Ziran Wang

Assistant Professor, Purdue University
HAMP G133, 350 Stadium Mall Drive, West Lafayette, IN 47907
Email: ziran@purdue.edu | Website: http://ziranw.github.io

SUMMARY

Currently lead the Purdue Digital Twin Lab at Purdue University as a Tenure-Track Assistant Professor, and previously led the Digital Twin Roadmap at Toyota Motor North America as a Principal Researcher. Published more than 40 refereed papers in premier journals and conference proceedings, and filed more than 50 patent applications worldwide. Serve as the Founding Chair of IEEE technical committee on Internet of Things in Intelligent Transportation Systems, and associated editor of three academic journals. Achievements were demonstrated on Consumer Electronic Show (CES), and acknowledged by the US Department of Transportation NCST Dissertation Award and four best paper awards.

EMPLOYMENT

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

- Assistant Professor
  - Autonomous and Connected Systems Initiative *Jul. 2022 – Present*
  - Lyles School of Civil Engineering *Jul. 2022 – Present*
  - Center for Innovation in Control, Optimization, and Networks *Jul. 2022 – Present*

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

- Principal Researcher (Supervisor: 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*

University of California, Riverside (Riverside, CA)

- Researcher Assistant, Transportation Systems Research Lab (Advisor: Dr. Matthew Barth) *Jun. 2016 - Jun. 2019*
- Teaching Assistant, Mechanical Engineering, Electrical and Computer Engineering *Sep. 2016 - Jun. 2017*
- Researcher Assistant, Cooperative Vehicle Networks Lab (Advisor: Dr. Wei Ren) *Nov. 2015 - Jun. 2016*

Changan Suzuki (Chongqing, China)

- Summer Intern *Jul. 2014 - Aug. 2014*

EDUCATION

Ph.D. in Mechanical Engineering *Sep. 2015 - Jun. 2019*
University of California, Riverside (UCR)
Advisor: Dr. Matthew J. Barth, Yeager Family Chair Professor, 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 (BUPT)

REFEREED PUBLICATIONS

Under Review

[J43]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*, under review

Journal Publications

[**J42**]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*, early access

[**J41**]Mobility Digital Twin: Concept, Architecture, Case Study, and Future Challenges

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- *IEEE Internet of Things Journal*, early access, DOI: 10.1109/JIOT.2022.3156028

[**J40**]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*, early access, DOI: 10.1109/TSMC.2021.3131431

[**J39**]The Role of Digital Twins in Connected and Automated Vehicles

- Chris Schwarz and Ziran Wang
- *IEEE Intelligent Transportation Systems Magazine*, early access, DOI: 10.1109/MITS.2021.3129524

[**J38**]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*, to appear

[**J37**]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*, early access, DOI: 10.1109/TIV.2021.3103695

[**J36**]Digital Twin-Assisted Cooperative Driving at Non-Signalized Intersections

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- *IEEE Transactions on Intelligent Vehicles*, early access, DOI: 10.1109/TIV.2021.3100465

[**J35**]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

[**J34**]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

[**J33**]Driver Behavior Modeling using Game Engine: 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

[**J32**]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

[**J31**]A Survey on Cooperative Longitudinal Motion Control of Multiple Connected Automated Vehicles

- 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, Spring 2020, pp. 4–25

[J30]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

[J29]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

[J28]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

[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 (ICCPS),* 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

[B3]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

[P52]Lane Merging Near-Miss Prevention ADAS

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

[P51]Software Defined Personalized Speed Limiter

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

[P50]Systems and Methods for Simulating Connected and Automated Vehicles with Digital Twin

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

[P49]Systems and Methods for Personalized Takeover Prediction with Driver Haptic Inputs

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

[P48]Systems and Methods for Lane-Change Prediction with Federated Learning

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

[P47]Senior "Aging" Glaucoma Pedestrian Detection Metaverse ADAS

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

[P46]Systems and Methods for Active Road Surface Maintenance with Mobility Digital Twin

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

[P45]Software Driven Multi-Sensory Fusion Mood Based Personalized Adaptive Cruise Control

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

[P44]Systems and Methods for Personalized Adaptive Cruise Control with Transformers and RNNs

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

[P43]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, Filed May 2022

[P42]Software Driven User Profile Personalized Adaptive Cruise Control

- Rohit Gupta, Ziran Wang, and Kyungtae Han
- U.S. patent application, Filed May 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 17/744452, 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 17/725297, Filed Apr. 2022

[P39]Personalized Vehicle Lane Change Maneuver Prediction

- Ziran Wang, Rohit Gupta, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/715011, 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 17/586593, Filed Jan. 2022

[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 17/578330, 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 17/572486, 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 17/567504, Filed Jan. 2022

[P34]Apparatus and Method for Cooperative Escape Zone Detection
- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/509711, Filed Oct. 2021

[P33]Cooperative Artificial Intelligent Assisted Driving
- Jianyu Su, Rui Guo, and Ziran Wang
- U.S. patent application 17/475306, Filed Sep. 2021

[P32]Subconscious Big Picture Macro and Split Second Micro Decisions ADAS
- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/471100, 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 17/411831, 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 17/410536, 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 17/398666, 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 17/388488, 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 17/387045, Filed Jul. 2021

[P26]Vehicular Topple Risk Notification
- Rohit Gupta, Ziran Wang, Yanbing Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/385012, 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 17/373050, 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 17/333616, Filed Jun. 2021

[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 17/217358, 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 17/216924, Filed Mar. 2021

[P19]Vehicle Guard Rail System

- Rohit Gupta, Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/206706, 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 17/196016, Filed Mar. 2021

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

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/193278, 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 17/174998, Filed Feb. 2021

[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 17/168582, Filed Feb. 2021

[P14]System and Method for Connected Vehicle Lane Merge

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 17/031095, Filed Sep. 2020

[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 16/999332, 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 16/998529, Filed Aug. 2020

[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 16/927467, 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 16/897386, Filed Jun. 2020

[P9]Adjustable Blind Spot Monitor

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- China patent application 202010223851.8, Filed Mar. 2019

[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 16/781211, Filed Feb. 2020

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

- Ziran Wang, Kyungtae Han, and Prashant Tiwari
- U.S. patent application 16/775772, 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 16/364851, 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 16/364851, 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 16/295700, Filed Mar. 2019

[P2]Virtualized Driver Assistance

- Ziran Wang, BaekGyu Kim, and Hiromitsu Kobayashi
- U.S. patent application 16/268729, Filed Feb. 2019

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

- Ziran Wang, Kyungtae Han, and BaekGyu Kim
- U.S. patent application 16/264475, Filed Jan. 2019 | U.S. patent 11257363, Granted Feb. 2022

PROFESSIONAL ACTIVITIES

As an Editor

Associate editor of *IEEE Transactions on Intelligent Vehicles* — *Jun. 2022 - Present*
Guest editor of *IEEE Open Journal of Intelligent Transportation Systems* — *May 2022 - Present*
Associate editor of *Frontiers in Sustainable Cities-Urban Transportation Systems and Mobility* — *Sep. 2021 - Present*
Handling editor of *SAE Non-Event Technical Papers* — *Apr. 2021 - Present*
Associate editor of *IEEE Intelligent Vehicles Symposium (IV)* — *Nov. 2020 - Present*
Associate editor of *SAE International Journal of Connected and Automated Vehicles* — *Jun. 2020 - Present*
Associate editor of *IEEE International Conference on Intelligent Transportation Systems (ITSC)* — *Feb. 2020 - Present*

As a Committee/Program 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*

Member of Technical Program Committee in the *2021 IEEE 94th Vehicular Technology Conference: VTC2021-Fall* — *May 2021 - Present*
Member of Technical Program Committee in the *2021 IEEE International Conference on Digital Twin and Parallel Intelligence* — *Apr. 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 - Present*
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

Member of Society of Automotive Engineers (SAE) *Jan. 2018 - Present*
Member of Southern California Chinese-American Environmental Protection Association (SCCAEPA) *Feb. 2017 - Present*
Member of International Chinese Transportation Professionals Association (ICTPA) *Feb. 2017 - Present*
Member of Chinese Overseas Transportation Association (COTA) *Jan. 2017 - Present*
Friend of Transportation Research Board (TRB) Standing Committee: Vehicle-Highway Automation *Jan. 2017 - Present*
Member of Intelligent Transportation Systems Society (ITSS), IEEE *Sep. 2016 - Present*
Member of Institute of Electrical and Electronics Engineers (IEEE) *Sep. 2016 - Present*

As an Organizer

Chair of *24th IEEE International Conference on Intelligent Transportation Systems (ITSC)*, 2nd Workshop on Internet of Things in Intelligent Transportation Systems: Opportunities and Challenges, Indianapolis, IN *Sep. 2021*
Chair of *2021 IEEE Intelligent Vehicles Symposium (IV)*, Cooperative Driving in Mixed Traffic Workshop, Nagoya, Japan *Jul. 2021*
Chair of *2020 IEEE Intelligent Vehicles Symposium (IV)*, Internet of Things in Intelligent Transportation Systems: Opportunities and Challenges Workshop, Virtual *Oct. 2020*
Chair of *23rd IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Testing and Evaluation Connected and Automated Vehicles Using Emerging Simulation Technologies Workshop, Virtual *Sep. 2020*
Co-Chair of *4th IEEE Conference on Control Technology and Applications (CCTA)*, Automotive Control Invited Sessions, Virtual *Aug. 2020*

As a Reviewer

Reviewer of *MDPI Remote Sensing* *Apr. 2022 - Present*
Reviewer of *IEEE Robotics and Automation Letters* *Mar. 2022 - Present*
Reviewer of *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* *Mar. 2022 - Present*
Reviewer of *Transportation Research Part B: Methodological* *Mar. 2022 - Present*
Reviewer of *Applied Energy* *Oct. 2021 - Present*
Reviewer of *IEEE Transactions on Industrial Informatics* *Sep. 2021 - Present*
Reviewer of *Physica A: Statistical Mechanics and its Applications* *Jul. 2021 - Present*
Reviewer of *Connection Science* *Jul. 2021 - Present*
Reviewer of *Simulation Modelling Practice and Theory* *Jun. 2021 - Present*
Reviewer of *Transportation Research Part C: Emerging Technologies* *Apr. 2021 - Present*
Reviewer of *IEEE Transactions on Transportation Electrification* *Feb. 2021 - Present*
Reviewer of *IEEE Transactions on Systems, Man and Cybernetics: Systems* *Jan. 2021 - Present*
Reviewer of *Automatica* *Dec. 2020 - Present*
Reviewer of *IEEE Transactions on Control Systems Technology* *Dec. 2020 - Present*
Reviewer of *Journal of Traffic and Transportation Engineering* *Nov. 2020 - Present*
Reviewer of *IEEE Vehicular Technology Magazine* *Nov. 2020 - Present*
Reviewer of *Transportation Research Part D: Transport and Environment* *Nov. 2020 - Present*
Reviewer of *Information Sciences* *Oct. 2020 - Present*
Reviewer of *Journal of Selected Topics in Signal Processing* *Sep. 2020 - Present*
Reviewer of *Serbian Journal of Electrical Engineering* *Aug. 2020 - Present*
Reviewer of *IEEE Transactions on Control of Network Systems* *Jul. 2020 - Present*
Reviewer of *MDPI Multimodal Technologies and Interaction* *May 2020 - Present*
Reviewer of *MDPI Applied Science* *May 2020 - Present*
Reviewer of *IEEE Forum on Integrated and Sustainable Transportation Systems* *Mar. 2020 - Present*

Reviewer of *International Journal of Automotive Technology* — *Feb. 2020 - Present*
Reviewer of *MDPI Sensors* — *Feb. 2020 - Present*
Reviewer of *Journal of Intelligent Transportation Systems* — *Jan. 2020 - Present*
Reviewer of *International Journal of Transportation Science and Technology* — *Jan. 2020 - Present*
Reviewer of *MDPI Information* — *Jan. 2020 - Present*
Reviewer of *IEEE Open Journal of Intelligent Transportation Systems* — *Dec. 2019 - Present*
Reviewer of *IEEE Vehicular Technology Conference* — *Nov. 2019 - Present*
Reviewer of *MDPI Vehicles* — *Nov. 2019 - Present*
Reviewer of *IEEE Transactions on Intelligent Vehicles* — *Oct. 2019 - Present*
Reviewer of *IEEE Access* — *Aug. 2019 - Present*
Reviewer of *Journal of Control, Automation and Electric Systems* — *Apr. 2019 - Present*
Reviewer of *IEEE Conference on Control Technology and Applications* — *Mar. 2019 - Present*
Reviewer of *SAE International Journal of Connected and Automated Vehicles* — *Oct. 2018 - Present*
Reviewer of *American Control Conference (ACC)* — *Oct. 2018 – Present*
Reviewer of *Transportation Research Record (TRR)* — *Aug. 2018 - Present*
Reviewer of *International Conference on Computer Science and Application Engineering (CSAE)* — *Aug. 2018 - Present*
Reviewer of *Journal of Advanced Transportation* — *Jul. 2018 - Present*
Reviewer of *IEEE International Conference on Intelligent Transportation Systems (ITSC)* — *May 2018 - Present*
Reviewer of *Case Studies on Transport Policies (CSTP)* — *May 2018 - Present*
Reviewer of *IEEE Intelligent Vehicles Symposium* — *Mar. 2018 - Present*
Reviewer of *IET Intelligent Transport Systems* — *Jan. 2018 - Present*
Reviewer of *ASCE International Conference on Transportation & Development (ICTD)* — *Dec. 2017 - Present*
Reviewer of *SAE Technical Papers* — *Oct. 2017 - Present*
Reviewer of *TRB Annual Meeting* — *Sep. 2017 - Present*
Reviewer of *IEEE Transactions on Intelligent Transportation Systems* — *Jun. 2017 - Present*
Reviewer of *COTA International Conference of Transportation Professionals (CICTP)* — *Feb. 2017 - Present*

As a Volunteer

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

TEACHING EXPERIENCE

Intelligent Transportation Systems (UCR EE 246) — *Oct. 2018*

- Conducted 2 hours of lecture independently as a rotating lecturer of the course
- Introduced car-following models, cooperative adaptive cruise control, and simulation tools

Feedback Control (UCR ME 121) — *Mar. 2017 - Jun. 2017*

- Conducted 20 hours of discussion sessions independently as a teaching assistant of the course
- Introduced the analysis and design of feedback control systems using classical control methods, including block diagrams, closed-loop stability, root locus, Bode plots, and etc.

Mechanical Engineering Modeling and Analysis (UCR ME 118) — *Jan. 2017 - Mar. 2017*

- Conducted 20 hours of discussion sessions independently as a teaching assistant of the 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) *Sep. 2016 - Dec. 2016*

- Conducted 60 hours of lab sessions independently as a teaching assistant of the 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.

MENTORED STUDENTS

Mentored at Purdue

- Zihao Li, *now*: M.S. student in Civil Engineering @Purdue

Mentored at Toyota

- Runjia Du, 2022 summer intern @Toyota, *now*: Ph.D. student in Civil Engineering @Purdue
- Zhouqiao Zhao, 2021 summer intern @Toyota, *now*: Ph.D. candidate in ECE @UCR
- 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*: Ph.D. candidate in ECE @UCR
- 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

HONORS & AWARDS

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*
BUPT Scholarship Award *Jun. 2014 & Jun. 2013*
The Honorable Mention, The Mathematical Contest in Modeling (MCM) *Feb. 2014*

INVITED TALKS

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

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*