

Pei Li

CONTACT INFORMATION

Department of Civil and Environmental Engineering Mobile: (608) 890-2439
University of Wisconsin-Madison E-mail: pei.li@wisc.edu
Madison, WI 53706 USA

RESEARCH INTERESTS

Smart Mobility, Digital Twins, Vehicle-to-Everything, Artificial Intelligence, Human Factors

EDUCATION

University of Central Florida, Orlando, FL, USA

Ph.D., Civil Engineering, Aug 2021

M.S., Smart Cities, May 2020

Tongji University, Shanghai, China

M.Eng., Communication and Transportation Engineering, June 2018

B.Eng., Logistics Engineering, June 2015

PROFESSIONAL EXPERIENCE

Scientist

University of Wisconsin-Madison, Madison, WI, USA

Sep 2022 - Present

Postdoctoral Research Fellow

University of Michigan, Ann Arbor, MI, USA

Sep 2021 - Aug 2022

Graduate Research Assistant

University of Central Florida, Orlando, FL, USA

Aug 2018 - Aug 2021

PUBLICATIONS

Under Review Articles

1. Gan, R., Shi, H., **Li, P.**, Wu, K., An, B., & Ran, B. (2024). Goal-based Neural Physics Vehicle Trajectory Prediction Model. *Transportation Research Part C*.
2. Tamaru, R., **Li, P.**, & Ran, B. (2024). Enhancing Pedestrian Trajectory Prediction with Crowd Trip Information. *Expert Systems with Applications*.
3. Wan, H., **Li, P.**, & Kusari, A. (2024). Demystifying deep reinforcement learning-based autonomous vehicle decision-making. *IEEE Transactions on Intelligent Vehicles*.
4. Wu, K., **Li, P.**, Cheng, Y., Parker, S. T., Ran, B., Noyce, D. A., & Ye, X. (2024). A Digital Twin Framework for Physical-Virtual Integration in V2X-Enabled Connected Vehicle Corridors. *IEEE Transactions on Intelligent Vehicles*.
5. Ma, C., Li, H., Long, K., Zhou, H., Liang, Z., **Li, P.**, Yu, H., Li, X. (2024). Real-Time Identification of Cooperative Perception Necessity in Road Traffic Scenarios. *Transportation Research Part C*.

Journal Articles

1. Yin, H., Yue, L., Gong, Y., **Li, P.**, & Huang, Y. (2024). Personalized Lane Departure Warning Based on Non-Stationary Crossformer and Kernel Density Estimation. *Alexandria Engineering Journal*. 109.
2. **Li, P.**, Chen, S., Yue, L., Xu, Y., & Noyce, D. A. (2024). Analyzing relationships between latent topics in autonomous vehicle crash narratives and crash severity using natural language processing techniques and explainable XGBoost. *Accident Analysis & Prevention*, 203, 107605.

3. Liu, C., Sheng, Z., **Li, P.**, Chen, S., Luo, X., & Ran, B. (2024). A distributed deep reinforcement learning-based longitudinal control strategy for connected automated vehicles combining attention mechanism. *Transportation Letters*, 1-17.
4. **Li, P.**, Wu, K., Cheng, Y., Parker, S. T., & Noyce, D. A. (2023). How Does C-V2X Perform in Urban Environments? Results From Real-World Experiments on Urban Arterials. *IEEE Transactions on Intelligent Vehicles*.
5. Dong, J., Chen, S., Miralinaghi, M., Chen, T., **Li, P.**, & Labi, S. (2023). Why did the AI make that decision? Towards an explainable artificial intelligence (XAI) for autonomous driving systems. *Transportation Research Part C: Emerging Technologies*, 156, 104358.
6. **Li, P.**, Guo, H., Bao, S., & Kusari, A. (2023). A probabilistic framework for estimating the risk of pedestrian-vehicle conflicts at intersections. *IEEE Transactions on Intelligent Transportation Systems*.
7. Abdel-Aty, M., Zheng, O., Wu, Y., Abdelraouf, A., Rim, H., & **Li, P.** (2023). Real-Time Big Data Analytics and Proactive Traffic Safety Management Visualization System. *Journal of Transportation Engineering, Part A: Systems*, 149(8), 04023064.
8. **Li, P.**, & Abdel-Aty, M. (2022). A hybrid machine learning model for predicting real-time secondary crash likelihood. *Accident Analysis & Prevention*, 165, 106504.
9. **Li, P.**, & Abdel-Aty, M. (2022). Real-time crash likelihood prediction using temporal attention-based deep learning and trajectory fusion. *Journal of Transportation Engineering, Part A: Systems*, 148(7), 04022043.
10. **Li, P.**, Abdel-Aty, M., & Zhang, S. (2022). Improving Spatiotemporal Transferability of Real-Time Crash Likelihood Prediction Models Using Transfer-Learning Approaches. *Transportation Research Record: Journal of the Transportation Research Board*, 2676(11), 621–631.
11. **Li, P.**, Abdel-Aty, M., & Islam, Z. (2021). Driving Maneuvers Detection using Semi-Supervised Long Short-Term Memory and Smartphone Sensors. *Transportation Research Record: Journal of the Transportation Research Board*, 2675(9), 1386–1397.
12. **Li, P.**, Abdel-Aty, M., & Yuan, J. (2021). Using bus critical driving events as surrogate safety measures for pedestrian and bicycle crashes based on GPS trajectory data. *Accident Analysis & Prevention*, 150, 105924.
13. **Li, P.**, Abdel-Aty, M., Cai, Q., & Islam, Z. (2020). A deep learning approach to detect real-time vehicle maneuvers based on smartphone sensors. *IEEE Transactions on Intelligent Transportation Systems*, 23(4), 3148–3157.
14. **Li, P.**, Abdel-Aty, M., Cai, Q., & Yuan, C. (2020). The application of novel connected vehicles emulated data on real-time crash potential prediction for arterials. *Accident Analysis & Prevention*, 144.
15. **Li, P.**, Abdel-Aty, M., & Yuan, J. (2020). Real-time crash risk prediction on arterials based on LSTM-CNN. *Accident Analysis & Prevention*, 135, 105371.
16. Zhang, S., Abdel-Aty, M., Cai, Q., **Li, P.**, & Ugan, J. (2020). Prediction of pedestrian-vehicle conflicts at signalized intersections based on long short-term memory neural network. *Accident Analysis & Prevention*, 148, 105799.
17. Zhang, S., Abdel-Aty, M., Yuan, J., & **Li, P.** (2020). Prediction of Pedestrian Crossing Intentions at Intersections Based on Long Short-Term Memory Recurrent Neural Network. *Transportation Research Record: Journal of the Transportation Research Board*, 2674(4), 57–65.

Conference Articles

1. Gan, R., Shi, H., **Li, P.**, Wu, K., An, B., & Ran, B. (2025). Goal-based Neural Physics Vehicle Trajectory Prediction Model. In *Transportation Research Board 104th Annual Meeting*.
2. Wan, H., **Li, P.**, & Kusari, A. (2025). Demystifying deep reinforcement learning-based autonomous vehicle decision-making. In *Transportation Research Board 104th Annual Meeting*.

3. Zhu, J., Parker, S. T., **Li, P.**, Ran, B., & Noyce, D. A. (2025). A Comprehensive Analysis of Crash Hotspot Identification Methods for Law Enforcement Resource Allocation. In Transportation Research Board 104th Annual Meeting.
4. Ma, C., Li, H., Long, K., Liang, Z., **Li, P.**, & Li, X. (2025). Field-Based Identification of Cooperative Perception Necessity in Road Traffic Scenarios. In Transportation Research Board 104th Annual Meeting.
5. Wu, K., Gan, R., You, J., Cheng, Y., **Li, P.**, Parker, S. T., & Ran, B. (2025). V2X-LLM: Improving Vehicle-to-Everything Integration and Understanding with Large Language Models. In Transportation Research Board 104th Annual Meeting.
6. You, J., **Li, P.**, Cheng, Y., Wu, K., Gan, R., Parker, S. T., & Ran, B. (2024). Real-World Data Inspired Interactive Connected Traffic Scenario Generation. In Transportation Research Board 104th Annual Meeting.
7. **Li, P.**, Parker, S. T., & Noyce, D. A. (2024). Automated Vehicles vs. Human Drivers: Modeling Driving Behavior Using Data from Field Experiments. In International Conference on Transportation and Development 2024 (pp. 560-572).
8. Wu, K., **Li, P.**, Cheng, Y., Parker, S. T., Ran, B., & Noyce, D. A. (2024). The Enhancement of the Data Pipeline of a Connected Vehicle Corridor: A Leap Towards Digital Twin. In International Conference on Transportation and Development 2024.
9. **Li, P.**, Chen, S., Yue, L., Xu, Y., & Noyce, D. A. (2024). Analyzing relationships between latent topics in autonomous vehicle crash narratives and crash severity using natural language processing techniques and explainable XGBoost. In Transportation Research Board 103rd Annual Meeting.
10. **Li, P.**, Wu, K., Cheng, Y., Parker, S. T., & Noyce, D. A. (2024). How Does C-V2X Perform in Urban Environments? Results From Real-World Experiments on Urban Arterials. In Transportation Research Board 103rd Annual Meeting.
11. **Li, P.**, Guo, H., Bao, S., & Kusari, A. (2024). A Probabilistic Framework for Estimating the Risk of Pedestrian-vehicle Conflicts at Intersections. In Transportation Research Board 103rd Annual Meeting.
12. Yin, H., Yue, L., **Li, P.**, & Sun, J. (2024). Personalized Lane Departure Warning based on Non-Stationary Crossformer and Kernel Density Estimation. In Transportation Research Board 103rd Annual Meeting.
13. Wu, K., Cheng, Y., **Li, P.**, Parker, S. T., Ran, B., & Noyce, D. A. (2024). The Enhancement of the Data Pipeline of a Connected Vehicle Corridor: A Leap Towards Digital Twin Implementation. In Transportation Research Board 103rd Annual Meeting.
14. **Li, P.** (2023). Exploring Latent Topics from Autonomous Vehicles Crashes and Analyzing Their Relationships with Crash Metadata. In Transportation Research Board 102th Annual Meeting.
15. Kusari, A., **Li, P.**, Yang, H., Punshi, N., Rasulis, M., Bogard, S., & LeBlanc, D. J. (2022, June). Enhancing SUMO simulator for simulation based testing and validation of autonomous vehicles. In 2022 IEEE Intelligent Vehicles Symposium (IV) (pp. 829-835). IEEE.
16. **Li, P.**, & Abdel-Aty, M. (2022). Real-time Secondary Crash Likelihood Prediction Using A Hybrid Machine Learning Model. In Transportation Research Board 101st Annual Meeting.
17. **Li, P.**, & Abdel-Aty, M. (2022). Improving Spatio-temporal Transferability of Real-Time Crash Likelihood Prediction Models Using Transfer Learning Approaches. In Transportation Research Board 101st Annual Meeting.
18. **Li, P.**, & Abdel-Aty, M. (2021). Trajectory Fusion-based Real-Time Crash Likelihood Prediction Using LSTM-CNN with Attention Mechanism. In Transportation Research Board 100th Annual Meeting.

19. **Li, P.**, & Abdel-Aty, M. (2021). Using Bus Driving Events as Surrogate Safety Measures for Pedestrian and Bicycle Based on GPS Trajectory Data. In Transportation Research Board 100th Annual Meeting.
20. **Li, P.**, Abdel-Aty, M., & Islam, Z. (2021). Driving Behavior Detection Using Semi-supervised LSTM and Smartphone Sensors. In Transportation Research Board 100th Annual Meeting.
21. Zhang, R., & **Li, P.** (2016). Calculation of external costs of road and railway freight transportation and internalization. In Transportation Research Board 95th Annual Meeting (Vol. 16, pp. 2507-2522).

HONORS AND
AWARDS

- Top 3 cited paper, Accident Analysis & Prevention 2023
- Academic Staff Professional Development Grant, University of Wisconsin-Madison 2023
- Transportation Forecasting Competition 1st Prize, TRB AED50 Committee 2022
- College of Graduate Studies Presentation Fellowship, University of Central Florida 2020
- Stage III Winner in the Solving for Safety Visualization Challenge, U.S. DOT 2019
- College of Graduate Studies Presentation Fellowship, University of Central Florida 2019
- ORC Doctoral Fellowship, University of Central Florida 2018
- Best Undergraduate Thesis, Tongji University 2015

TEACHING
EXPERIENCE

- University of Michigan**, Ann Arbor, USA Spring 2022
 Guest Lecturer (*CEE552 Travel Behavior Analysis and Forecasting*)
 • Prepared course slides on CAV simulation using CARLA and SUMO.
- Tongji University**, Shanghai, China Aug 2015 - June 2017
 Teaching Assistant (*Transportation Economics I & II*)
 • Prepared course slides, quizzes, and exams.
 • Evaluated course performance and held regular office hours.
- Instructor (*Freight Management*)
 • Prepared course slides and exams.
 • Lectured courses and evaluated the performance of students.

PROFESSIONAL
SERVICES

- Statistical Editor, Transportation Research Record
- Associate Chair, 16th International ACM Conference on Automotive User Interfaces and Interactive Vehicular Applications
- Reviewer, Accident Analysis and Prevention
- Reviewer, IEEE Transactions on Intelligent Transportation Systems
- Reviewer, Traffic Injury Prevention
- Reviewer, Journal of Advanced Transportation
- Reviewer, Transportmetrica A: Transport Science
- Reviewer, Journal of Transportation Engineering, Part A: Systems
- Reviewer, Scientific Report
- Reviewer, Council of University Transportation Centers Student Awards Competition