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Anticipated Start Date: March 2026



ResearchGate

Academic Appointments

The Hong Kong Polytechnic University

Position: Postdoctoral Fellow

Affiliation: Department of Logistics and Maritime Studies, Faculty of Business

Advisor: Prof. [Shuaian \(Hans\) Wang](#) and Prof. [Min Xu](#);

Mar 2026 – Present



Education

MS University of Shanghai for Science and Technology, Master of Engineering

Sep 2018 – Dec 2020

Major: Transportation Engineering;

Advisor: Prof. [Jing Zhao](#);

Coursework: Traffic Flow Theory; Advanced Operations Research; Connected and Automated Vehicles; Signal Control



Visiting University of Wisconsin-Madison

Jan 2024 – Jan 2025

Major: Civil Engineering;

Advisor: Prof. [Sikai \(Sky\) Chen](#);

Collaborators: Prof. [Soyoung \(Sue\) Ahn](#) and Prof. [Xiaopeng \(Shaw\) Li](#)

Coursework: (CEE572) Traffic Operations; (ECE717) Linear Systems; (ECE821) Optimal Control and Variational Methods



PhD Southeast University, Doctor of Engineering

Mar 2022 – Mar 2026

Major: Transportation Engineering;

Advisor: Prof. [Jian Wang](#) and Prof. [Wei Wang](#);

Coursework: Machine learning; Traffic flow theory; Traffic simulation; Intelligent transportation system

Thesis: Cooperative multi-vehicle control for urban intersections in connected and automated vehicle environments



Research Interests

Multi-agent cooperative control, Autonomous driving risk identification and assessment, Data-driven intelligent transportation systems

Publications

Published / Accepted

[J1] **Single-Layer Efficient Optimization for Right-of-Way and Trajectory Control of Connected and Autonomous Vehicles at Signalized Intersections** Jan 2026

Qichao Liu, Hang Zhou, Jinbiao Huo, Chengyuan Ma

Journal of Transportation Engineering Part A: System

[J2] **Aggressiveness-Conservativeness Trade-Off in Cooperative Driving: An Adaptive CBF Approach under Perception Constraints** Oct 2025

Qichao Liu, Jian Wang

Transportation Research Part C: Emerging Technologies (JCR Q1, TOP)

<https://doi.org/10.1016/j.trc.2025.105435>

[J3] **RiskNet: Interaction-Aware Risk Forecasting for Autonomous Driving in Long-Tail Scenarios** Oct 2025

Qichao Liu, Heye Huang, Shiyue Zhao, Lei Shi, Soyoung Ahn, Xiaopeng Li

Publications

Transportation Research Part E: Logistics and Transportation Review (JCR Q1, TOP)

<https://doi.org/10.1016/j.tre.2025.104478>

[J4] An unstructured single-layer optimization approach for flexible right-of-way allocation and cooperative trajectory planning at signalized intersections Apr 2025

Computer-Aided Civil and Infrastructure Engineering (JCR Q1, Top)

Qichao Liu, Zilin Huang, Zihao Sheng, Sikai Chen

<https://doi.org/10.1111/mice.13481>

[J5] Cooperative longitudinal driving and lane assignment strategy for left-turn connected and autonomous vehicles at signalized intersections with a contraflow left-turn lane Jun 2024

IEEE Transactions on Intelligent Transportation Systems (JCR Q1, Top)

Qichao Liu, Jian Wang, Wei Wang, Xuedong Hua, Yuchuan Du

[10.1109/TITS.2024.3416442](https://doi.org/10.1109/TITS.2024.3416442)

[J6] Optimal Trajectory Control for Left-Turn Vehicles at Exit Lane for Left-Turn Intersections Oct 2021

Qichao Liu, Jing Zhao, Xizhao Zhou

Journal of Transportation Engineering Part A: System

<https://ascelibrary.org/doi/10.1061/JTEPBS.0000576>

[J7] Path Planning Method for Electric Vehicles Based on Freeway Network Oct 2021

Journal of Advanced Transportation

Qichao Liu, Wei Wang, Xuedong Hua

<https://onlinelibrary.wiley.com/doi/full/10.1155/2021/3030050>

[J8] Modeling the Operation of Left-Turn Vehicles at Exit Lanes for Left-Turn Intersection Mar 2021

Journal of Transportation Engineering Part A: System

Qichao Liu, Xizhao Zhou, Jing Zhao

<https://ascelibrary.org/doi/10.1061/JTEPBS.0000520>

[J9] REACT: Runtime-Enabled Active Collision-avoidance Technique for Autonomous Driving Dec 2025

Heye Huang, Hao Cheng, Zhiyuan Zhou, Zijin Wang, Haoran Wang, Qichao Liu, Xiaopeng Li

Advanced Engineering Informatics

<https://doi.org/10.1016/j.aei.2025.104248>

Under Review / Submitted

[J10] Real-Time Cooperative Optimization of Right-of-Way Allocation and Two-Dimensional Trajectories for Connected and Automated Vehicles at Signal-Free Intersections Sep 2025

Qichao Liu, Jian Wang, Zhiyuan Liu

Submitted to *Transportation Research Part B: Methodological*

[J11] A Distributed Two-dimensional Model Predictive Control Method for Left-turn Control of Connected and Automated Vehicle Platoon at an Intersection Area Jul 2025

Qichao Liu, Jian Wang

Submitted to *Transportation Research Part E: Logistics and Transportation Review*

[J12] Fair and Safe: A Real-Time Hierarchical Control Framework for Intersections Nov 2025

Lei Shi, Yongju Kim, Xinzhi Zhong, Wissam Kontar, Qichao Liu, Soyoung Ahn

Submitted to *IEEE Transactions on Intelligent Transportation Systems*

[J13] **Integrated Spatiotemporal Resource and Vehicle Coordination for Optimizing Signal Control Intersection Performance** Apr 2026

Qichao Liu, Jian Wang, Dong Ngoduy, Wei Wang, Xuedong Hua

Submitted to *Transportation Research Part B: Methodological*

Conference Publications

Published / Accepted

[C1] **An unstructured single-layer optimization approach for flexible right-of-way allocation and cooperative trajectory planning at signalized intersections** Jan 2026

Qichao Liu, Zilin Huang, Zihao Sheng, Sikai Chen

Accepted at *Transportation Research Board (TRB) 2026 Annual Meeting*

[C2] **Cooperative Longitudinal Driving and Lane Assignment for Left-Turning CAVs at Signalized Intersections with Contraflow Left-Turn Configuration** Jan 2026

Qichao Liu, Jian Wang, Wei Wang, Xuedong Hua

Accepted at *Transportation Research Board (TRB) 2026 Annual Meeting*

[C3] **RiskNet: Interaction-Aware Risk Forecasting for Autonomous Driving in Long-Tail Scenarios** Jan 2026

Qichao Liu, Heye Huang, Shiyue Zhao, Lei Shi, Soyoung Ahn, Xiaopeng Li

Accepted at *Transportation Research Board (TRB) 2026 Annual Meeting*

[C4] **REACT: Runtime-Enabled Active Collision-avoidance Technique for Autonomous Driving** Jan 2026

Heye Huang, Hao Cheng, Zhiyuan Zhou, Zijin Wang, Haoran Wang, Qichao Liu, Xiaopeng Li

Accepted at *Transportation Research Board (TRB) 2026 Annual Meeting*

[C5] **Model Predictive Control for Coordinated Lane Assignment and Longitudinal Coordination in Intersection Lane Expansion Zones** Oct 2025

Qichao Liu, Dong Ngoduy, Weijie Yu, Jian Wang

Accepted at *IEEE Intelligent Transportation Systems Conference (ITSC 2025)* as an Oral Presentation

<https://ieeexplore.ieee.org/document/11423429>

[C6] **A Fairness-Oriented Control Framework for Safety-Critical Multi-Robot Systems: Alternative Authority Control** May 2025

Lei Shi[†], Qichao Liu[†], Cheng Zhou, Xiong Li

Co-first author, Accepted at *IEEE International Conference on Robotics and Automation (ICRA 2025)* as an Oral Presentation

<https://ieeexplore.ieee.org/document/11127533>

[C7] **Adaptive Graph Convolutional Recurrent Network with Online Learning for Short-Term Network Traffic Prediction after Unexpected Disruptions** Jan 2025

Lianbo Huang, Jian Wang, Qichao Liu, Yuhao Li

Accepted at *Transportation Research Board (TRB) 2025 Annual Meeting* as a Poster Presentation

Research Projects

[G1] National Key R&D Program of China, Mechanisms and Migration Characteristics of the Polymorphic Evolution of Resilient Transportation Systems, **Grant No. 2021YFB1600100**

[G2] National Natural Science Foundation of China (General Program), Robust Cooperative Driving Control of Intelligent Connected Vehicle Platoons under Multi-Source Disturbances, **Grant No. 52472340**

[G3] National Natural Science Foundation of China (General Program), Integrated Traffic Analysis Technologies for Comprehensive Transportation Systems, **Grant No. 51878166**



[G4] National Natural Science Foundation of China (Young Scientists Fund), Congestion Pricing Models for Mixed Traffic Flow of Intelligent Connected Vehicles and Human-Driven Vehicles, **Grant No. 52472340**

[G5] National Natural Science Foundation of China (Young Scientists Fund), Microscopic Modeling and Simulation of Continuous Traffic Flow in Vehicle–Infrastructure Cooperative Environments, **Grant No. 71801042**

Patents

[P1] A Two-Stage Traffic Distribution Forecasting Method, **Patent No. ZL202210276416.0**.

[P2] A Parameter Calibration Method for Road Impedance Functions under Mixed Traffic Conditions with Multiple Vehicle Types, **Patent No. ZL202310922000.6**.

[P3] A Continuous Road Network Design Method for Emerging Mixed Traffic Flow, **Patent No. ZL202211345489.7**.

Academic Service

Reviewer for journals

- IEEE Transactions on Intelligent Transportation Systems
- Transportation Research Part C: Emerging Technologies
- Transportation Research Part E: Logistics and Transportation Review
- Transportation Research Interdisciplinary Perspectives

Reviewer for Conference

- IEEE Intelligent Transportation Systems Conference (ITSC)
- IEEE Intelligent Vehicles Symposium (IV)

Invited Talks / Presentations

- IEEE International Conference on Robotics and Automation (ICRA), Atlanta, USA, May 2025.
- IEEE Intelligent Transportation Systems Conference (ITSC), Gold Coast, Australia, November 2025.