Curriculum Vitae

Yuyan (Annie) Pan, Ph.D.

Personal Particulars

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Google Scholar: https://scholar.google.com/citations?user=4pjS2hYAAAAJ&hl=zh-CN

Research Interests

- Signal Control, Connected and Automated Vehicles, Machine Learning in Smart Mobility
- Traffic Demand Management, Traffic State Estimation and Prediction, Spatial Data Analysis
- Traffic Flow Theory, Transportation Network Optimization, Dynamic Traffic Assignment

Educational Background

- Beijing University of Technology, Beijing, China.
  Ph.D., Transportation Engineering, October 2023.
- Beijing University of Technology, Beijing, China.
  M.S., Transportation Engineering, July 2018.
- Shandong University of Technology, Zibo, China.
  B.S., Transportation Engineering, July 2014.

Employment History

- Postdoctoral Scholar, Department of Civil and Environmental Engineering, The Pennsylvania State University. University Park, PA, April 2024-July 2025.
  Advisor: Dr. Xianbiao (XB) Hu
  - Led USDOE streetlight charging project and PennDOT Act 130 project
  - Responsible for project design, report writing, and collaboration with external agencies
- Postdoctoral Scholar, FAMU-FSU College of Engineering, Florida A&M University. Tallahassee, FL, July 2025-present.
  Advisor: Dr. Qianwen Guo

Peer-reviewed Publications

1. Yang, T., Ding, Y., **Pan, Y.**, Qin, R., Yin, Z., & Hu, X. (2025). SimLKAS: A Simulation-Based Framework for the Verification and Validation of Lane Keeping Assistance Systems. Journal of Intelligent Transportation Systems.
2. Li, A., Xu, Z., **Pan, Y.**, Zhang, J., Chen, N., Chen, Y., & Li, Y., (2025). CMTT: A Convolutional Transformer Network for Vehicle Trajectory Prediction in Urban Traffic Scenarios. Journal of Transportation Engineering, Part A: Systems.
3. Li, A., **Pan, Y.**, Xu, Z., Bi, H., Gao, B., Li, K., & Chen, Y. (2025). MaTVT: A Transformer-Based Approach for Multi-Agent Prediction in Complex Traffic Scenarios. IEEE Transactions on Vehicular Technology
4. Li, A., Xu, Z., **Pan, Y.**, Gao, B., Zhang, J., Chen, Y., & Li, Y. (2025). Cell-Trans: A Traffic Prediction Method for Motion Planning of Autonomous Vehicles at Signalized Intersections. Journal of Transportation Engineering, Part A: Systems.

5. **Pan, Y.**, Song, Y., Yang, T., Ding, Y., & Hu, X. (2025). Equitable Urban Electric Vehicle Charging: Feasibility and Benefits of Streetlight Charging in Kansas City Right-of-Way. Journal of Urban Planning and Development.
6. **Pan, Y.**, Zhang, B., Guo, J., Chen, Y., & Zhao, H. (2025). Road Impedance Function for Oversaturated Traffic State Based on Fundamental Diagram. Journal of Highway and Transportation Research and Development. https://doi.org/10.3969/j.issn.1002-0268.2025.02.001
7. Li, A., Xu, Z., Li, W., Chen, Y., & **Pan, Y.***. (2025). Urban Signalized Intersection Traffic State Prediction: A Spatial-Temporal Graph Model Integrating the Cell Transmission Model and Transformer. Applied Sciences. https://doi.org/10.3390/app15052377
8. **Pan, Y.**, Li, F., Li, A., Niu, Z., & Liu, Z. (2025). Urban Intersection Traffic Flow Prediction: A Physics-guided Stepwise Framework Utilizing Spatio-Temporal Graph Neural Network Algorithms. Multimodal Transportation. https://doi.org/10.1016/j.multra.2025.100207
9. **Pan, Y.**, Cheng, Q., Li, A., Zhang, J., Guo, J., & Chen, Y. (2024). Analysis of Congestion Key Parameters, Dynamic Discharge Process, and Capacity Estimation at Urban Freeway Bottlenecks: A Case Study in Beijing, China. Transportation Letters. https://doi.org/10.1080/19427867.2024.2404349
10. Li, W., Chen, Y., **Pan, Y.**, & Zhang, Y. (2024). An Improved Spatio-Temporal Network Traffic Flow Prediction Method Based on Impedance Matrix. Journal of Highway and Transportation Research and Development. http://doi.org/10.26599/HTRD.2024.9480015
11. Zhao, H., Chen, Y., Zhang, B. & **Pan, Y.**. (2024). Study on Transit Signal Priority Timing Considering Traffic and Environmental Benefit. Journal of Highway and Transportation Research and Development. http://doi.org/10.3969/j.issn.1002-0268.2024.02.022
12. **Pan, Y.**, Guo, J., Chen, Y., Cheng, Q., Li, W., & Liu, Y. (2024). A Fundamental Diagram based Hybrid Framework for Traffic Flow Estimation and Prediction by Combining a Markovian Model with Deep Learning. Expert Systems with Applications, 122219. https://doi.org/10.1016/j.eswa.2023.122219
13. **Pan, Y.**, Zheng, H., Guo, J., & Chen, Y. (2023). Modified Volume-Delay Function Based on Traffic Fundamental Diagram: A Practical Calibration Framework for Estimating Congested and Uncongested Conditions. Journal of Transportation Engineering, Part A: Systems, 149(11), 04023112. https://doi.org/10.1061/JTEPBS.TEENG-790
14. **Pan, Y.**, Guo, J., & Chen, Y. (2022). Calibration of Dynamic Volume-delay Functions: A Rolling Horizon-based Parsimonious Modeling Perspective. Transportation Research Record, 2676(2), 606-620. https://doi.org/10.1177/03611981211044727
15. **Pan, Y.**, Guo, J., Chen, Y., Li, S., & Li, W. (2022). Incorporating Traffic Flow Model into a Deep Learning Method for Traffic State Estimation: A Hybrid Stepwise Modeling Framework. Journal of Advanced Transportation, 2022. https://doi.org/10.1155/2022/5926663
16. **Pan, Y.**, Guo, J., Chen, Y., & Xie, J. (2022). Analysis of Urban Expressway Traffic Flow Characteristics Based on Traffic Flow Model: A Case Study of Beijing and Los Angeles. Science Technology & Engineering. 2022, 22(36): 16238-16245.
17. Chen, Y., Li, S., **Pan, Y.**, & Zhang, J. (2022). Urban Expressway Congestion Forewarning Based on Slope Change of Traffic Flow Fundamental Diagram. Journal of Transportation Engineering, Part A: Systems, 148(6), 04022030. https://doi.org/10.1061/jtepbs.0000687
18. Chen, Y., Zhao, H., **Pan, Y.**, & Li, S. (2022). Research on Signal Timing Optimization Model Considering Stopping Emissions Based on VISSIM Simulation. In CICTP 2022, 590-600. https://ascelibrary.org/doi/abs/10.1061/9780784484265.056
19. Shi, J., Xie, J., **Pan, Y.**, & Li, Y. (2022). Mixed Traffic Flow Simulation Analysis Considering Manual-Automatic Driving on Single Lane Road. Science Technology & Engineering. 2022, 22(28): 12651-12658.
20. Tong, L., **Pan, Y.***, Shang, P., Guo, J., Xian, K., & Zhou, X. (2019). Open-Source Public Transportation Mobility Simulation Engine DTALite-S: A Discretized Space-Time Network-Based Modeling Framework for Bridging Multi-Agent Simulation and Optimization. Urban Rail Transit, 5. https://doi.org/10.1007/s40864-018-0100-x

Conference Presentations

1. Equitable Electric Vehicle Charging: Feasibility and Benefits of Streetlight Charging in Kansas City Right-of-Way. **Transportation Research Board 104th Annual Meeting**, Washington, DC, January 2025.
2. Fundamental Diagram-Consistent Fluid Queue Model for Hyper-Congestion and Dynamic Traffic Flow Characterization. **Transportation Research Board 104th Annual Meeting**, Washington, DC, January 2025.
3. Revisiting BPR Volume Delay Functions: A Space-Time Network-Based Modeling Perspective. **Transportation Research Board 100th Annual Meeting**, Online Conference, January 2021.
4. A Review on Volume-Delay-Functions: Connecting Theoretical Fundamental, Practical Deployment and Emerging Applications. **4th Bridging Transportation Researchers**, Online Conference, August 2022.

Research Projects

Dr. Pan served as the lead technical investigator

- PennDOT Act 130 Reporting: Evaluating the impact of connected and automated vehicles in the Commonwealth of Pennsylvania. Funded by the Pennsylvania Department of Transportation (PennDOT), $99,893.07, April 8, 2024-January 8, 2025.
  Served as lead technical investigator: Led data analysis, team coordination and report authorship
- Electric Vehicle Charging Station (EVST) Innovation: Streetlight Charging in City Right-of-Way, funded by U.S. Department of Energy (DOE). Lead organization Metropolitan Energy Center, subcontract to PSU.
  Lead technical investigator: Data analysis and report writing

Dr. Pan served as the primary proposal writer

- Immersive and Interactive Training on Medium and Heavy-Duty Zero-Emission Vehicles (MHD ZEVs) and Infrastructure Technologies for Critical Emergency Response Workers. Funded by the U.S. Department of Energy (DOE), $2,500,000, 2025.

Teaching Experience

- Teaching Assistant, Transportation Planning, Beijing University of Technology, Fall 2021
  - Assisted in lab instruction, homework grading, and student mentoring

Peer Review Activities

- Transportation Research Part B/C/E
- Transactions on Intelligent Transportation Systems
- Transportmetrica B: Transport Dynamics
- Transportation Research Record
- Transportation
- Journal of Advanced Transportation
- Urban Rail Transit
- Multimodal Transportation
- International Journal of Intelligent Systems
- Journal of Highway and Transportation Research and Development
- Complexity
- Sustainability
- Transportation
- TRB Annual Meeting and Transportation Research Record (TRB)
- COTA International Conference of Transportation Professionals (CICTP)

Scholarships and Awards

- **Postdoctoral Travel Award**, 2024
  Office of Postdoctoral Affairs, The Pennsylvania State University, October 2024
  Received $500 to attend and present at the 104th Transportation Research Board (TRB) Annual Meeting.
- **Graduate Student Innovation Award**, First Prize
  Beijing University of Technology, June 2022
  Awarded for outstanding research achievements in the Science and Technology Innovation Program in transportation.
- **Renfutian Transportation Scholarship**, First Prize
  Beijing University of Technology, October 2023
  Granted in recognition of academic excellence and research contributions in transportation engineering.
- **Science and Technology Innovation Award**, Second Prize
  Beijing University of Technology, December 2022
  Recognized for innovative work in scientific research and technological advancement in transportation.

Skills

- **Programming:** Python, GAMS, OSM2GMNS, Path4GMNS
- **Simulation:** DTALite, SUMO, VISSIM, TransCAD, AnyLogic
- **Statistics:** SPSS, SQL, Zotero, Overleaf
- **Visualization:** ArcGIS, QGIS, NeXTA GUI
- **Language:** Mandarin (native), English