# Zhanhong Cheng

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## Education

**McGill University** — Montreal, Canada
Ph.D. student in Transportation — Jan 2019–Current

- Advisor: Prof. Lijun Sun (McGill, main) & Prof. Martin Trépanier (PolyMtl, co-supervisor)
- Thesis: "Travel-Behavior-Based Inference and Forecasting Methods in Metro System"
- Expected to graduate in April 2022

**Harbin Institute of Technology** — Harbin, China
M.S. in Transportation Planning and Management — Sep 2016–Jul 2018

- Advisor: Prof. Jia Yao
- Thesis: "An Analysis of Two Hybrid Route Choice Models in Stochastic Assignment Paradox"

**Harbin Institute of Technology** — Weihai, China
B.Eng. in Traffic Engineering — Aug 2012–Jul 2016

- Thesis: "Design of a Traffic Data Management and Analysis Software"

## Research Interests

- Travel behavior and mobility pattern mining
- Spatiotemporal data forecasting
- Machine learning in transportation
- Sustainable transportation

## Experience

**Exo** — Montreal, Canada
Intern — Feb 2019–Current

- Mitacs project: "spatiotemporal travel behavior modeling and analysis for better public transport systems"

**Wenzhou Urban Planning and Design Institution** — Wenzhou, China
Intern — Summer 2016

- Residential area parking spaces renovation project

**Weihai Traffic Engineering Research Institute** — Weihai, China
Research Assistant — May 2015–Jun 2016

- Weihai traffic signal system optimization project
- Traffic impact analysis

## Teaching

- **Teaching Assistant** at McGill University — Winter 2021
  Traffic Engineering & Simulation (CIVE 440)
- **Teaching Assistant** at McGill University — Winter 2021

Sustainable project management (CIVE 324)

- **Teaching Assistant** at McGill University — Fall 2021
  Traffic Engineering & Simulation (CIVE 440)

## Scholarships and Awards

- CIRRELT Excellence Scholarship (Doctoral Rédaction) — 2020–2021
- McGill Engineering Doctoral Award (International) — 2019–Current
- Excellent Graduate Thesis of HIT — 2018
- First Level Scholarship of HIT — 2016, 2017
- Excellent Graduate of Shandong Province — 2016
- Third Prize of National Competition of Transport Science and Technology — 2015
- First Prize of China Undergraduate Mathematical Contest in Modeling — 2014

## Journal Publications

[1] **Z. Cheng**, M. Trepanier, and L. Sun, "Real-time forecasting of metro origin-destination matrices with high-order weighted dynamic mode decomposition", *Transportation Science*, 2022. DOI: 10.1287/trsc.2022.1128.

[2] F. Wu, H. Chen, K. Hou, **Z. Cheng**, and T. Z. Qiu, "Adaptive pushbutton control for signalized pedestrian midblock crossings", *Journal of Transportation Engineering, Part A: Systems*, vol. 148, no. 4, p. 04 022 011, 2022. DOI: 10.1061/JTEPBS.0000659.

[3] K. Zhu, **Z. Cheng**, J. Wu, F. Yuan, and L. Sun, "Quantifying out-of-station waiting time in oversaturated urban metro systems", *Communications in Transportation Research*, vol. 2, p. 100 052, 2022. DOI: 10.1016/j.commtr.2022.100052.

[4] **Z. Cheng**, M. Trépanier, and L. Sun, "Incorporating travel behavior regularity into passenger flow forecasting", *Transportation Research Part C: Emerging Technologies*, vol. 128, p. 103 200, 2021. DOI: 10.1016/j.trc.2021.103200.

[5] **Z. Cheng**, J. Yao, A. Chen, and S. An, "Analysis of a multiplicative hybrid route choice model in stochastic assignment paradox", *Transportmetrica A: Transport Science*, pp. 1–25, 2021. DOI: 10.1080/23249935.2021.1953189.

[6] X. Wang, **Z. Cheng**, M. Trépanier, and L. Sun, "Modeling bike-sharing demand using a regression model with spatially varying coefficients", *Journal of Transport Geography*, vol. 93, p. 103 059, 2021. DOI: 10.1016/j.jtrangeo.2021.103059.

[7] **Z. Cheng**, M. Trépanier, and L. Sun, "Probabilistic model for destination inference and travel pattern mining from smart card data", *Transportation*, pp. 1–19, 2020. DOI: 10.1007/s11116-020-10120-0.

[8] J. Yao, **Z. Cheng**, J. Dai, A. Chen, and S. An, "Traffic assignment paradox incorporating congestion and stochastic perceived error simultaneously", *Transportmetrica A: Transport Science*, vol. 15, no. 2, pp. 307–325, 2019. DOI: 10.1080/23249935.2018.1474962.

[9] J. Yao, W. Huang, A. Chen, **Z. Cheng**, S. An, and G. Xu, "Paradox links can improve system efficiency: An illustration in traffic assignment problem", *Transportation Research Part B: Methodological*, vol. 129, pp. 35–49, 2019. DOI: 10.1016/j.trb.2019.07.018.

[10] J. Yao, **Z. Cheng**, F. Shi, S. An, and J. Wang, "Evaluation of exclusive bus lanes in a tri-modal road network incorporating carpooling behavior", *Transport Policy*, vol. 68, pp. 130–141, 2018. DOI: 10.1016/j.tranpol.2018.05.001.

## Working Papers

[1] X. Chen, **Z. Cheng**, and L. Sun, *Bayesian inference for link travel time correlation of a bus route*, 2022. arXiv: 2202.09485 [stat.AP].

[2] Y. Wu, **Z. Cheng**, and L. Sun, *Individual mobility prediction via attentive marked temporal point processes*, 2021. arXiv: 2109.02715 [cs.LG].

## Conferences

[1] X. Wang, **Z. Cheng**, M. Trépanier, and L. Sun, "Modeling bike-sharing demand using a regression model with spatially varying coefficients", in *Transportation Research Board 100th Annual Meeting*, Washington, D.C. (virtual), 2021.

[2] **Z. Cheng**, H. Alizadeh, M. Nazem, M. Trépanier, and L. Sun, "Long-term ridership forecast using heuristic, SARIMA and random forest methods", in *TransitData 2020*, Toronto (virtual), 2020.

[3] **Z. Cheng**, M. Trépanier, and L. Sun, "Integrating travel behavior regularity into passenger flow prediction", in *TransitData 2020*, Toronto (virtual), 2020.

[4] **Z. Cheng**, M. Trépanier, and L. Sun, "Inferring trip destinations in transit smart card data using a probabilistic topic model", in *TransitData 2019*, Paris, 2019.

[5] Z. Zhuang, **Z. Cheng**, J. Yao, J. Wang, and S. An, "Bus travel time reliability incorporating in-stop waiting time and in-vehicle travel time with AVL data", in *Transportation Research Board 98th Annual Meeting*, Washington, D.C., 2019.

[6] J. Yao, **Z. Cheng**, S. An, and A. Chen, "Analysis of a multiplicative hybrid route choice model in stochastic assignment paradox", in *Transportation Research Board 97th Annual Meeting*, Washington, D.C., 2018.

[7] J. Yao, J. Dai, A. Chen, **Z. Cheng**, and S. An, "Traffic assignment paradox incorporating congestion and stochastic perceived error simultaneously", in *Transportation Research Board 97th Annual Meeting*, Washington, D.C., 2018.

## Projects

- Enhancing Transit Service by Intelligent Trip Inference and Recommendation System — Nov 2021–Current
  - NSERC Alliance project with *Transit* (https://transitapp.com/)
  - Principal researcher
- Spatiotemporal Travel Behavior Modeling and Analysis for Better Public Transport Systems — 2019–2022
  - Mitacs Accelerate project with *exo* (https://exo.quebec/en)
  - Student participant
- Research on Spatiotemporal Characteristics of Travel Route Selection Based on Big Data — 2018–2019
  - GAIA collaborative research funds for young scholars with DiDi (https://www.didiglobal.com/)
  - Student participant
- Research on the Characteristics of Traffic Paradox in Random Route Choice Model — 2016–2018
  - National Natural Science Foundation of China
  - Student participant

## Presentations

[1] "Probabilistic model for destination inference and travel pattern mining from smart card data", in *Zooming in on collaborative digital intelligence*, Montreal (virtual), Apr. 21, 2021. [Online]. Available: https://youtu.be/xLuYrb_mmdM.

## Professional service

### Reviewer

- Reviewer of Transportation Research Part C: Emerging Technologies
- Reviewer of Journal of Advanced Transportation
- Reviewer of Public Transport
- Reviewer of Transportation Research Board (TRB) Annual Meeting

### Member

- Student member of Chinese Overseas Transportation Association (COTA)
- Student member of IEEE
- Student member of Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT)
- Friend member of TRB Standing Committee on Public Transport Planning and Development (AP025).
- Student member of McGill Sustainability Systems Initiative (MSSI)