Qixiu Cheng, PhD

University of Bristol Business School, University of Bristol, Bristol, BS8 1PY, UK

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Working Experience

Assistant Professor (UK Lecturer), University of Bristol Business School, University of Bristol, Bristol, UK, 09/2023 – present

Research Assistant Professor, Department of Logistics & Maritime Studies, The Hong Kong Polytechnic University, Hong Kong, China, 04/2022 – 08/2023

Postdoctoral Fellow, Department of Logistics & Maritime Studies, The Hong Kong Polytechnic University, Hong Kong, China, 12/2020 – 04/2022

Educational Background

Certificate in University Teaching, The Hong Kong Polytechnic University, Hong Kong, China, 11/2022

PhD, Transportation Engineering, Southeast University (SEU), China, 02/2017 – 03/2021
- Thesis title: Dynamic Traffic Assignment and its Application in Congestion Pricing

Visiting PhD Student, Arizona State University, USA, 03/2019 – 04/2020

MSc, Transportation Systems Engineering, Monash University, Australia, 03/2015 – 06/2017

MPhil, Transportation Engineering, Southeast University, China, 09/2014 – 12/2016
- Thesis title: The Optimal Toll Rate of Distance-Based Dynamic Congestion Pricing

BEng, Civil Engineering, Changsha University of Science & Technology, China, 09/2010 – 06/2014

Research Interests

Macroscopic and Microscopic Traffic Flow Theory

Freeway Traffic Management and Control

Transportation Network Modelling and Optimization

Transportation Big Data Analytics and Urban Informatics

Teaching Experience

University of Bristol, Bristol, UK
- Lecturer, MGRCM0021 Optimisation & Algorithms (Spring 2024)
- Unit Director and Lecturer, EFIM30051 Data Analytics and Artificial Intelligence for Business (Fall 2023)

The Hong Kong Polytechnic University, Hong Kong, China
- Instructor, LGT3102 Management Science (Spring 2023)

Southeast University, China
- Graduate Teaching Assistant, Modelling Transportation Systems (Spring 2016, Spring 2017, Spring 2018)

Journal Papers (Corresponding author *)

1. Wang, Z., Liu, Z., **Cheng, Q.***, & Gu, Z. (2024). Integrated self-consistent macro-micro traffic flow modelling and calibration framework based on trajectory data. *Transportation Research Part C*, 158, 104439.

2. **Cheng, Q.**, Lin, Y., & Lu, J. (2024). Dynamic system modeling and integrated transportation demand-and-supply management with a polynomial arrival queue model. Accepted by *ASCE Journal of Transportation Engineering, Part A*. DOI: 10.1061/JTEPBS/TEENG-8136.

3. Xing, J., Liu, R., Zhang, Y., Choudhury, C.F., Fu, X., & **Cheng, Q.*** (2024). Urban network-wide traffic volume estimation under sparse deployment of detectors. Accepted by *Transportmetrica A*. DOI: 10.1080/23249935.2023.2197511.

4. **Cheng, Q.**, Lin, Y., Zhou, X., & Liu, Z. (2024). Analytical formulation for explaining the variation of traffic states: A fundamental diagram modeling perspective with stochastic parameters. *European Journal of Operational Research*, 312(1), 182-197.

5. Pan, Y., Guo, J., Chen, Y., **Cheng, Q.***, Li, W., & Liu, Y. (2024). A fundamental diagram based interpretable framework for traffic flow estimation and prediction by combining a Markovian model with deep learning. *Expert Systems with Applications*, 238, 122219.

6. Lin, H., Yan, Y., & **Cheng, Q.** (2023). The future role of artificial intelligence in advancing transportation electrification. *Journal of Intelligent and Connected Vehicles*, 6(3), 183-186.

7. Huo, J., Liu, Z., Chen, J., **Cheng, Q.**, & Meng, Q. (2023). Bayesian optimization for congestion pricing problems: A general framework and its instability. *Transportation Research Part B*, 169, 1-28.

8. Wang, Z., Shi, Y., Tong, W., Gu, Z., & **Cheng, Q.*** (2023). Car-following models for human-driven vehicles and autonomous vehicles: A systematic review. *ASCE Journal of Transportation Engineering, Part A*, 149(8), 04023075.

9. Zhang, K., Zhang, H., **Cheng, Q.**, Chen, X., Wang, Z., & Liu, Z. (2023). A customized two-stage parallel algorithm for solving the combined modal split and traffic assignment problem. *Computers & Operations Research*, 154, 106193.

10. Zhang, Y., **Cheng, Q.***, Liu, Y., & Liu, Z. (2023). Full-scale spatio-temporal traffic flow estimation for city-wide networks: A transfer learning based approach. *Transportmetrica B*, 11(1), 869-895.

11. **Cheng, Q.**, Liu, Z., Guo, J., Wu, X., Pendyala, R., Belezamo, B., & Zhou, X. (2022). Estimating key traffic state parameters through parsimonious spatial queue models. *Transportation Research Part C*, 137, 103596. **(ESI Highly Cited Paper)**

12. **Cheng, Q.***, Chen, Y., & Liu, Z. (2022). A bi-level programming model for the optimal lane reservation problem. *Expert Systems with Applications*, 189, 116147.

13. Liu, Z., Wang, Y., **Cheng, Q.**, & Yang, H. (2022). Analysis of the information entropy on traffic flows. *IEEE Transactions on Intelligent Transportation Systems*, 23(10), 18012-18023.

14. Zhang, Y., Li, L., Zhang, W., & **Cheng, Q.*** (2022). GATC and DeepCut: Deep spatiotemporal feature extraction and clustering for large-scale transportation network partition. *Physica A*, 606, 128110.

15. Xing, J., Wu, W., **Cheng, Q.***, & Liu, R. (2022). Traffic state estimation of urban road network by multi-source data fusion: Review and new insights. *Physica A*, 595, 127079.

16. Wang, Y., **Cheng, Q.**, Wang, M., & Liu, Z. (2022). Weibull-distribution-based neural network for capacity estimation. *ASCE Journal of Transportation Engineering, Part A*, 148(4), 04022009.

17. Zhou, X., **Cheng, Q.**, Wu, X., Li, P., Belezamo, B., Lu, J., & Abbasi, M. (2022). A meso-to-macro cross-resolution approach for connecting polynomial arrival queue model to volume-delay function with inflow-demand-to-capacity ratio. *Multimodal Transportation*, 1(2), 100017. **(Best Paper Award)**

18. Zhang, J., Wu, W., **Cheng, Q.***, Tong, W., Khadka, A., Fu, X., & Gu, Z. (2022). Extracting the complete travel trajectory of subway passengers based on mobile phone data. *Journal of Advanced Transportation*, 2022, 8151520.

19. **Cheng, Q.**, Liu, Z., Lin, Y., & Zhou, X. (2021). An s-shaped three-parameter (S3) traffic stream model with consistent car following relationship. *Transportation Research Part B*, 153, 246-271.

20. Liu, Z., Wang, Z, **Cheng, Q.**, Yin, R., & Wang, M. (2021). Estimation of urban network capacity with second-best constraints for multimodal transport systems. *Transportation Research Part B*, 152, 276-294.

21. Chen, Y., Song, X., **Cheng, Q.***, An, Q., & Zhang, Y. (2021). A cordon-based reservation system for urban traffic management. *Physica A*, 582, 126276.

22. Selmoune, A., **Cheng, Q.***, Wang, L., & Liu, Z. (2020). Influencing factors in congestion pricing acceptability: A literature review. *Journal of Advanced Transportation*, 2020, 4242964.

23. Huang, K., Xu, L., Chen, Y., **Cheng, Q.***, & An, K. (2020). Customized bus route optimization with the real-time data. *Journal of Advanced Transportation*, 2020, 8838994.

24. An, Q., Fu, X., Huang, D., **Cheng, Q.**, & Liu, Z. (2020). Analysis of adding-runs strategy for peak-hour regular bus services. *Transportation Research Part E*, 143, 102100.

25. **Cheng, Q.**, Wang, S., Liu, Z., & Yuan, Y. (2019). Surrogate-based simulation optimization approach for day-to-day dynamics model calibration with real data. *Transportation Research Part C*, 105, 422-438.

26. Liu, Z., Liu, Y., Meng, Q., & **Cheng, Q.** (2019). A tailored machine learning approach for urban transport network flow estimation. *Transportation Research Part C*, 108, 130-150.

27. **Cheng, Q.**, Liu, Z., & Szeto, W. Y. (2019). A cell-based dynamic congestion pricing considering travel distance and congestion level. *Transportmetrica B*, 7(1), 1286-1304.
28. **Cheng, Q.**, Liu, Z., & Selmoune, A. (2018). Nonlinear distance-based dynamic pricing considering congestion-level correction. *International Journal of Transportation*, 6(2), 1-8.
29. Gu, Z., Liu, Z., **Cheng, Q.**, & Saberi, M. (2018). Congestion pricing practices and public acceptance: a review of evidence. *Case Studies on Transport Policy*, 6(1), 94-101.
30. **Cheng, Q.**, Liu, Z., Liu, F., & Jia, R. (2017). Urban dynamic congestion pricing: An overview and emerging research needs. *International Journal of Urban Sciences*, 21(S1), 3-18.
31. Liu, Z., Wang, S., Zhou, B., & **Cheng, Q**. (2017). Robust optimization of distance-based tolls in a network considering stochastic day to day dynamics. *Transportation Research Part C*, 79, 58-72.
32. Sun, X., Huang, D., & **Cheng, Q.** (2016). Optimal nonlinear distance toll for cordon-based congestion pricing considering equity issue. *Journal of Harbin Institute of Technology*, 23(6), 73-79.

Conference Papers (* Corresponding Author)

1. **Cheng, Q.**, Liu, Z., Guo, J., Wu, X., & Zhou, X. (2020). A queueing-theoretic performance model for oversaturated traffic systems. *Proceedings of the 99th Annual Meeting of Transportation Research Board (No. 20-03048)*, Washington D.C., 01/2020.
2. Chen, Y., **Cheng, Q.***, & Liu, Z. (2020). A bi-level programming model for the optimal lane reservation problem. *Proceedings of the 99th Annual Meeting of Transportation Research Board (No. 20-03266)*, Washington D.C., 01/2020.
3. Liu, Y., Lyu, C., **Cheng, Q.**, & Liu, Z. (2019). Exploring personalization in the application of intelligent transportation systems. *International Workshop on Ride-hailing Algorithms, Applications, and Systems (RAAS 2019) at the 27th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Chicago, 11/2019.
4. **Cheng, Q.**, Liu, Z., Guo, J., Wu, X., & Zhou, X. (2019). Fluid approximation for traffic system performance evaluation under oversaturated conditions: Model formulation, parameter calibration and applications. *2019 INFORMS Annual Meeting*, Seattle, Washington, 10/2019.
5. Fang, Z., **Cheng, Q.**, Liu, Z., & Liu, Y. (2019). A deep learning approach for the traffic assignment problem. *Proceedings of the 98th Annual Meeting of Transportation Research Board* (*No. 19-01956*), Washington D.C., 01/2019.
6. Selmoune, A., **Cheng, Q.**, & Liu, Z. (2018). Analysis of the influencing factors in the public acceptance of urban congestion pricing practices in Nanjing City. *Proceedings of the 23rd International Conference of Hong Kong Society for Transportation Studies (HKSTS)*, Hong Kong, 12/2018.
7. Xie, X., **Cheng, Q.***, Selmoune, A., Lu, B., & Liu, Z. (2018). A Lagrangian-based approach for reliable user equilibrium considering link travel time variance. *CICTP 2018*, Beijing, 06/2018.
8. Zhou, D., **Cheng, Q.***, An, Q., Lu, B., & Liu, Z. (2018). Link criticality analysis based on reliable shortest path in a network with correlated link travel times. *CICTP 2018*, Beijing, 06/2018.
9. **Cheng, Q.**, & Liu, Z. (2018). A cell-based dynamic congestion pricing considering travel distance and congestion level. *The 7th International Symposium on Dynamic Traffic Assignment*, Hong Kong, 06/2018.
10. **Cheng, Q.**, Xing, J., Selmoune, A., Fu, X., & Liu, Z. (2017). Day-to-day dynamics in urban railway networks based on smart card transaction data. *Proceedings of the 22nd International Conference of Hong Kong Society for Transportation Studies (HKSTS)*, Hong Kong, 12/2017.
11. **Cheng, Q.**, Liu, Z., & Huang, D. (2016). Dynamic optimal toll with joint distance and congestion. *Proceedings of the 1st Transportation Research Congress (TRC)*, Beijing, 06/2016.

Conference Presentations

1. Cheng, Q. (2022). Multi-resolution traffic flow modeling: An analytical-based approach. *The 11th Transportation Research Forum (Shanghai)*, Hefei, 12/2022.
2. Zhang, Y., **Cheng, Q.***, Liu, Y., & Liu, Z. (2021). A Gaussian Process-based Model for Transport Network Flow Estimation. *The 4th International Symposium on Multimodal Transportation (ISMT 2021)*, Nanjing, 12/2021.

3. **Cheng, Q.**, Liu, Z., Guo, J., Wu, X., & Zhou, X. (2020). A Queueing-theoretic Performance Model for Oversaturated Traffic Systems. *The 99th Annual Meeting of Transportation Research Board*, Washington D.C., 01/2020.

4. Liu, Y., Lyu, C., **Cheng, Q.**, & Liu, Z. (2019). Exploring Personalization in the Application of Intelligent Transportation Systems. *International Workshop on Ride-hailing Algorithms, Applications, and Systems (RAAS 2019) at the 27th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Chicago, 11/2019.

5. Zhou, X., **Cheng, Q.**, & Liu, Z. (2019). Data Driven Approach for Calibrating BPR Function as A Queueing Model. *INFORMS Annual Meeting 2019*, Seattle, Washington, 10/2019.

6. **Cheng, Q.**, & Liu, Z. (2018). A cell-based dynamic congestion pricing considering travel distance and congestion level. *The 7th International Symposium on Dynamic Traffic Assignment*, Hong Kong, 06/2018.

7. **Cheng, Q.**, Xing, J., Selmoune, A., Fu, X., & Liu, Z. (2017). Day-to-day Dynamics in Urban Railway Networks Based on Smart Card Transaction Data. *The 22nd International Conference of Hong Kong Society for Transportation Studies (HKSTS)*, Hong Kong, 12/2017.

Patents (in Chinese)

1. **Cheng, Q.**, Wang, Y., Wang, Z., Liu, P., Gu, Z., Zhang, Q., Qu, X., & Liu, Z. Car-following behavior prediction based on the deep learning and multi-dimensional data fusion method. *CN202210876936.*

2. Huang, K., Chen, W., **Cheng, Q.**, Qin, W., & Liu, Z. A signal control method for pedestrian queuing demand estimation at crosswalk safety island. *CN202210892264.*

3. Liu, Z., Selmoune, A., Wang, Z., **Cheng, Q.**, Liu, P., Wan, J, Zhang, Q., & Liu, S. Data-driven car-following behavior prediction based on drivers' characteristics. *CN202210884305.*

4. Liu, Z., **Cheng, Q.**, Zhang, H., & Zhang, Q. A multiscale demand-and-supply modeling approach for oversaturated transportation systems based on queueing theory. *CN202110350726.8.*

5. Liu, Z., **Cheng, Q.**, Liu, Y., Wei, W., Yu, J., & Li, Z. A method for forecasting the day-to-day dynamic traffic demand based on the neural networks. *CN201810431068.3.*

6. Liu, Z., Wang, L., **Cheng, Q.**, & Yu, J. A method for calculating the optimal toll rate of dynamic congestion pricing based on the cell transmission model. *CN201810418436.0.*

7. Liu, Z., **Cheng, Q.**, Bie, Y., Jing, W., Huang, D., & Huang, K. Congestion charging optimal toll rate determining method based on trial-and-error method and motor vehicle flow. *CN201510883352.0.*

Professional Services and Memberships

Editorial Services
- Section Editor-in-Chief of Current Social Sciences (Transportation Section), 06/2022 – present
- Associate Editor of Urban Resilience and Sustainability, 11/2022 – present
- Academic Editor of Advances in Civil Engineering, 11/2022 – present
- Editorial Board Editor of Multimodal Transportation, 01/2023 – present
- Young Academic Editor of Journal of Traffic and Transportation Engineering (English Edition), 06/2022 – present
- Associate Editor of the 23rd COTA International Conference for Transportation Professionals (CICTP2023), 07/2023
- Lead Guest Editor for the Special Issue of "Intelligence in Urban Transportation" in Electronic Research Archive, 06/2022 – present
- Lead Guest Editor for the Special Issue of "Sustainable, Resilient and Smart Mobility" in Sustainability, 06/2022 – present
- Lead Guest Editor for the Special Issue of "Data-Driven Modelling and Learning for Smart and Sustainable Transportation" in IET Intelligent Transport Systems, 10/2022 – present
- Lead Guest Editor for the Research Topic of "Transportation Network Modeling in an Era of Automated and Connected Vehicles" in Frontiers in Future Transportation, 07/2022 – present
- Guest Editor for the Special Issue of "Advanced Data Intelligence Theory and Practice in Transportation 2023" in Journal of Advanced Transportation, 07/2023 – present
- Guest Editor for the Research Topic of "Emerging Technologies in Future Maritime Transportation" in Frontiers in Future Transportation, 03/2023 – present

Memberships

- Member of Transportation Research Board (TRB) Standing Committee on Urban Transportation Data and Information Systems (AED20), 04/2023 – present
- Member of Institute of Electrical and Electronics Engineers (IEEE), 10/2022 – present
- Member of IEEE Intelligent Transportation Systems Society, 10/2022 – present
- Student Member of Institute for Operations Research and the Management Sciences (INFORMS), 09/2019 – 08/2020

Committee Member for International Conferences

- Academic Committee Member of the 23rd COTA International Conference for Transportation Professionals (CICTP2023), Beijing, China, 07/2023
- Scientific Committee Member of the 4th International Symposium on Multimodal Transportation (ISMT), Nanjing, China, 12/2021

Appointment as External Assessors

- Israel Science Foundation (ISF)

Referee for Academic Journals and Peer-reviewed Conferences

- Annual Meeting of Transportation Research Board
- Annual Meeting of COTA International Conference of Transportation Professionals
- Annual Meeting of World Transport Convention
- Applied Sciences
- Case Studies on Transport Policy
- Cleaner Logistics and Supply Chain
- Communications in Transportation Research
- Discrete Dynamics in Nature and Society
- Energies
- Engineering Applications of Artificial Intelligence
- Frontiers in Future Transportation
- Frontiers in Sustainable Cities
- IEEE Intelligent Transportation Systems Magazine
- IEEE Transactions on Intelligent Transportation Systems
- IET Intelligent Transport Systems
- Journal of Advanced Transportation
- Journal of Cleaner Production
- Journal of Intelligent Transportation Systems: Technology, Planning, and Operations
- Journal of Traffic and Transportation Engineering (English Edition)
- Journal of Transportation Engineering Part A: Systems
- KSCE Journal of Civil Engineering
- Multimodal Transportation
- Operational Research: An International Journal
- Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences
- Physica A: Statistical Mechanics and its Applications
- Scientific Reports
- Sustainability
- Sustainability Analytics and Modeling
- Sustainable and Resilient Infrastructure
- Transport Policy
- Transportation Letters: The International Journal of Transportation Research
- Transportation Research Part A: Policy and Practice
- Transportation Research Part B: Methodological
- Transportation Research Part C: Emerging Technologies

- Transportation Research Part D: Transport and Environment
- Transportation Research Part E: Logistics and Transportation Review
- Transportation Research Record: Journal of the Transportation Research Board
- Transportation Science
- Transportmetrica B: Transport Dynamics
- Travel Behaviour and Society
- Utilities Policy

Research Grants

Awarded
- Travel time reliability analysis with a frequency domain decomposition approach. Departmental General Research Fund of The Hong Kong Polytechnic University. 02/2023 – 01/2024. Award Amount: HKD $63.552k. **PI**.
- Day-to-day dynamics with mixed traffic flow considering autonomous vehicles. Guangdong Basic and Applied Basic Research Fund. 10/2022 – 09/2025. Award Amount: RMB ¥100k. **PI**.
- Stochastic fundamental diagram and freeway capacity: Model formulation, parameter calibration, and potential applications. Start-up Fund for RAPs under the Strategic Hiring Scheme of The Hong Kong Polytechnic University. 06/2022 – 06/2024. Award Amount: HKD $250k. **PI**.
- Day-to-day dynamic flow evolution process for multimodal transport network. Graduate Scientific Research Innovation Project of Jiangsu Province. 04/2017 – 12/2020. Award Amount: RMB ¥30k. **PI**.
- Dynamic traffic assignment and its application in urban congestion pricing. Scientific Research Foundation of Graduate School of Southeast University. 10/2018 – 12/2020. Award Amount: RMB ¥42k. **PI**.

Honors & Awards

- Best Doctoral Dissertation Award of the 14th International Workshop on Computational Transportation Science (CTS 2023), 2023
- Best Academic Report Award of the 11th Transportation Research Forum (Shanghai), 2022
- Best Paper Award of Multimodal Transportation, 2022
- Outstanding Reviewer Award of Multimodal Transportation, 2022
- Outstanding Submittal Award of "TRB 2017 Transportation Data Analytics Contest", Awarded by TRB Effects of Information and Communication Technologies on Travel Choices Committee, 2017
- Best Paper Award of the 2nd Transportation Research Congress, 2017
- Outstanding Student Scholarship, Southeast University, 2015 – 2020
- Excellent Graduate, Hunan Province, 2014
- Outstanding Volunteer, Hunan Province, 2013
- Outstanding Student Scholarship, Changsha University of Science & Technology, 2011 – 2014

Postdoc and Visiting Scholar Supervision

Postdoctoral Fellows
- Dr. Ruyang Yin (PhD at Monash University), 02/2023 – 08/2023

Visiting Scholars
- Dr. Ting Lu (Lecturer at Ningbo University), 05/2024 – 05/2025

Technical Skills

- Programming Language & Scientific Application: Python, Matlab, Cplex, Gurobi
- Simulation Software: Vissim, Visum, Cube, TransCAD

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