

Yubo Jiao

Postdoctoral Researcher
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EMPLOYMENT

Postdoctoral Researcher Department of Civil Engineering, McGill University – Advisor: Luis Miranda-Moreno ; Co-Advisor: Jiangbo Yu	Montreal, Canada Sept 2024–Current
Transportation Engineer Xuzhou Communications Planning and Design Institute	Xuzhou, China July 2019–Aug 2020

EDUCATION

University of Waterloo International Visiting Graduate Student – Advisor: Liping Fu	Waterloo, Canada Sept 2020–Aug 2024
Southwest Jiaotong University Ph.D. in Transportation Planning and Management – Thesis: “Data-Driven Detection and Assessment for Urban Railway Transit Driver Fatigue” – Advisor: Chaozhe Jiang	Chengdu, China Sept 2020–Sept 2024
Southwest Jiaotong University M.Eng. in Traffic and Transportation Engineering – Thesis: “Research on Signal Control Optimization of Urban Road Intersection Based on Vehicle-Infrastructure Cooperation System” – Advisor: Chaozhe Jiang	Chengdu, China Sept 2016–July 2019
Southwest Jiaotong University B.S. in Transportation	Chengdu, China Sept 2012–July 2016

RESEARCH INTERESTS

- AI-Native Mobility Analytics: Machine Learning, Deep Learning, and Foundation Models
- Human–Vehicle Interaction (HVI): Driver-State Estimation and Adaptive Interventions
- Sustainable Mobility: Context-Aware On-Road Emissions Modeling
- Travel Behavior: LLM-Assisted Modeling and Data Collection
- Road Safety: Safety Analytics and Risk Modeling
- Network Operations and Control: Signal Control and Network-Level Optimization

INVOLVED RESEARCH PROJECTS

- Talk To Me On- or Off-Road: A Conversational System for The Inclusive Planning and Operation of Future Mobility Services Aug 2025–Present
Sponsor: Fonds de recherche du Québec, Canada; Supervisor: Jiangbo Yu
- Laboratory for Synergistic Design and Development of Shared Automated Electric Mobility Systems Sept 2024–Present
Sponsor: Canada Foundation for Innovation, Canada; Supervisor: Jiangbo Yu
- Urban Mobility and Emission Inventories in A Changing Climate: An Integrated Modelling Framework Sept 2024–Present
Sponsor: Minister of Environment and Climate Change, Canada; Supervisor: Luis Miranda-Moreno
- Collaborative Research for Improved Rail Safety Sept 2022–Aug 2024
Sponsor: Transport Canada, Canada; Supervisor: Liping Fu
- Lanzhou Rail Transit Vital Signs Monitoring System Project Technical Consulting Service May 2020–Dec 2023
Sponsor: Lanzhou Rail Transit Co., Ltd., China; Supervisor: Chaozhe Jiang
- A Data-Driven Study of High-Speed Railway Delay Propagation Mechanism and Recovery Theory Using Train Operation Data Jan 2020–Dec 2022
Sponsor: National Natural Science Foundation of China, China; Supervisor: Chao Wen
- Research on The Fatigue Mechanism and Real-Time Working Status Assessment of High-Speed Railway Drivers Based on The Fusion of Drivers' Physiological Indicators Jan 2017–May 2020
Sponsor: State Key Laboratory of Rail Traffic Control and Safety, China; Supervisor: Chaozhe Jiang
- Research on The Implementation and Management of PM2.5 Caused by Motor Vehicle Operation Emissions in Urban Areas Based on Big Data Jan 2016–Mar 2021
Sponsor: National Social Science Foundation of China, China; Supervisor: Chaozhe Jiang

TEACHING

- **Teaching Assistant** at Southwest Jiaotong University Sept 2020–July 2022
Transportation Systems Engineering
The Theory and Method of Integrated Transportation System Planning
Railway Transport Operations
Transportation System Analysis
Traffic Management and Control

PUBLICATIONS

[xxx* indicates the corresponding author(s); xxx[†] indicates equal contributions.]

Preprints and Submitted Papers

1. **Yubo Jiao**, Jônatas Augusto Manzoli, Xiting Zhang, Jiangbo Yu and Luis Miranda-Moreno, “Context-aware Vehicle CO2 Emission Estimation via Parameter-Efficient Fine-Tuning of Large Language Models”, Aug 2025. (Submitted to *TRB Annual Meeting 2026*)
2. Ali Fares, Jiangbo Yu, Tarek Zayed, Nour Faris, Jean-Paul Romero, Mingjian Wu, **Yubo Jiao** and Luis Miranda-Moreno, “AI500: A Synthetic Dataset for Data-Efficient Deep Learning in Asphalt Crack Segmentation”, Aug 2025. (Submitted to *TRB Annual Meeting 2026*)

3. Xiting Zhang, Xudong Wang, **Yubo Jiao**, Lijun Sun and Luis Miranda-Moreno, “JOINT LATENT ANALYSIS OF BEHAVIORAL PATTERNS IN MULTI-SOURCE OD”, Aug 2025. (Submitted to *TRB Annual Meeting 2026*)
4. Wenjun Zhang, Yifan Tan, Kun Liu, Yunbiao Wang, Chenglin Liu and **Yubo Jiao***, “Towards Reliable Fatigue Detection in Urban Rail: Mode-Aware Labeling and Hybrid Multimodal Fusion”, Aug 2025. (Submitted to *IEEE Transactions on Human-Machine Systems*)
5. **Yubo Jiao**, Luis Miranda-Moreno and Jiangbo Yu, “Large Language Model-Empowered Bayesian Inference of Traveler Mental State Dynamics: A Case Study of Driver Fatigue Estimation”, *SSRN Working Paper*, May 2025. (Submitted to *Transportation Research Part C*)
6. Wenjun Zhang, Jiangli Deng and **Yubo Jiao***, “Cognitive Load State Estimation of Railway Transit Drivers Using Psychological and Physiological Responses”, May 2025. (Submitted to *IEEE Transactions on Human-Machine Systems*)
7. **Yubo Jiao**, Yubo Wang and Liping Fu, “Exploring Key Factors Affecting Collision Risk at Grade Crossings in Canada: A Nonparametric Machine Learning Approach”, Apr 2025. (Submitted to *Journal of Transportation Engineering, Part A: Systems*)
8. **Yubo Jiao** and Jiangbo Yu, “An Online-Offline Machine Learning Approach for Estimating Driver States Using Multi-Sensory Data”, Dec 2024. (Submitted to *IEEE Transactions on Intelligent Transportation Systems*)

Refereed Journal Publications

1. Yubo Wang, **Yubo Jiao**, Liping Fu and Qiangqiang Shangguan, “Exploring Causal Factor in Highway–Railroad-Grade Crossing Crashes: A Comparative Analysis”, *Infrastructures*, vol. 10, no. 8, article 216, 2025.
2. Hao Wu, **Yubo Jiao***, Chaozhe Jiang, Tong Wang and Jiangbo Yu, “Fatigue state evaluation of urban railway transit drivers using psychological, biological, and physical response signals”, *IEEE Access*, vol. 13, pp. 23270–23284, 2025.
3. Chenyang Zhang, Jiajun Yuan, **Yubo Jiao**, Haiyue Liu, Liping Fu, Chaozhe Jiang and Chao Wen, “Variation of pilots’ mental workload under emergency flight conditions induced by different equipment failures: a flight simulator study”, *Transportation Research Record*, vol. 2678, no. 4, pp. 365–377, 2024.
4. Zhiqiang Sun, Haiyue Liu, **Yubo Jiao**, Chenyang Zhang, Fang Xu, Chaozhe Jiang, Xiaozhuo Yu and Gang Wu, “Machine learning noise exposure detection of rail transit drivers using heart rate variability”, *Transportation Safety and Environment*, vol. 6, no. 2, article tdad028, 2024.
5. Yufan Chen, Yang Zhang, Qing Pan, Lanxi Wei, **Yubo Jiao**, Chaozhe Jiang, Zhiqiang Sun and Lei Hou, “Dynamic evolution of high-speed railway driver fatigue across scheduling shifts—a simulator study in China”, *International Journal of Rail Transportation*, pp. 1–18 (advance online), 2024.
6. **Yubo Jiao**, Ce Zhang, Xiaoyu Chen, Liping Fu, Chaozhe Jiang and Chao Wen, “Driver fatigue detection using measures of heart rate variability and electrodermal activity”, *IEEE Trans. on Intelligent Transportation Systems*, vol. 25, no. 6, pp. 5510–5524, 2024.
7. **Yubo Jiao**, Xiaoyu Chen, Zhiqiang Sun, Liping Fu, Chaozhe Jiang, Chao Wen and Xiaoming Zhang, “Data-driven detection and assessment for urban railway transit driver fatigue in real work conditions”, *Transportation Research Record*, vol. 2677, no. 1, pp. 1367–1375, 2023.
8. **Yubo Jiao**, Yifan Tan, Xiaoming Zhang, Zhiqiang Sun, Liping Fu, Chao Wen and Chaozhe Jiang, “Label-less learning for urban railway transit driver fatigue detection with heart rate variability”, *Transportation Research Record*, vol. 2677, no. 5, pp. 11–23, 2023.
9. Kun Liu, **Yubo Jiao**, Congcong Du, Xiaoming Zhang, Xiaoyu Chen, Fang Xu and Chaozhe Jiang, “Driver stress detection using ultra-short-term HRV analysis under real world driving conditions”, *Entropy*, vol. 25, no. 2, 194, 2023.
10. **Yubo Jiao**, Zhiqiang Sun, Liping Fu, Xiaozhuo Yu, Chaozhe Jiang, Xiaoming Zhang and Kun Liu, “Physiological responses and stress levels of high-speed rail train drivers under various operating conditions—a simulator study in China”, *International Journal of Rail Transportation*, vol. 11, no. 4, pp. 449–464, 2023.

11. Kun Liu, **Yubo Jiao**, Xiaoming Zhang, Xiaoyu Chen and Chaozhe Jiang, “Test of railway train drivers’ stress by using ECG signal”, *China Safety Science Journal*, vol. 32, no. 6, pp. 31–37, 2022.
12. Yifan Tan, Haixu Liu, Yun Pu, Xuemei Wu and **Yubo Jiao**, “Passenger Flow Prediction of Integrated Passenger Terminal Based on K-Means–GRNN”, *Journal of Advanced Transportation*, vol. 2021, article 1055910, 2021.
13. Hao Wu, **Yubo Jiao** and Qiyuan Peng, “Multi-objective Optimization Research on Intersection Signal Timing Based on ARRB Model”, *Journal of Transportation Engineering and Information*, vol. 18, no. 2, pp. 139–147, 2020.

Refereed Conference Papers

1. **Yubo Jiao**, Kun Liu, Yuhong Chen, Xiaoming Zhang, Chaozhe Jiang and Shuai Zhang, “Traffic Signal Control for Urban Intersection Under Connected Vehicle Data Environment”, *Proc. 6th Int. Conf. on Intelligent Transportation Engineering (ICITE)*, Lecture Notes in Electrical Engineering, pp. 455–467, 2021.

TALKS & PRESENTATIONS

1. Podium, “Driver State Modeling and Real-Time Estimation: A Case Study of Driver Fatigue”, *Invited online guest lecture*, Virtual, Apr 2025.
2. Poster, “Can AI Agent Estimate Human Driver State? A Case Study of Driver Fatigue”, *11th Colloquium of the Quebec Road Safety Research Network*, Québec City, Canada, Mar 2025.
3. Poster, “Driver Fatigue Detection Using Measures of Heart Rate Variability and Electrodermal Activity”, *The 103rd Annual Meeting of Transportation Research Board*, Washington, D.C., Jan 2024.
4. Podium, “Variation of Pilots’ Mental Workload Under Emergency Flight Conditions Induced by Different Equipment Failures: A Flight Simulator Study”, *The 102nd Annual Meeting of Transportation Research Board*, Washington, D.C., Jan 2023.
5. Podium, “Stress Assessment During Simulated High-Speed Train Driving with Wearable Devices”, *The 9th International Conference on Railway Operations Modelling and Analysis*, Beijing, China, Nov 2021.
6. Podium, “Traffic Signal Control for Urban Intersection Under Connected Vehicle Data Environment”, *2021 6th International Conference on Intelligent Transportation Engineering (ICITE)*, Beijing, China, Oct 2021.

PATENTS

1. Jie Liu, Mingwei He, **Yubo Jiao**, Yong Yin, Chunyan Shuai, Wenxin Li, Zhuangbin Shi and Yang Liu, “A Method for Predicting Travel Time Reliability of Urban Rail Transit Network”, *China patent, Granted number: CN115759369B*, Jan 2018

PROFESSIONAL SERVICES

- Journal Reviewer
 - Applied Sciences
 - BMC Research Notes
 - Brain Sciences
 - Cognitive Neurodynamics
 - IEEE Transactions on Affective Computing
 - IEEE Transactions on Automation Science and Engineering
 - IET Image Processing
 - Journal of Advanced Transportation
 - Journal of Business Logistics

- Journal of Traffic and Transportation Engineering (English Edition)
 - Scientific Reports
 - Sensors
- Conference Reviewers
 - Bridging Transportation Researchers (BTR) Conference
 - Transportation Research Board (TRB) Annual Meeting