DONGQIN ZHOU

Postdoctoral Research Fellow ◇ Institute for Experiential AI
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EDUCATION

The Pennsylvania State University, University Park, PA, USA — Aug 2019 - May 2024
Ph.D., Civil Engineering
Advisor: Vikash V. Gayah
Minor: Operations Research

Southeast University, Nanjing, Jiangsu, China — Aug 2015 - Jun 2019
B.Eng., Traffic Engineering
Mao Yisheng Elite Class

University of Waterloo, Waterloo, ON, Canada — Sept 2018 - Dec 2018
Exchange student, Civil and Environmental Engineering

RESEARCH INTERESTS

Traffic operations and control, Intelligent transportation systems, Infrastructure resilience, Climate-weather extremes modeling and simulation
Deep reinforcement learning, Graph neural networks, Representation learning

RESEARCH & WORK EXPERIENCE

Northeastern University — June 2024 - present

- Postdoctoral Research Fellow, Institute for Experiential AI
- Advisor: Auroop R. Ganguly

The Pennsylvania State University

- Graduate Research Assistant — June 2020 - May 2024
- University Graduate Fellow — Aug 2019 - May 2020

PUBLICATIONS

Journal Publications

1. **Zhou, D.**, & Gayah, V.V. (2024) A Dictionary-Based Bayesian Approach to Optimizing Left-Turn Restriction Locations in Grid Networks. *International Journal of Transportation Science and Technology*, https://doi.org/10.1016/J.IJTST.2024.10.008
2. **Zhou, D.**, & Gayah, V.V. (2024) Evaluating the Effectiveness and Transferability of a Data-Driven Two-Region Perimeter Control Method Using Microsimulation. *Transportation Research Record: Journal of the Transportation Research Board*, https://doi.org/10.1177/03611981241230313
3. **Zhou, D.**, Gayah, V.V. (2023) Scalable multi-region perimeter metering control for urban networks: A multi-agent deep reinforcement learning approach. *Transportation Research Part C: Emerging Technologies*. 148, 104033. https://doi.org/10.1016/J.TRC.2023.104033
4. **Zhou, D.** and Gayah, V.V. (2023) Improving deep reinforcement learning-based perimeter metering control methods with domain control knowledge. *Transportation Research Record: Journal of the Transportation Research Board*, Vol. 2677, No. 7. https://doi.org/10.1177/03611981231152466

5. **Zhou, D.**, Gayah, V.V. and Wood, J.S. (2022) Integration of machine learning and statistical models for crash frequency modeling. *Transportation Letters*, 1-12.

6. **Zhou, D.** and Gayah, V. V. (2021) Model-free perimeter metering control for two-region urban networks using deep reinforcement learning. *Transportation Research Part C: Emerging Technologies*, 124, 102949.

Refereed Conference Proceedings

1. **Zhou, D.**, Gayah, V.V. (2025) Multi-Scale Model-Free Perimeter Control and Local Signal Control in Urban Networks. *104th Annual Meeting of the Transportation Research Board*, January, Washington, D.C. [abstract available in conference proceedings]

2. **Zhou, D.**, Gayah, V.V. (2024) Evaluating the Effectiveness and Transferability of a Data-Driven Two-Region Perimeter Control Method Using Microsimulation. *103rd Annual Meeting of the Transportation Research Board*, January, Washington, D.C. [abstract available in conference proceedings]

3. **Zhou, D.**, Gayah, V.V. (2023) A scalable model-free deep reinforcement learning-based perimeter metering control method for multi-region urban networks. *102nd Annual Meeting of the Transportation Research Board*, January, Washington, D.C. [abstract available in conference proceedings]

4. Lyu, L., **Zhou, D.**, Liu, H., Gayah, V.V., Guler, S.I. (2023) Adaptive Action Selection Strategy Of Reinforcement Learning Approach For Intelligent Traffic Light Control. *102nd Annual Meeting of the Transportation Research Board*, January, Washington, D.C. [abstract available in conference proceedings]

5. **Zhou, D.**, Gayah, V.V. (2022) Integration of human guidance into a reinforcement learning-based perimeter metering control method for urban traffic networks. *101st Annual Meeting of the Transportation Research Board*, January, Washington, D.C. [abstract available in conference proceedings]

6. **Zhou, D.**, Gayah, V.V. (2021) Model free perimeter metering control for urban networks using deep reinforcement learning. *100th Annual Meeting of the Transportation Research Board*, January, Washington, D.C. [abstract available in conference proceedings]

7. **Zhou, D.**, Cheng, Q., An, Q., Lu, B. and Liu, Z. (2018) Link criticality analysis based on reliable shortest path in a network with correlated link travel times. *18th COTA International Conference of Transportation Professionals*, 5-8 July, Beijing, China. [abstract available in conference proceedings]

8. Li, Z., Lam, W.H.K., Wepulanon, P. and **Zhou, D.** (2017) Estimating pedestrian walking time on campus based on Wi-Fi detection data. *Transport and Society - Proceeding of the 22nd International Conference of Hong Kong Society for Transportation Studies, HKSTS 2017 (pp. 233-240)*, 9-12 December, Hong Kong, China. [abstract available in conference proceedings]

Journal Paper(s) in Review

1. **Zhou, D.**, Gayah, V.V. (2024) Multi-scale model-free perimeter control and local signal control in urban networks. Submitted for publication in *Transportation Research Part C: Emerging Technologies*, first revision

PROJECT ENGAGEMENT

DoD Strategic Environmental Research and Development Program (SERDP)

- Sit in monthly research meetings
- Participate in Quarterly Progress Report (QPR) and In-Process Review (IPR)
- Attend annual SERDP symposium

PRESENTATIONS

Research presentations

1. Chatterjee, S., **Zhou, D.**, Dey, S., Mukherjee, O., Watson, J., and Ganguly, A. (2024) A Graph Neural Network Approach for Analyzing Urban Rail Transit System Threat Deterrence. ADSA28: Building Effective Security for Soft Targets. 13-14 November, Boston, MA
2. **Zhou, D.**, (2024) Multi-scale model-free perimeter control and local signal control in urban networks. Conference in Emerging Technologies in Transportation Systems (TRC-30). 2-4 September, Heraklion, Greece
3. **Zhou, D.**, (2024) Evaluating the effectiveness and transferability of a data-driven two-region perimeter control method using microsimulation. *103rd Annual Meeting of the Transportation Research Board*, 10 January, Washington, D.C.
4. **Zhou, D.**, (2023) Multi-region perimeter control with deep reinforcement learning. *Transportation Engineering Seminar at The Pennsylvania State University*, 18 April, University Park, Pennsylvania.
5. **Zhou, D.** and Gayah, V.V. (2022) A scalable model-free deep reinforcement learning-based perimeter metering control method for multi-region urban networks. *2022 Transportation Engineering and Safety Conference*, 7-9 December, University Park, Pennsylvania.
6. **Zhou, D.**, (2022) Macroscopic traffic control with deep reinforcement learning and domain control knowledge. *Transportation Engineering Seminar at The Pennsylvania State University*, 16 Feb, University Park, Pennsylvania.
7. **Zhou, D.** and Gayah, V.V. (2021) Integration of human guidance into a reinforcement learning-based perimeter metering control method for urban traffic networks. *2021 Transportation Engineering and Safety Conference*, 8-10 December, University Park, Pennsylvania.
8. **Zhou, D.**, (2021) Model free perimeter metering control for two-region urban networks using deep reinforcement learning. *Transportation Engineering Seminar at The Pennsylvania State University*, 10 Feb, University Park, Pennsylvania.
9. **Zhou, D.** and Gayah, V.V. (2020) Deep reinforcement learning applied to perimeter metering control: An overview. *2020 Transportation Engineering and Safety Conference*, 9-11 December, University Park, Pennsylvania.
10. **Zhou, D.**, (2020) Model free perimeter control for urban networks using deep reinforcement learning. *College of Engineering Research Symposium*, University Park, Pennsylvania.
11. **Zhou, D.**, Bagherzadehkhorasani, A. and Gayah, V.V. (2019) Travel time prediction using large-scale taxi trip records data. *2019 Transportation Engineering and Safety Conference*, 11-13 December, University Park, Pennsylvania.
12. **Zhou, D.**, (2019) Traffic signal control using reinforcement learning methods. *Research Seminar at The Pennsylvania State University*, 9 Oct, University Park, Pennsylvania.

Invited talks

1. **Zhou, D.**, (2024) Introduction to Reinforcement Learning. *Invited talk at the SDS Lab, Northeastern University*, 14 March, online.

Guest lectures

1. **Zhou, D.**, (2024) Road traffic network simulation and perimeter metering control. *CIVE 7110 – Critical Infrastructure Resilience* (Prof. A. Ganguly, Northeastern University), 26 Nov, Boston, MA

2. **Zhou, D.**, (2022) Macroscopic traffic control with deep reinforcement learning and domain control knowledge. *OR 590 - Operations Research Colloquium* (Prof. J. Ventura, Penn State), 22 Feb, University Park, PA.

AWARDS & HONORS

- **C. Norwood Wherry Memorial Graduate Fellowship**, Penn State 2022 - 2023
- **Glenn E. Singley Memorial Graduate Fellowship**, Penn State 2022
- **Mark E. and Claire L. Alpert Graduate Fellowship**, Penn State 2021
- **Leo P. Russell Graduate Fellowship**, Penn State 2021
- **College of Engineering Scholarship**, Penn State 2019 - 2020
- **University Graduate Fellowship**, Penn State 2019 - 2020
- **Curriculum Scholarships**, Southeast University 2016 - 2019
- **Zeng Xianzi Education Foundation Scholarship**, Southeast University 2016 - 2019
- **Model Student of Academic Records**, Southeast University 2016 - 2019
- **CSC Scholarships, National Prize** 2018
- **Jiangsu Provincial Merit Student**, Southeast University 2018
- **Third Prize in 14th RoboCup Competition**, Southeast University 2017
- **Pacemaker to Merit Student, Highest Honor**, Southeast University 2017
- **Mao Yisheng Railway Education Student Scholarship**, Southeast University 2017
- **Third Prize in National English Competition for College Students** 2017
- **National Encouragement Scholarship, National Prize** 2017
- **Third Prize in Advanced Mathematics Competition**, Southeast University 2016
- **Third Prize in National English Competition for College Students** 2016
- **China National Scholarship, National Prize** 2016
- **Merit Student**, Southeast University 2016

TEACHING EXPERIENCE

Teaching Assistant, **The Pennsylvania State University**

- Traffic Operations (Prof. V. Gayah) Fall 2022
  - Prepare lab materials (weekly handouts and presentations, and course project)
  - Lead weekly lab sessions (2-hour)
  - Hold regular office hours (2-hour)
  - Grade lab submittals and course project
  - Modify quiz, homework assignments solutions
  - Average student evaluation score: 6.6/7.0
- Transportation Operations (Prof. V. Gayah) Fall 2021
  - Hold office hours (in-person and online)

- Advise general study plan
- Help students structure understandings of the course materials

Teaching Assistant, **Southeast University**

- Ethics Cultivation & Basis of Law Fall 2017
  - Lead weekly in-class discussions of student presentations
  - Grade all homework assignments and presentations

REFEREE SERVICE

- American Control Conference
- COTA International Conference of Transportation Professionals
- Hong Kong Society for Transportation Studies
- IEEE Intelligent Vehicles Symposium
- IEEE Intelligent Transportation Systems Conference
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Mobile Computing
- International Journal of Transportation Science and Technology
- Scientific Reports
- Transportation Research Board
- Transportation Research Part B: Methodological
- Transportation Research Part C: Emerging Technologies
- Transportation Research Record: Journal of the Transportation Research Board
- Transportmetrica B: Traffic Dynamics