Curriculum Vitae

Yuyan (Annie) Pan, Ph.D. Candidate

CONTACT INFORMATION

School: Beijing University of Technology

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RESEARCH INTERESTS

- Traffic Flow Theories, Systems Modelling in Bottlenecks
- Traffic State Estimation and Prediction
- Machine Learning Applications and Traffic Big Data Analytics
- Transportation Emerging Technology Simulation and Optimization
- Open-source Transportation Modeling Software Development

EDUCATION

- Beijing University of Technology, Beijing, China. (Advisors: Prof. Jifu Guo, Prof. Yanyan Chen, Prof. Xuesong Zhou)
  - Ph.D., Transportation Engineering, Expected graduation date: October, 2023
- Beijing University of Technology, Beijing, China. (Advisor: Prof. Jianjun Shi)
  - M.S., Transportation Engineering, July, 2018
- Shandong University of Technology, Zibo, China. (Advisor: Prof. Junyou Zhang)
  - B.S., Transportation Engineering, July, 2014

PUBLICATION

1. **Pan, Y. A.**, Zheng, H., Guo, J., & Chen, Y. (2023). Modified volume-delay function based on traffic fundamental diagram: A calibration framework for estimating the congested and uncongested condition. Journal of Transportation Engineering, Part A: Systems. Accepted. Unpublished.
2. **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
3. **Pan, Y. A.**, 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
4. **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.
5. **Pan, Y.**, Guo, J., Chen, Y., Zhao, H., & Li, S. (2022). Study on volume-delay function in oversaturated condition based on fundamental diagram. Journal of Highway and Transportation Research and Development. Accepted. Unpublished.
6. 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

7. 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
8. 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.
9. Chen, Y., Zhao, H., & P**an, Y.** (2022). Research on transit signal priority timing optimization method considering traffic operation benefit and environmental benefit. Journal of Highway and Transportation Research and Development. Accepted. Unpublished.
10. 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, 1-16. https://doi.org/10.1007/s40864-018-0100-x

WORKING PAPERS

1. **Pan, Y. A.**, Guo, J., Chen, Y., Abbasi, M., List, G., & Zhou, X. (2023). A review of link performance functions: Connecting theoretical fundamental, practical deployment and emerging applications. http://dx.doi.org/10.2139/ssrn.4143355
2. **Pan, Y. A.**, Guo, J., Chen, Y., Cheng, Q., Li, W., & Liu, Y. (2023). A fundamental diagram-based hybrid framework for traffic flow estimation and prediction by combining a Markovian model with deep learning. Submitted to Expert Systems with Applications. Under Review.
3. **Pan, Y. A.**, Cheng, Q., Zhang, J., Guo, J., & Chen, Y. (2023). Joint calibration of the fundamental diagram and stochastic distribution to analyze urban freeway capacity and traffic evolution at bottlenecks.
4. **Pan, Y. A.**, Guo, J., Chen, Y., & Zhou, X. (2023). Evaluating U, V, and L-shaped discharge rate recoveries: A traffic fundamental diagram and fluid queue compatible approach for traffic flow estimation and benefit analysis of traffic flow control and trip reservation systems. In Preparation for Submission.

CONFERENCE PRESENTATION

1. Revisiting BPR volume delay functions: A space-time network-based modeling perspective. Transportation Research Board 100th Annual Meeting. Online Conference. January, 2021.
2. A review on volume-delay-functions: Connecting theoretical fundamental, practical deployment and emerging applications. 4th Bridging Transportation Researchers. Online Conference. August 2022.
3. Modeling, development and emerging applications of the volume-delay functions. Beijing Jiaotong University, ChangJiang Scholar Research Center (CJSRC). Online Conference. September, 2022.

RESEARTCH PROJECTS AND CONTRIBUTING TASKS

Project 1: Advanced Simulation Technology for Effective Traffic Congestion Control in Megacities. Founded by the Beijing Municipal Commission of Transport. 2017-present.

- Retrieved the data for the West Third Ring Road in Beijing and utilize it to construct the corresponding road network within the DTALite simulation software.
- Developed a framework for evaluating bottleneck performance to support the dynamic simulation of queue evolution processes in traffic bottlenecks. This was achieved by integrating fluid queuing models with analytical models.

Project 2: Exploring Artificial Intelligence-based Traffic Operational Situations and Network Control Systems. Founded by CIECC Engineering Company Limited. 2021-present.

- Collected multi-source transportation data on freeway corridors, repaired the data, and integrate these data based on the machine learning method.
- Developed a "data + model" dual-driven traffic flow estimation and prediction framework based on the fundamental diagram to implementation of congestion warning in freeway bottlenecks.

Project 3: Investigating Mobile Internet-based Travel Intervention Technology for Congested Areas. Founded by Beijing Municipal Science & Technology Commission. 2020-2021.

- Adopted DTALite software to simulate the network of Zhongguancun Science City by intervening in the spatial-temporal travel demand.
- Evaluated different strategies for reducing congestion in Zhongguancun Science City, predicted the impacts on people's travel time and estimated the revenues earned under all strategies.

Project 4: Analysis of Reservation-based Travel with BMW. Founded by BMW. 2021-2022.

- Build an optimized model for reservation-based travel and evaluated different strategies of reservation with DTALite.

Project 5: Analysis of Reservation-based Travel in the Huitian Area. Founded by the Beijing Municipal Commission of Transport. 2020-2021.

- Developed an integrated framework for reservation-based travel that combines the client-side, cloud platform, and management side.
- Analyzed and summarized the difficulties and obstacles currently faced in the implementation of reservation-based travel from the perspective of technology, passengers, and systems.

Project 6: Key Technology for Networked Collaborative Services in Large-scale Connected Vehicle Systems. Founded by the National Key Research and Development Program. 2019-2021.

- A literature review of large-scale networked collaborative services for CAVs from the perspectives of infrastructure, vehicle scale, data security, and multi-source data fusion.

PEER REVIEWER

- Transportation Research Part C
- Urban Rail Transit
- Transportation Research Record
- Journal of Advanced Transportation
- Ain Shams Engineering Journal
- Complexity
- TRB Annual Meeting and Transportation Research Record (TRB)
- COTA International Conference

AWARDS

- Outstanding Student Scholarship (Beijing University of Technology) 2018
- Outstanding Student Scholarship (Beijing University of Technology) 2022

SKILLS

- **Programming:** Python, GAMS, OSM2GMNS, Path4GMNS
- **Simulation:** DTALite, VISSIM, TransCAD, Anylogic
- **Statistics:** SPSS, SQL, Zotero
- **Visualization:** GIS, QGIS, NeXTA GUI
- **Language:** Mandarin, English (CET-6)