Dingyi Zhuang

77 Massachusetts Ave
Cambridge, MA 02139, United States
☏ (+1) 617-803-4153
✉ dingyi@mit.edu
🖥 https://zhuangdingyi.github.io/
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Research Interests

Urban Computing
- Spatiotemporal data mining
- Graph neural network on traffic network
- Bayesian probabilistic models

Intelligent transportation system
- Reinforcement learning based traffic control

Education

2021 – Now   **Massachusetts Institute of Technology**
- Master in Transportation and Highway Engineering
- Advisor: Jinhua Zhao, Haris N. Koutsopoulos

2019 – 2021   **McGill University**
- Master (Thesis) in Transportation Engineering
- Advisor: Lijun Sun
- GPA: **3.8**/**4.0**
- Thesis: Spatial Aggregation and Temporal Convolution Graph Neural Network for Kriging

2015 – 2019   **Shanghai Jiao Tong University**
- Bachelor of Science in Mechanical Engineering (Tsien Hsue-Shen Class)
- Advisor: Jiangang Jin
- GPA: **3.55**/**4.0**; Ranking: **3/8**
- Graduate with Outstanding Honor (Top 5%)

Journal Publications

2022   **A Universal Framework of Spatiotemporal Bias Block for Long-Term Traffic Forecasting** ☑ .
Fuqiang Liu, Jiawei Wang, Jingbo Tian, <u>Dingyi Zhuang</u>, Luis Miranda-Moreno, Lijun Sun*
IEEE Transactions on Intelligent Transportation Systems

2020   **From compound word to metropolitan station: Semantic similarity analysis using smart card data** ☑.
<u>Dingyi Zhuang</u>, Siyu Hao, Lee Der-Horng*, Jiangang Jin
Transportation Research Part C: Emerging Technologies, Volume 114, May 2020, Pages 322-337

2019   **Understanding the bike sharing travel demand and cycle lane network: the case of Shanghai** ☑.
<u>Dingyi Zhuang</u>, Jiangang Jin*, Yifan Shen, Wei Jiang
International Journal of Sustainable Transportation, 2019: 1-13

Conference Proceedings

2022 **Uncertainty Quantification of Sparse Trip Demand Prediction with Spatial-Temporal Graph Neural Networks** ☑.
Dingyi Zhuang, Shenhao Wang*, Haris N. Koutsopoulos, Jinhua Zhao
28th ACM SIGKDD Conference on Knowledge Discovery & Data Mining (KDD-2022)

2022 **The Braess Paradox in Dynamic Traffic** ☑ .
Dingyi Zhuang, Yuzhu Huang, Vindula Jayawardana, Jinhua Zhao, Dajiang Suo, Cathy Wu*
25th IEEE International Conference on Intelligent Transportation Systems

2020 **Inductive graph neural networks for spatiotemporal kriging** ☑.
Yuankai Wu, Dingyi Zhuang, Lijun Sun*
The Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI-21)

2020 **A Pseudo-3D Convolutional Neural Network based Framework for Short-term Mixed Passenger Flow Prediction in Large-scale Public Transit**.
Siyu Hao, Dingyi Zhuang, De Zhao, Lee Der-Horng*
Transportation Research Board 2020

2018 **An empirical study on cycle lane network using bike sharing data: the case of Shanghai**.
Dingyi Zhuang, Jiangang Jin*, Yifan Shen, Wei Jiang
2018 International Conference on Transportation and Space-time Economics

Working Papers

2022 **Deep Hybrid Model with Urban Road Network**.
Dingyi Zhuang, Shenhao Wang*, Haris N. Koutsopoulos, Jinhua Zhao
Submitted to Transportation Research Part C: Emerging Technologies

2022 **Effects on the Spread of the COVID-19 Omicron Variant from Mask Wearing on Public Transit**.
Dingyi Zhuang, Yuzhu Huang, Xiaotong Guo, Jinhua Zhao
Working paper

2022 **Understanding Incident Impacts on Ridership Demand Change in Urban Transit System: the Case in Chicago**.
Dingyi Zhuang, Baichuan Mo, Haris N. Koutsopoulos, Jinhua Zhao*
In submission to Journal of Public Transportation

2022 **Mitigating The Braess's Paradox in A Closed System Using Reinforcement Learning**.
Yuzhu Huang, Dingyi Zhuang, Vindula Jayawardana, Jinhua Zhao, Dajiang Suo, Cathy Wu*
Working paper

2022 **Fairness-enhancing deep learning for ride-hailing demand prediction**.
Yunhan Zheng, Qingyi Wang, Dingyi Zhuang, Shenhao Wang*, Jinhua Zhao
Submitted to Transportation Research Part C: Emerging Technologies

2022 **Uncertainty Quantification of Spatiotemporal Travel Demand with Probabilistic Graph Neural Networks**.
Qingyi Wang, Shenhao Wang*, Dingyi Zhuang, Haris Koutsopoulos, Jinhua Zhao
Submitted to IEEE Transactions on Intelligent Transportation Systems

2021 **Low-Rank Hankel Tensor Completion for Traffic Speed Estimation** ☑ .
Xudong Wang, Yuankai Wu, Dingyi Zhuang, Lijun Sun*
Submitted to IEEE Transactions on Intelligent Transportation Systems

2021 **Spatial Aggregation and Temporal Convolution Networks for Real-time Kriging** ☑.
Yuankai Wu, Dingyi Zhuang, Lijun Sun*
Submitted to IEEE Transactions on Knowledge and Data Engineering

Work & Research Experience

Apr 2021– Now
MIT Transit Lab⬀
Research Assistant
Advisor: Jinhua Zhao; Shenhao Wang
Working agencies:
- Chicago Transit Authority (CTA), rail incident data analysis
- Department of Energy (DOE), travel demand prediction

Aug 2020– Jun 2021
Mitacs Accelerate with ExPretio ⬀
Winter Intern
- Combination of multi-horizon models for demand forecasting

2019-2021
Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT)⬀
Master's Student
Advisor: Lijun Sun

Jul 2018– Sep 2018
Civil and Environmental Engineering, National University of Singapore
Research Assistant
Advisor: Lee Der-Horng

Oct 2017– Nov 2017
Institute of Refrigeration and Cryogenic Engineering, Shanghai Jiao Tong Univ.
Research Assistant

Mar 2017– Jun 2018
Chuntsung Program, Shanghai Jiao Tong Univ. ⬀
Research Assistant

Aug 2016– Sep 2015
Robotics Institute, Shanghai Jiao Tong Univ.
Research Assistant

Honors & Awards

2020 **CIRRELT Excellence Scholarships (Master's), CIRRELT**

2019 & 2021 **Graduate Excellence Fellowship, McGill University**

2019 **Hsue-shen Tsien Class, Shanghai Jiao Tong University**
Top 5%, Honor Program in School of Mechanical Engineering

2017 **Chungtsung Scholarship, Hui-Chun Chin and Tsung-Dao Lee Chinese Undergraduate Research Endowment**
Top 10% in selected excellent research students in Shanghai Jiao Tong University

2017 **Chinese Big Data Innovation Application and Modeling Contest** ⬀
First Prize (1/135)

2016 & 2017 **Eleme Scholarship, Shanghai Jiao Tong University**

2017 **2017 Mathematical Contest in Modeling**
Honorable Mention

2016 **Excellent Student, Shanghai Jiao Tong University**
Top 5%

2015 **Freshmen Scholarship, Shanghai Jiao Tong University**

Position of Responsibility

Oct 2015– Sep 2017
Center of Quality Development, Shanghai Jiao Tong University
Vice president

Technical skills

Languages	`Python,MATLAB,R,`LaTeX
Tools	Adobe PhotoShop, Premier, Lightroom