- Jianyu Su, Rui Guo, and Ziran Wang
- U.S. patent application 17475306, Filed Sep. 2021 | U.S. patent 12118884, Granted Oct. 2025

[P32]Subconscious Big Picture Macro and Split Second Micro Decisions ADAS

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17471100, Filed Sep. 2021

[P31]Systems and Methods for Protecting a Vehicle at an Intersection

- Rohit Gupta, Ziran Wang, Yanbing Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17411831, Filed Aug. 2021

[P30]Driver Classification Systems and Methods for Obtaining an Insurance Rate for a Vehicle

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17410536, Filed Aug. 2021

[P29]Hybrid Deterministic Override of Probabilistic Advanced Driving Assistance Systems (ADAS)

- Rohit Gupta, Yanbing Wang, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17398666, Filed Aug. 2021

[P28]Student-T Process for Personalized Adaptive Cruise Control

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17388488, Filed Jul. 2021

[P27]System and Methods for Personalizing Adaptive Cruise Control in a Vehicle

- Yanbing Wang, Ziran Wang, Kyungtae Han, Rohit Gupta, and Prashant Tiwari
- U.S. patent application 17387045, Filed Jul. 2021

[P26]Vehicular Topple Risk Notification

- Rohit Gupta, Ziran Wang, Yanbing Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17385012, Filed Jul. 2021

[P25]Detection, Classification, and Prediction of Bacteria Colony Growth in Vehicle Passenger Cabin

- Rohit Gupta, Ziran Wang, Yanbing Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17373050, Filed Jul. 2021

[P24]Systems and Methods to Reduce Audio Distraction for a Vehicle Driver

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari

- U.S. patent application 17333616, Filed Jun. 2021 | U.S. patent 11705141, Granted Jul. 2023

[P23]Methods and Systems for Rideshare Implicit and Explicit Needs Personalization

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- China patent application, Filed Mar. 2021

[P22]Methods and Systems for Rideshare Implicit and Explicit Needs Personalization

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- Japan patent application, Filed Mar. 2021

[P21]Methods and Systems for Rideshare Implicit and Explicit Needs Personalization

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17217358, Filed Mar. 2021

[P20]Determining a Setting for a Cruise Control

- Kyungtae Han, Ziran Wang, Prashant Tiwari, John Lenneman, Toshinori Esaka, Miles Johnson, and Chase Violetta
- U.S. patent application 17216924, Filed Mar. 2021

[P19]Vehicle Guard Rail System

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17206706, Filed Mar. 2021

[P18]Systems and Methods for Estimating Motion of an Automated Vehicle for Cooperative Driving

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17196016, Filed Mar. 2021 | U.S. patent 11827245, Granted Nov. 2023

[P17]System and Method for Scheduling Connected Vehicles to Cross Non-Signalized Intersections

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17193278, Filed Mar. 2021

[P16]Cooperative Driving Systems and Method

- Sergei Avedisov, Ziran Wang, Ahmed Sakr, Kyungtae Han, Rui Guo, and Onur Altintas
- U.S. patent application 17174998, Filed Feb. 2021 | U.S. patent 11904855, Granted Feb. 2024

[P15]Producing, for an Autonomous Vehicle, a Route from an Origination to a Destination

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17168582, Filed Feb. 2021 | U.S. patent 11634163, Granted Apr. 2023

[P14]System and Method for Connected Vehicle Lane Merge

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17031095, Filed Sep. 2020 | U.S. patent 11597388, Granted Mar. 2023

[P13]System and Methods for Providing Guidance to Vehicle Drivers Regarding Predicted Lane-Change Behavior of Vehicle Drivers

- Zhenyu Shou, Kyungtae Han, Ziran Wang, Yongkang Liu, and Prashant Tiwari
- U.S. patent application 16999332, Filed Aug. 2020 | U.S. patent 11151880, Granted Oct. 2021

[P12]Rest Stop Recommendation System

- Zhenyu Shou, Ziran Wang, Kyungtae Han, Yongkang Liu, and Prashant Tiwari
- U.S. patent application 16998529, Filed Aug. 2020 | U.S. patent 12073332, Granted Aug. 2024

[P11]Identifying a Specific Object in a Two-Dimensional Image of Objects

- Yongkang Liu, Ziran Wang, Kyungtae Han, Zhenyu Shou, and Prashant Tiwari
- U.S. patent application 16927467, Filed Jul. 2020 | U.S. patent 11222215, Granted Jan. 2022

[P10]Systems and Methods for Long-Term Prediction of Lane Change Maneuver

- Zhenyu Shou, Ziran Wang, Kyungtae Han, Yongkang Liu, and Prashant Tiwari

- U.S. patent application 16897386, Filed Jun. 2020 | U.S. patent 11433923, Granted Sep. 2022

[P9]Adjustable Blind Spot Monitor

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- China patent application 16364851, Filed Mar. 2019 | U.S. patent 11328605, Granted May 2022

[P8]Adjustable Blind Spot Monitor

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- Japan patent application 2020-048606, Filed Mar. 2019

[P7]Ramp Merging Assistance

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 16781211, Filed Feb. 2020 | U.S. patent 11398156, Granted Jul. 2022

[P6]Systems and Methods for Compensating for Driver Speed-Tracking Error

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 16775772, Filed Jan. 2020 | U.S. patent 11087623, Granted Aug. 2021

[P5]Longitudinal Motion Control of Connected and Automated Vehicles

- Ziran Wang, Hiromitsu Kobayashi, Kyungtae Han, and BaekGyu Kim
- U.S. patent application 16364851, Filed May 2019 | U.S. patent 11214253, Granted Jan. 2022

[P4]Adjustable Blind Spot Monitor

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- U.S. patent application 16364851, Filed Mar. 2019 | U.S. patent 11328605, Granted May 2022

[P3]Vehicle-to-Everything Communication-Based Lane Change Collision Avoidance Warning

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- U.S. patent application 16295700, Filed Mar. 2019 | U.S. patent 11697410, Granted Jul. 2023

[P2]Virtualized Driver Assistance

- Ziran Wang, BaekGyu Kim, and Hiromitsu Kobayashi
- U.S. patent application 16268729, Filed Feb. 2019 | U.S. patent 11465626, Granted Oct. 2022

[P1]XR-based Slot Reservation System for Connected Vehicles Traveling Through Intersections

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- U.S. patent application 16264475, Filed Jan. 2019 | U.S. patent 11257363, Granted Feb. 2022

PROFESSIONAL ACTIVITIES

As a Journal Editor

Associate editor of <i>IEEE Transactions on Intelligent Transportation Systems</i>	Nov. 2024 - Present
Associate editor of <i>IEEE Intelligent Transportation Systems Magazine</i>	Nov. 2024 - Present
Guest editor of <i>IEEE Internet Computing</i>	Jul. 2024 - Present
Associate editor of <i>IEEE Internet of Things Journal</i>	Oct. 2022 - Present
Associate editor of <i>IEEE Transactions on Intelligent Vehicles</i>	Jun. 2022 - Present
Guest editor of <i>IEEE Open Journal of Intelligent Transportation Systems</i>	May 2022 - Present
Associate editor of <i>Frontiers in Sustainable Cities-Urban Transportation Systems and Mobility</i>	Sep. 2021 - Present
Handling editor of <i>SAE Non-Event Technical Papers</i>	Apr. 2021 - Present
Associate editor of <i>SAE International Journal of Connected and Automated Vehicles</i>	Jun. 2020 - Present

As a Conference Committee Chair/Member

Member of Technical Program Committee in the 3 rd <i>IEEE International Conference on Mobility (MOST)</i>	May 2025
Member of Technical Program Committee in the 2 nd <i>IEEE International Conference on Mobility (MOST)</i>	May 2024
Program Chair of 2024 <i>IEEE Forum on Integrated and Sustainable Transportation Systems (FISTS)</i>	Feb. 2024

Member of Organizing Committee in the 2023 <i>TRB Innovations in Travel Analysis and Planning Conference</i>	Jun. 2023
Member of Technical Program Committee in the <i>1st IEEE International Conference on Mobility (MOST)</i>	May. 2023
Member of Technical Program Committee in the <i>14th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs)</i>	May. 2023
Poster/Demo Co-Chair in the <i>2023 IEEE Vehicular Networking Conference (VNC)</i>	Apr. 2023
Member of International Advisory Committee in the <i>16th IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI 2022)</i>	Dec. 2022
Member of Technical Program Committee in the <i>2021 IEEE 94th Vehicular Technology Conference: VTC2021-Fall.</i>	Sep. 2021
Member of Technical Program Committee in the <i>2021 IEEE International Conference on Digital Twin and Parallel Intelligence (DTPI)</i>	Jul. 2021 - Aug. 2021

As a Technical Committee Chair/Member

Member of the Advisory Board of the SAE MobilityRxiv	Nov. 2021 - Present
Member of Technical Committee on Artificial Intelligence, SAE China	Oct. 2021 - Present
Founding Chair of Technical Committee on Internet of Things in Intelligent Transportation Systems, IEEE ITS Society	Mar. 2021 - Present
Member of Technical Committee on Cooperative and Connected Vehicles, IEEE ITS Society	Feb. 2021 - Present
Member of SAE On-Road Automated Driving (ORAD) Simulation Task Force	Nov. 2020 - Nov. 2021
Member of Technical Committee on Industrial CPS, IEEE Industrial Electronics Society	Jul. 2020 - Present
Member of Technical Committee on Smart Cities, IEEE Control Systems Society	Jun. 2020 - Present

As a Society Member

Senior Member of Institute of Electrical and Electronics Engineers (IEEE)	Jun. 2024 - Present
Member of Society of Automotive Engineers (SAE)	Jan. 2018 - Present
Member of Intelligent Transportation Systems Society (ITSS), IEEE	Sep. 2016 - Present

As a Workshop/Tutorial Organizer

Workshop Organizer of the <i>2025 IEEE/CVF International Conference on Computer Vision (ICCV)</i> , Workshop on Distillation of Foundation Models for Autonomous Driving, Honolulu, HI	Oct. 2025
Workshop Organizer of the <i>2025 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)</i> , Workshop on Distillation of Foundation Models for Autonomous Driving, Nashville, TN	Jun. 2025
Workshop Organizer of the <i>2025 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)</i> , 3 rd Workshop on Large Language and Vision Models for Autonomous Driving, Tucson, AZ	Mar. 2025
Workshop Organizer of the <i>27th IEEE International Conference on Intelligent Transportation Systems (ITSC)</i> , 2 nd Workshop on Large Language and Vision Models for Autonomous Driving, Edmonton, Canada	Sep. 2024
Workshop Organizer of the <i>2024 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)</i> , 1 st Workshop on Large Language and Vision Models for Autonomous Driving, Waikoloa, HI	Jan. 2024
Special Session Organizer of the <i>26th IEEE International Conference on Intelligent Transportation Systems (ITSC)</i> , 3 rd Special Session on Cooperative Driving in Mixed Traffic, Bilbao, Spain	Sep. 2023
Workshop Organizer of the <i>2023 IEEE Intelligent Vehicles Symposium (IV)</i> , 3 rd Workshop on Internet of Things in Intelligent Transportation Systems: Opportunities and Challenges, Anchorage, AK	Jun. 2023
Special Session Organizer of the <i>25th IEEE International Conference on Intelligent Transportation Systems (ITSC)</i> , 2 nd Special Session on Cooperative Driving in Mixed Traffic, Macau, China	Sep. 2022
Tutorial Organizer of the <i>59th Design Automation Conference (DAC)</i> , Tutorial on Cloud Computing and Edge Computing for Connected and Automated Vehicles, San Francisco, CA	Jul. 2022
Workshop Organizer of the <i>24th IEEE International Conference on Intelligent Transportation Systems (ITSC)</i> , 2 nd Workshop on Internet of Things in Intelligent Transportation Systems, Indianapolis, IN	Sep. 2021
Workshop Organizer of the <i>2021 IEEE Intelligent Vehicles Symposium (IV)</i> , Cooperative Driving in Mixed Traffic Workshop, Nagoya, Japan	Jul. 2021
Workshop Organizer of the <i>2020 IEEE Intelligent Vehicles Symposium (IV)</i> , Internet of Things in Intelligent Transportation	

Systems: Opportunities and Challenges Workshop, Virtual	Oct. 2020
Workshop Organizer of the 23 rd IEEE International Conference on Intelligent Transportation Systems (ITSC), Testing and Evaluation CAVs Using Emerging Simulation Technologies Workshop, Virtual	Sep. 2020
Workshop Organizer of the 4 th IEEE Conference on Control Technology and Applications (CCTA), Automotive Control Invited Sessions, Virtual	Aug. 2020

As a Reviewer

Reviewer of <i>Journal of Transportation Engineering, Part A: Systems</i>	Jan. 2024 - Present
Reviewer of <i>MDPI Remote Sensing</i>	Apr. 2022 - Present
Reviewer of <i>IEEE Robotics and Automation Letters</i>	Mar. 2022 - Present
Reviewer of <i>IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)</i>	Mar. 2022 - Present
Reviewer of <i>Transportation Research Part B: Methodological</i>	Mar. 2022 - Present
Reviewer of <i>Applied Energy</i>	Oct. 2021 - Present
Reviewer of <i>IEEE Transactions on Industrial Informatics</i>	Sep. 2021 - Present
Reviewer of <i>Physica A: Statistical Mechanics and its Applications</i>	Jul. 2021 - Present
Reviewer of <i>Connection Science</i>	Jul. 2021 - Present
Reviewer of <i>Simulation Modelling Practice and Theory</i>	Jun. 2021 - Present
Reviewer of <i>Transportation Research Part C: Emerging Technologies</i>	Apr. 2021 - Present
Reviewer of <i>IEEE Transactions on Transportation Electrification</i>	Feb. 2021 - Present
Reviewer of <i>IEEE Transactions on Systems, Man and Cybernetics: Systems</i>	Jan. 2021 - Present
Reviewer of <i>Automatica</i>	Dec. 2020 - Present
Reviewer of <i>IEEE Transactions on Control Systems Technology</i>	Dec. 2020 - Present
Reviewer of <i>Journal of Traffic and Transportation Engineering</i>	Nov. 2020 - Present
Reviewer of <i>IEEE Vehicular Technology Magazine</i>	Nov. 2020 - Present
Reviewer of <i>Transportation Research Part D: Transport and Environment</i>	Nov. 2020 - Present
Reviewer of <i>Information Sciences</i>	Oct. 2020 - Present
Reviewer of <i>Journal of Selected Topics in Signal Processing</i>	Sep. 2020 - Present
Reviewer of <i>Serbian Journal of Electrical Engineering</i>	Aug. 2020 - Present
Reviewer of <i>IEEE Transactions on Control of Network Systems</i>	Jul. 2020 - Present
Reviewer of <i>MDPI Multimodal Technologies and Interaction</i>	May 2020 - Present
Reviewer of <i>MDPI Applied Science</i>	May 2020 - Present
Reviewer of <i>IEEE Forum on Integrated and Sustainable Transportation Systems</i>	Mar. 2020 - Present
Reviewer of <i>International Journal of Automotive Technology</i>	Feb. 2020 - Present
Reviewer of <i>MDPI Sensors</i>	Feb. 2020 - Present
Reviewer of <i>Journal of Intelligent Transportation Systems</i>	Jan. 2020 - Present
Reviewer of <i>International Journal of Transportation Science and Technology</i>	Jan. 2020 - Present
Reviewer of <i>MDPI Information</i>	Jan. 2020 - Present
Reviewer of <i>IEEE Open Journal of Intelligent Transportation Systems</i>	Dec. 2019 - Present
Reviewer of <i>IEEE Vehicular Technology Conference</i>	Nov. 2019 - Present
Reviewer of <i>MDPI Vehicles</i>	Nov. 2019 - Present
Reviewer of <i>IEEE Transactions on Intelligent Vehicles</i>	Oct. 2019 - Present
Reviewer of <i>IEEE Access</i>	Aug. 2019 - Present
Reviewer of <i>Journal of Control, Automation and Electric Systems</i>	Apr. 2019 - Present
Reviewer of <i>IEEE Conference on Control Technology and Applications</i>	Mar. 2019 - Present
Reviewer of <i>SAE International Journal of Connected and Automated Vehicles</i>	Oct. 2018 - Present
Reviewer of <i>American Control Conference (ACC)</i>	Oct. 2018 - Present
Reviewer of <i>Transportation Research Record (TRR)</i>	Aug. 2018 - Present
Reviewer of <i>International Conference on Computer Science and Application Engineering (CSAE)</i>	Aug. 2018 - Present
Reviewer of <i>Journal of Advanced Transportation</i>	Jul. 2018 - Present

Reviewer of <i>IEEE International Conference on Intelligent Transportation Systems (ITSC)</i>	<i>May 2018 - Present</i>
Reviewer of <i>Case Studies on Transport Policies (CSTP)</i>	<i>May 2018 - Present</i>
Reviewer of <i>IEEE Intelligent Vehicles Symposium</i>	<i>Mar. 2018 - Present</i>
Reviewer of <i>IET Intelligent Transport Systems</i>	<i>Jan. 2018 - Present</i>
Reviewer of <i>ASCE International Conference on Transportation & Development (ICTD)</i>	<i>Dec. 2017 - Present</i>
Reviewer of <i>SAE Technical Papers</i>	<i>Oct. 2017 - Present</i>
Reviewer of <i>TRB Annual Meeting</i>	<i>Sep. 2017 - Present</i>
Reviewer of <i>IEEE Transactions on Intelligent Transportation Systems</i>	<i>Jun. 2017 - Present</i>
Reviewer of <i>COTA International Conference of Transportation Professionals (CICTP)</i>	<i>Feb. 2017 - Present</i>

As a Volunteer

Organizer of <i>2018 IEEE 21st ITSC</i> , Maui, HI	<i>Nov. 2018</i>
Onsite support of Humanplus Intelligent Robotics Technology Co., Ltd. on CES 2018, Las Vegas, NV	<i>Jan. 2018</i>
Organizer of Chinese Institute of Engineers (CIE) So-Cal Chapter Annual Convention, Rowland Heights, CA	<i>Sep. 2017</i>
Organizer of <i>2017 IEEE IV Symposium</i> , Redondo Beach, CA	<i>Jun. 2017</i>
Onsite support of UISEE Technology Co., Ltd. on CES 2017, Las Vegas, NV	<i>Jan. 2017</i>

TEACHING EXPERIENCE

Vehicular Cyber-Physical Systems (Purdue CE 562)	<i>Spring 2023/24/25</i>
<ul style="list-style-type: none"> Delivered a semester of lectures independently as the sole instructor of the graduate course Introduced cyber-physical systems and their applications in the automotive domain 	
Highway Transportation Characteristics (Purdue CE 463)	<i>Fall 2024</i>
<ul style="list-style-type: none"> Delivered a semester of lectures independently as the sole instructor of the undergraduate course Introduced basic characteristics of highway transportation systems and the elements influencing these characteristics 	
Intelligent Transportation Systems (Purdue CE 597)	<i>Fall 2023/25</i>
<ul style="list-style-type: none"> Delivered a semester of lectures independently as the sole instructor of the graduate course Introduced intelligent sensing and control technologies in transportation systems 	
Next-Generation Mobility (Purdue CCE 299)	<i>Spring 2023/24, Fall 2023/24</i>
<ul style="list-style-type: none"> Conducted two hours of lecture independently as a rotating lecturer of the undergraduate course Introduced digital twin and connected and automated vehicle technologies 	
Intelligent Transportation Systems (UCR EE 246)	<i>Oct. 2018</i>
<ul style="list-style-type: none"> Delivered two hours of lecture independently as a rotating lecturer of the graduate course Introduced car-following models, cooperative adaptive cruise control, and simulation tools 	
Feedback Control (UCR ME 121)	<i>Mar. 2017 - Jun. 2017</i>
<ul style="list-style-type: none"> Delivered 20 hours of discussion sessions independently as a teaching assistant for the undergraduate course Introduced the analysis and design of feedback control systems using classical control methods, including block diagrams, closed-loop stability, root locus, Bode plots, etc. 	
Mechanical Engineering Modeling and Analysis (UCR ME 118)	<i>Jan. 2017 - Mar. 2017</i>
<ul style="list-style-type: none"> Delivered 20 hours of discussion sessions independently as a teaching assistant for the undergraduate course Introduced data analysis and modeling used in engineering through MATLAB, including descriptive and inferential statistics, fitting linear and nonlinear models to observed data, numerical differentiation and integration, etc. 	
Introduction to Engineering Computation (UCR ME 018)	<i>Sep. 2016 - Dec. 2016</i>
<ul style="list-style-type: none"> Delivered 60 hours of lab sessions independently as a teaching assistant for the undergraduate course Introduced the use of MATLAB in engineering computation, including scripts and functions, programming, input/output, two and three-dimensional graphics, elementary numerical analysis, etc. 	

STUDENT MENTORING

Mentoring at Purdue

- Jiaru Zhang, *now*: Postdoc in Civil Engineering @Purdue
- SungYeon Park, *now*: Ph.D. student in Civil Engineering @Purdue
- Juanwu Lu, *now*: Ph.D. student in Civil Engineering @Purdue
- Can Cui, *now*: Ph.D. student in Civil Engineering @Purdue
- Yunsheng Ma, *now*: Ph.D. student in Civil Engineering @Purdue
- Juntong Peng (co-advise), *now*: Ph.D. student in Electrical and Computer Engineering @Purdue
- Zichong Yang (co-advise), *now*: Ph.D. student in Mechanical Engineering @Purdue
- Yupeng Zhou (co-advise), *now*: Ph.D. student in Mechanical Engineering @Purdue
- Guanxiao Li (co-advise), *now*: Ph.D. student in Electrical and Computer Engineering @Purdue
- Luyang Jiang (co-advise), *now*: M.S. student in Electrical and Computer Engineering @Purdue
- Vaishnavi Satish, *now*: M.S. student in Autonomy @Purdue
- Udit Ekansh, *now*: M.S. student in Autonomy @Purdue
- Girish Jagadeesan, *now*: M.S. student in Autonomy @Purdue
- Prashanth Sankaranarayanan, *now*: M.S. student in Autonomy @Purdue
- Shashwat Kumar, *now*: M.S. student in Autonomy @Purdue
- Manav Gagvani, B.S. student in Electrical and Computer Engineering @Purdue
- Patrick Shen, B.S. student in Electrical and Computer Engineering @Purdue
- Matthew Yao, B.S. student in Electrical and Computer Engineering @Purdue
- Kyungmin Kim, B.S. student in Computer Science @Purdue
- Trang Do, B.S. student in Data Science @Purdue

Mentored at Purdue

- Guanxiao Li, M.S. student in Electrical and Computer Engineering @Purdue, *now*: Ph.D. student in Electrical and Computer Engineering @Purdue
- Yupeng Zhou, M.S. student in Mechanical Engineering @Purdue, *now*: Ph.D. student in Mechanical Engineering @Purdue
- Zihao Li, M.S. student in Electrical and Computer Engineering @Purdue, *now*: Transportation System Modeler @North Central Texas Council of Governments
- Peiran Liu, M.S. student in Industrial Engineering @Purdue, *now*: Ph.D. student in Industrial Engineering @Purdue
- Shubham Khawale, M.S. student in Mechanical Engineering @Purdue, *now*: Engineer @Dayton-Phoenix Group
- Rohit Naidu, B.S. student in Electrical and Computer Engineering @Purdue, *now*: Engineer @Texus Instruments

Mentored at Toyota

- Runjia Du, 2022 summer intern @Toyota, *now*: Ph.D. candidate in Civil Engineering @Purdue
- Zhouqiao Zhao, 2021 summer intern @Toyota, *now*: Post-doc scholar @MIT
- Yanbing Wang, 2021 spring intern @Toyota, *now*: Ph.D. student in Civil Engineering @Vanderbilt
- Jianyu Su, 2021 spring intern @Toyota, *now*: ML Engineer @JD.com
- Yongkang Liu, 2020 winter intern @Toyota, Ph.D. student in EE @UT Dallas, *now*: ML Engineer @Toyota
- Zhenyu Shou, 2020 winter intern @Toyota, *now*: Ph.D. student in Civil Engineering @Columbia
- Xianguo Liu, 2019 summer intern @Toyota, *now*: Ph.D. candidate in ECE @Northwestern

Mentored at UCR

- Xishun Liao, M.S. student in ME @UMD & summer research intern @UCR, *now*: Post-doc scholar @UCLA
- Yuan-Pu Hsu, M.S. student in ECE @UCR, *now*: Software Engineer @Cruise
- Francisco Caballero, B.S. student in CS @CSUSB
- Xuanpeng Zhao, B.S. & M.S. student in ECE @UCR, *now*: Ph.D. candidate in ECE @UCR
- Yu Jiang, B.S. & M.S. student in ECE @UCR, *now*: Algorithm Engineer @IQHi Inc

- Pingbo Ruan, B.S. & M.S. student in ECE @UCR, now: M.S. student in ECE @UCR
- Shangrui Liu, B.S. & M.S. student in ECE @UCR, now: M.S. student in ECE @UCR
- Hangquan Zhao, B.S. student in ECE @UCR, now: Software Engineer @Toyota
- Yue You, B.S. student in ECE @UCR, now: Software Engineer @WeRide
- Yu Wang, M.S. student in ME @UCR

INVITED TALKS

LLM4AD: Large Language Models for Autonomous Driving

- University of California, Berkeley PATH Seminar, Berkeley, CA, Feb. 2025

LLM4AD: Large Language Models for Autonomous Driving

- Illinois Center for Transportation Kent Seminar, Rantoul, IL, Jan. 2025

LLM4AD: Large Language Models for Autonomous Driving

- Bosch Research Seminar, Sunnyvale, CA, Dec. 2024

Overview of the Purdue Digital Twin Lab

- Seoul National University Civil Engineering Seminar, Seoul, South Korea, Jun. 2024

Large Language Models for Autonomous Driving

- Scania Seminar, Virtual, May. 2024

Overview of the Purdue Digital Twin Lab

- University of Pennsylvania Pennovation Seminar, Philadelphia, Pennsylvania, Dec. 2023

Mobility Digital Twin for Connected and Automated Vehicles

- The Daegu Gyeongbuk Institute of Science & Technology (DGIST) EECS Seminar Series, Virtual, Nov. 2023

Mobility Digital Twin with Big Data and Cloud Computing

- Purdue Rosen Center for Advanced Computing (RCAC) Cyberinfrastructure Symposium, West Lafayette, IN, Sep. 2023

Mobility Digital Twin for Connected and Automated Vehicles

- The University of Queensland Seminar Series, Virtual, Apr. 2023

Digital Twin Simulation for Connected and Automated Vehicles

- Purdue Rosen Center for Advanced Computing (RCAC) Digital Twins Symposium, West Lafayette, IN, Apr. 2023

Augmented Reality-Based Advanced Driver-Assistance Systems for Connected and Automated Vehicles

- 2022 IEEE International Conference on Systems, Man, and Cybernetics, Prague, Czech Republic, Oct. 2022

Mobility Digital Twin for Connected and Automated Vehicles

- Purdue Institute for Control, Optimization, and Networks (ICON) Seminar, West Lafayette, IN, Oct. 2022

Mobility Digital Twin for Connected and Automated Vehicles

- Modeling, Estimation and Control Conference (MECC) 2022, Jersey City, NJ, Oct. 2022

Cloud Computing and Edge Computing for Connected and Automated Vehicles

- 59th Design Automation Conference, San Francisco, CA, Jul. 2022

Mobility Digital Twin for Connected and Automated Vehicles

- Bosch Research Colloquium, Virtual, Jul. 2022

Digital Twin for Future Mobility

- IEEE 18th International Conference on Intelligent Environments (IE2022), Biarritz, France, Jun. 2022

Mobility Digital Twin: An AI-Based Data-Driven Vehicle-Edge-Cloud Framework

- NSF Workshop: The Frontiers of Artificial Intelligence-Empowered Methods and Solutions to Urban Transportation

Challenges, Seattle, WA, Jun. 2022

The Role of Digital Twins in Connected and Automated Vehicles

- ASCE International Conference on Transportation & Development (ICTD), Seattle, WA, Jun. 2022

Mobility Digital Twin for Connected Vehicles and Edge/Cloud Computing

- Design, Automation, and Test in Europe Conference (DATE 2022), Mar. 2022

Mobility Digital Twin for Connected and Automated Vehicles

- 25th COTA Annual Winter Symposium, Washington D.C., Jan. 2022

Mobility Digital Twin with Connected Vehicles and Cloud Computing

- Columbia University NSF Project Meeting, Dec. 2021

Cooperative Motion Planning and Control at Ramp Merging: A Field Experiment

- 2021 Conference on Control Technology and Applications (CCTA) Workshop, Aug. 2021

AI and Transportation Technology - Panel Discussion

- The ITE Virtual Student Leadership Summit, Feb. 2021

A Digital Twin Paradigm: Vehicle-to-Cloud Based Advanced Driver Assistance Systems

- 23rd COTA Annual Winter Symposium, Washington D.C., Jan. 2020

Unity3D-Based AV Simulation with V2X Communication and Human-in-the-Loop Integration

- Automated Vehicles Symposium, Orlando, FL, Jul. 2019

Eco-Friendly Applications in Connected and Automated Vehicle Technology

- University of California, Riverside CE-CERT Open House, Riverside, CA, Oct. 2018

Connected Eco-Bus: An Innovative Vehicle Powertrain Eco-Operation System for Efficient Plug-In Hybrid Electric Buses

- ARPA-E NEXTCAR 2018 Annual Meeting, Southfield, MI, Apr. 2018

Connected and Automated Vehicle Research at UCR

- University of California, Riverside Extension, Riverside, CA, Jan. 2018

Developing a Platoon-Wide Eco-Cooperative Adaptive Cruise Control (CACC) System

- Los Angeles Environmental Forum, San Gabriel, CA, Aug. 2017

Distributed Consensus-Based Cooperative Adaptive Cruise Control (CACC) Systems

- TuSimple Technology Co., Ltd., San Diego, CA, Jul. 2017

MEDIA EXPOSURES

ChatGPT Could Help Passengers Communicate Better with AVs, Study Finds, Tech Brew, Oct. 2024

Autonomous Vehicles Could Understand their Passengers Better with ChatGPT, Research Shows, News8Plus, Oct. 2024

Autonomous Vehicles Could Understand Their Passengers Better With ChatGPT, Tech Brief, Sep. 2024

Self-Driving Cars, Guided by Chat GPT, FOX (WXIN-IN), Sep. 2024

Self-Driving Cars Using Chat GPT, FOX (KTVU), Sep. 2024

Improving the Passenger Experience in Driverless Cars, FOX (KTXL), Sep. 2024

Self-Driving Cars, Guided by A.I., CBS (WTTK), Sep. 2024

Engineers at Purdue University Researching How ChatGPT Could be Used in Self-Driving Vehicles, ABC (WMUR-MAN), Sep. 2024

Self-Driving Cars Using AI, DC News Now (WDVM), Sep. 2024

Passengers Using AI to Command Driverless Cars, MyTV (KRON-SF), Sep. 2024

Self-Driving Cars, Guided by Chat GPT, The Morning Show (WJXT), Sep. 2024

The LLM Car: A Breakthrough in Human-AV Communication, Unite.AI, Sep. 2024

Research Reveals How ChatGPT Can Help Self-Driving Cars, AI Business, Sep. 2024

Research Reveals How ChatGPT Can Help Self-Driving Cars, IoT World Today, Sep. 2024

Can AI Make Autonomous Vehicle Better?, eeDesignit, Sep. 2024

Autonomous Cars Would be Less Confused if They Used ChatGPT, cybernews, Sep. 2024

Riding in Level Four AVs Feels Safe and Comfortable Study, Quantum Zeitgeist, Sep. 2024

The Role Chatbots Could Play in Autonomous Vehicles, Electronics 360, Sep. 2024

LLMs Could Help Passengers Intuitively Control Autonomous Vehicles, i-HLS, Sep. 2024

Autonomous Vehicles Could Understand Their Passengers Better with ChatGPT, Eurasia Review, Sep. 2024

Autonomous Vehicles Could Understand Their Passengers Better with ChatGPT, ScienceDaily, Sep. 2024

Autonomous Vehicles Could Understand Their Passengers Better with ChatGPT, Research Shows, EurekAlert!, Sep. 2024

Autonomous Vehicles Understand Passengers Better With ChatGPT, Study Reveals, The University Network, Sep. 2024

Autonomous Vehicles Could Understand their Passengers Better with ChatGPT, Research Shows, Tech Xplore, Sep. 2024

Autonomous Vehicles Could Understand their Passengers Better with ChatGPT, Research Shows, Techstreet Now, Sep. 2024

Autonomous Vehicles Could Understand their Passengers Better with ChatGPT, Research Shows, WBIV.com, Sep. 2024

Autonomous Vehicles Could Understand their Passengers Better with ChatGPT, Research Shows, Purdue University News, Sep. 2024

Digital Twins: An On-Ramp to Autonomous Driving, Medium, Mar. 2023

Former Researcher at Toyota Research Institute of America Reveals Autonomous Driving Digital Twin Experiment, Nikkei Cross Tech (xTech), Aug. 2022

NCST Partner CE-CERT Takes Eco-Driving Simulator to CES, National Center for Sustainable Transportation, Jan. 2020

Testing a Connected Eco-Driving System in Field Trials with Heavy-Duty Trucks, Featured News, Tech Xplore, Aug. 2019

Steering into the Future of Connected and Automated Vehicles, UCR News, Jul. 2019