XI XIONG

CONTACT INFORMATION

Department of Engineering Science
University of Oxford
Parks Road, Oxford
OX1 3PJ

Email: xi.xiong@eng.ox.ac.uk
URL: https://xiong-xi.com/

EDUCATION

New York University *New York, NY*
Doctor of Philosophy in Transportation Engineering May 2021
Dissertation: "Operations of Vehicle Platooning: Prediction, Optimization, and Cooperation"
Guidance committee: Li Jin, Kaan Ozbay, Dengfeng Sun, and Keith Ross.

Tsinghua University Beijing
Master of Science in Mechanical Engineering July 2015

Jilin University Changchun
Bachelor of Science in Automotive Engineering July 2012

ACADEMIC POSITIONS

University of Oxford Oxford
Department of Engineering Science May 2025 - Present
Visiting Researcher (Host: Jakob Foerster)

Tongji University Shanghai
College of Transportation Engineering April 2023 - Present
Research Professor (Principle Investigator)

The Chinese University of Hong Kong, Shenzhen Shenzhen
Shenzhen Research Institute of Big Data September 2021 - March 2023
Research Scientist

Harvard University Cambridge, MA
Harvard Kennedy School July 2021 - April 2022
Postdoctoral Fellow

FIELDS OF INTEREST

- Intelligent Systems
- Reinforcement Learning
- Generative AI
- Dynamic Programming
- Optimal Control
- Network Optimization

RESEARCH EXPERIENCE

Harvard University Cambridge, MA
Postdoctoral Fellow July 2021 - April 2022
Supervisor: Soroush Saghafian

- Designed a hierarchical reinforcement learning framework for decision-making in societal problems.
- Developed analytical tools to improve operations efficiency in the healthcare sector.

Civil and Urban Engineering, New York University New York, NY
Research Assistant August 2018 - May 2021
Supervisor: Li Jin

- Developed a multi-agent reinforcement learning framework to coordinate vehicle platooning in transportation networks.
- Proposed the threshold-based policy to coordinate vehicle platooning by an analytical approach.
- Derived theoretical properties of coordinated platooning with a stochastic model.
- Evaluated the platooning coordination strategy with a traffic simulation testbed.

Center for Urban Science and Progress, New York University New York, NY
Research Assistant August 2017 - July 2018
Supervisor: Kaan Ozbay

- Developed a framework combining neural networks with Kalman filter to forecast traffic demands.
- Proposed the line graph neural networks to incorporate traffic topology.
- Evaluated the demand forecasting approach with actual traffic data.

Tsinghua University Beijing
Research Assistant August 2015 - December 2016
Supervisor: Keqiang Li

- Developed a framework combining reinforcement learning with control for autonomous driving.
- Studied deep deterministic policy gradient for autonomous vehicle to improve safety.

PROJECTS

Principal Investigator May 2025 - December 2025
Fundamental Research Funds for the Central Universities Budget to date: CNY 100,000
Trustworthy Decision-Making in Offline Multi-Agent Reinforcement Learning

Principal Investigator May 2025 - December 2025
Fundamental Research Funds for the Central Universities Budget to date: CNY 50,000
Scalable and Robust Decision-Making via World Foundation Models and Reinforcement Learning

Principal Investigator October 2024 - December 2024
Fundamental Research Funds for the Central Universities Budget to date: CNY 50,000
Large-Scale Vehicle Routing with Reinforcement Learning and Large Language Models

Co-Investigator January 2024 - December 2027
National Natural Science Foundation of China (NSFC) Budget to date: CNY 410,000
Statistical and Optimization Study of Efficient Machine Learning for High-Dimensional and Streaming Data

Principal Investigator April 2024 - December 2024
Fundamental Research Funds for the Central Universities Budget to date: CNY 50,000

Reinforcement Learning from Human Feedback for Lane Changing of Autonomous Vehicles in Mixed Traffic

Principal Investigator July 2023 - December 2023
Fundamental Research Funds for the Central Universities Budget to date: CNY 50,000
Vehicle Platooning Coordination over A Cascade of Junctions

PUBLICATIONS

∗ represents supervised students

Book chapters

- Jin, L. and **Xiong, X.**, "Mesoscopic control for connected and autonomous vehicles in mixed autonomy." Book chapter in *Control, Learning, and Optimization with Applications in Connected and Autonomous Vehicles*, The Institution of Engineering and Technology (IET), 2026.

Journal papers

- Pang, A., Wang, M.*, Pun, M., Chen, C., and **Xiong, X.**, "iLLM-TSC: Integration reinforcement learning and large language model for traffic signal control policy improvement." *IEEE Transactions on Vehicular Technology*, 2025, Conditionally Accepted.
- Wang, M.*, Chen, Y., Kan, Y., Xu C., Lepech M., Pun, M., and **Xiong, X.**, "Traffic signal cycle control with centralized critic and decentralized actors under varying intervention frequencies." *IEEE Transactions on Intelligent Transportation Systems*, 2024, 25(12): 20085-20104.
- **Xiong, X.**, Sun, D. and Jin, L., "An approximate dynamic programming approach to vehicle platooning coordination in networks." *IEEE Transactions on Intelligent Transportation Systems*, 2024, 25(11): 16536-16547.
- Wang, M.*, **Xiong, X.**, Kan, Y., Xu, C. and Pun, M., "UniTSA: A universal reinforcement learning framework for V2X traffic signal control." *IEEE Transactions on Vehicular Technology*, 2024, 73(10): 14354-14369.
- Yang, S., Yin, H.H., Yeung, R.W., **Xiong, X.**, Huang, Y., Ma, L., Li, M., and Tang, C, "On scalable network communication for infrastructure-vehicular collaborative autonomous driving." *IEEE Open Journal of Vehicular Technology*, 2022, 4: 310 - 324.
- **Xiong, X.**, Sha, J. and Jin, L., "Optimizing coordinated vehicle platooning: An analytical approach based on stochastic dynamic programming." *Transportation Research Part B: Methodological*, 2021, 150: 482-502.
- Čičić, M., **Xiong, X.**, Jin, L. and Johansson, K.H., "Coordinating vehicle platoons for highway bottleneck decongestion and throughput improvement." *IEEE Transactions on Intelligent Transportation Systems*, 2021, 23(7): 8959-8971.
- **Xiong, X.**, Ozbay, K., Jin, L. and Feng, C., "Dynamic origin-destination matrix prediction with line graph neural networks and Kalman filter." *Transportation Research Record: Journal of Transportation Research Board*, 2020, 2674(8): 491-503.

Conference papers

- Cao, L.*, Wang, M., and **Xiong, X.**, "A large language model-enhanced Q-learning for capacitated vehicle routing problem with time windows." *In 28th IEEE International Conference on Intelligent Transportation Systems, ITSC 2025.*

- Bai, Y., Li, Y.*, and **Xiong, X.**, "Multi-armed bandit for stochastic shortest path in mixed autonomy." *In 28th IEEE International Conference on Intelligent Transportation Systems, ITSC 2025.*
- Zou, Y.*, Gao, Yi., **Xiong, X.**, and Jin, L., "Dyna-style learning with a macroscopic model for vehicle platooning in mixed-autonomy traffic." *In 5th IFAC Workshop on Control of Systems Governed by Partial Differential Equations, CPDE 2025.*
- Wang, Y.*, Liu, L., Wang, M., and **Xiong, X.**, "Reinforcement learning from human feedback for lane changing of autonomous vehicles in mixed traffic." *In Transportation Research Board 104th Annual Meeting, TRB 2025.*
- Liu, L.*, Wang, M., Pun, M., and **Xiong, X.**, "A multi-agent rollout approach for highway bottleneck decongestion in mixed autonomy." In *27th IEEE International Conference on Intelligent Transportation Systems, ITSC 2024.*
- **Xiong, X.** and Liu, L., "Combining policy gradient and safety-based control for autonomous driving." In *24th COTA International Conference of Transportation Professional, CICTP 2024.*
- Wang, M.*, Xu, Y., **Xiong, X.**, Kan, Y., Xu, C., and Pun, M., "ADLight: A universal approach of traffic signal control with augmented data using reinforcement learning." In *Transportation Research Board 102nd Annual Meeting, TRB 2022.*
- **Xiong, X.**, Xiao, E., and Jin, L., "Analysis of a stochastic model for coordinated platooning of heavy-duty vehicles." In *58th IEEE Conference on Decision and Control, CDC 2019.*
- **Xiong, X.**, Wang, T., and Jin, L., "Evaluation of headway threshold-based coordinated platooning over a cascade of highway junctions." In *Transportation Research Board 99th Annual Meeting, TRB 2019.*
- **Xiong, X.**, Jin, Z., Gao, D., and Lu, Q., "Development of HIL test platform based on VeriStand for hybrid powertrain controller." In *IEEE Conference and Expo Transportation Electrification Asia-Pacific, ITEC Asia-Pacific 2014.*

Working papers

- Liu, L.*, Xie, C., and **Xiong, X.**, "Optimizing Highway Traffic Flow in Mixed Autonomy: A Multiagent Truncated Rollout Approach."
- Gao, Y., **Xiong, X.**, Johansson, K.H., and Jin, L., "Proble-and-release control of mixed-autonomy traffic at highway bottlenecks with capacity breakdowns."
- Fan, Y., Cao, Y., **Xiong X.**, and Wei, K. Optimization of Courier-Order Matching and Delivery Performance for In-Time Delivery Systems.

RESEARCH SUPERVISION

Current Graduate Supervision

Yiming Li, Ph.D. Candidate, Transportation Engineering, Tongji University, 2024-

Lu Liu, Ph.D. Candidate, Transportation Engineering, Tongji University, 2023-

Maonan Wang, Ph.D. Candidate, Computer and Information Engineering, The Chinese University of Hong Kong, Shenzhen, 2022-

Linjiang Cao, M.S. Student, Transportation Engineering, Tongji University, 2024-

Jiazhuo Li, M.S. Student, Transportation Engineering, Tongji University, 2025-

Current Undergraduate Supervision

Yijue Jin, B.S. Transportation Engineering, Tongji University

Yi Fan, B.S. School of Economics and Management, Tongji University

Past Research Supervision

Junyi Sha, B.S., Mathematics and Physics, New York University
After graduation: Ph.D. student at the Massachusetts Institute of Technology

Erdong Xiao, M.S., Mechatronics and Robotics, New York University
After graduation: Ph.D. student at the University of Hong Kong

Teze Wang, M.S., Civil and Urban Engineering, New York University
After graduation: Marketing Director at China Chengxin Credit Management Co. Ltd.

Ramona Cheng
B.S. Aerospace Engineering and Computer Science, University of Michigan, Ann Arbor

Zev Nicolai-Scanio
B.S., Computer Science, Harvard University

Hengning Zhang
B.S., Computer Science, New York University

TEACHING

Tongji University

UY-15033204: Operations Research II, Spring 2024, Undergraduate

Shanghai Jiao Tong University

ECE-4530J: Decision Making in Smart Cities, Summer 2021, Undergraduate

New York University

CE-UY 4393: Analytics and Learning Methods for Smart Cities, Fall 2020, Undergraduate

TR-GY 8023: Stochastic Models and Methods for Engineering Systems, Spring 2020, Graduate

SERVICE

Professional Committees

Session Chair at the International Workshop on Mathematical Issues in Information Sciences

Member of Institute for Operations Research and the Management Sciences

Member of Chinese Association of Automation

Member of China Intelligent Transportation Systems Association

Referee Service

IEEE Transactions on Intelligent Transportation Systems

IEEE Transactions on Intelligent Vehicles

IEEE Transactions on Wireless Communications

IEEE Transactions on Vehicular Technology

IEEE Conference on Decision and Control

IEEE International Conference on Intelligent Transportation Systems

TALKS AND PRESENTATIONS

- *2025 Stanford Intelligent Systems Laboratory, Palo Alato, California.* (December 2025) "Optimizing Mixed-Autonomy Traffic with Reinforcement Learning and Large Language Models." (hosted by Prof. Mykel Kochenderfer)
- *2025 IEEE International Conference on Intelligent Transportation Systems, Gold Coast, Australia.* (November 2025) "Multi-armed Bandit for Stochastic Shortest Path in Mixed Autonomy."
- *2025 IEEE International Conference on Intelligent Transportation Systems, Gold Coast, Australia.* (November 2025) "A Large Language Model-Enhanced Q-learning for Capacitated Vehicle Routing Problem with Time Windows."
- *2024 IEEE International Conference on Intelligent Transportation Systems, Edmonton, Canada.* (September 2024) "A Multi-Agent Rollout Approach for Highway Bottleneck Decongestion in Mixed Autonomy."
- *2023 INFORMS Annual Meeting, Arizona.* (October 2023) "Coordinated platooning and adaptive routing with reinforcement learning."
- *2022 Young Investigators Symposium on Frontiers in Innovative Technology (FIT), the University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai.* (December 2022) "Vehicle platooning in networks: modeling, optimization, and cooperation."
- *2022 Transportation Research Board Annual Meeting, Washington, D.C.* (January 2023) "AD-Light: A universal approach of traffic signal control with augmented data using reinforcement learning."
- *2022 International Center for Industrial and Applied Mathematics, CUHK Shenzhen* (May 2022) "Traffic flow on networks: modeling and optimization." (hosted by Prof. Xiaoping Wang)
- *2*021 Session Chair at the International Workshop on Mathematical Issues in Information Sciences (MIIS), Shenzhen. (December 2021)
- *2020 Virtual INFORMS Annual Meeting* (November 2020) "Vehicle platooning coordination in networks: A multi-agent reinforcement learning approach."
- *2020 Transportation Research Board Annual Meeting, Washington, D.C.* (January 2020) "Dynamic origin-destination matrix prediction with line graph neural networks and Kalman filter."
- *2020 Transportation Research Board Annual Meeting, Washington, D.C.* (January 2020) "Evaluation of headway threshold-based coordinated platooning over a cascade of highway junctions."
- *2019 INFORMS Annual Meeting, Seattle.* (October 2019) "Optimization of coordinated platooning for heavy-duty vehicles."

INDUSTRIAL EXPERIENCE

LangRun FinTech Beijing
Co-Founder August 2017 – Present

- Integrated reinforcement learning with world models to design strategies for commodity trading.
- Developed a zero-shot reinforcement learning framework enabling trading under uncertainty.

JD.com, Inc. Beijing
Algorithm Engineer - Artificial Intelligence March 2017 – August 2017

- Constructed a simulation testbed for autonomous driving with deep reinforcement learning.
- Developed deep neural networks to recognize pavement for autonomous delivery vehicles.