

# Dingyi Zhuang

## 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

### 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, Dingyi Zhuang, 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

Dingyi Zhuang, 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

Dingyi Zhuang, 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)*
- 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 **Fairness-enhancing deep learning for ride-hailing demand prediction.**  
Yunhan Zheng, Qingyi Wang, Dingyi Zhuang, Shenhao Wang\*, Jinhua Zhao  
*Submitted to ...*
- 2022 **Uncertainty Quantification of Spatiotemporal Travel Demand with Probabilistic Graph Convolutional Neural Networks.**  
Qingyi Wang, Shenhao Wang\*, Dingyi Zhuang, Haris Koutsopoulos, Jinhua Zhao  
*Submitted to ...*
- 2022 **The Braess Paradox in Dynamic Traffic**  .  
Dingyi Zhuang, Yuzhu Huang, Vindula Jayawardana, Jinhua Zhao, Dajiang Suo, Cathy Wu\*  
*Submitted to 25th IEEE International Conference 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
- Aug 2020–  
Jun 2021 **Mitacs Accelerate with ExPretio**   
Winter Intern  
  - Combination of multi-horizon models for demand forecasting
- 2019 **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– **Chuntsung Program, Shanghai Jiao Tong Univ.**   
Jun 2018 Research Assistant  
Aug 2016– **Robotics Institute, Shanghai Jiao Tong Univ.**  
Sep 2015 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 University Students 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– **Center of Quality Development, Shanghai Jiao Tong University**  
Sep 2017 Vice president

## Technical skills

Languages Python, MATLAB, R,  $\text{\LaTeX}$   
Tools Adobe PhotoShop, Premier, Lightroom