

# Han Qiu

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## CONTACT INFORMATION

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## WORKING EXPERIENCE

**Transportation Business Unit, Meituan-Dianping, Beijing, China**

*Research Engineer*

**May, 2018 - present**

Includes a variety of projects on ride-hailing operations.

- **Macroscopic Modeling of the Ride-Hailing Business:** based on existing works in literature, proposed a model of macroscopic matching equilibriums and validated its accuracy with real-world data. This model has been used as a decision support module in a range of operational tools and algorithmic strategies.
- **Estimation of Supply Elasticities:** designed instrument variables and estimation methods to improve the accuracy of personal-level labor supply elasticities.
- **Pricing Optimization:** developed personal-level models of travelers' and drivers' behavior under the impact of pricing, and solved for optimal pricing schemes with linear programming and robust optimization.
- **Analysis Tool Development:**
  - a multi-agent simulation system for the ride-hailing dynamics;
  - a Python package for the conversion between road network representation and hexagon representation of spatial statistics.

**Shared Mobility Research Lab, Shanghai International Automobile City, Shanghai, China**

*Researcher*

**September, 2017 - May, 2018**

Includes several projects on the inference and prediction of traveler behavior in a carsharing business.

- Constructed and estimated a structural model of traveler coupon redemption behavior, with a focus on travelers' perceptions of future coupon redemption utilities and their awareness of available coupons
- Developed a long short-term memory (LSTM) network to estimate the impacts of users' negative comments on their trip frequencies in the future
- Developed deep learning models for personalized demand forecasting

**Shanghai Yuan Lan (Evolution Labs) Information Technology Co., Ltd, Shanghai, China**

*Research Intern*

**December, 2017 - May, 2018**

Implemented state-of-the-art reinforcement learning algorithms, including PPO, DDPG, and DQN, for alpha mining and trading signal discovery in Chinese commodity markets. Developed several reward shaping schemes to further improve learning efficiencies.

**Dublin Research Lab, International Business Machines (IBM) Corporation, Dublin, Ireland**

*Research Intern*

**June, 2017 - September, 2017**

Developed a time-series embedding algorithm for fast top- $k$  correlation searches in time-series databases, with a focus on deep neural network structures including recurrent neural networks (RNN) and autoencoders (AE).

## RESEARCH INTERESTS

- Human Decision Behavior Modeling;
- Modeling and Mechanism Design of Urban Systems;
- Decision-Making Methodology, including: Integer Programming & Combinatorial Optimization;

Reinforcement Learning;

PUBLICATIONS

**Qiu, H.**, Dai, X., & Chen, J. (2020). A Macroscopic Analysis of Curbside Stopping Activities of On-demand Mobility Service. *2020 IEEE Intelligent Transportation Systems Conference (ITSC)*.

**Qiu, H.** (2018). An Inattention Model for Traveler Behavior with e-Coupons. *Available at SSRN 3305753*.

**Qiu, H.**, Lam, H. T., Fusco, F., & Sinn, M. (2018). Learning Correlation Space for Time Series. *arXiv preprint arXiv:1802.03628*.

**Qiu, H.**, Li, R., & Zhao, J. (2018). Dynamic pricing in shared mobility on demand service. *arXiv preprint arXiv:1802.03559*.

**Qiu, H.**, Li, R., & Zhao, J. (2018). Daily Level Dynamic Pricing in Shared Mobility on Demand Service. *Transportation Research Board 2018 Annual Meeting* (No. 18-00723).

**Qiu, H.**, Li, R., & Liu, H. (2016). Integrated model for traffic flow forecasting under rainy conditions. *Journal of Advanced Transportation*.

WORKING PAPERS

Zhang, H., Guo, X., **Qiu, H.**, Renda, M. E., & Zhao, J. Mobility Sharing with Time Flexibility.

ACADEMIC  
EXPERIENCE

**Massachusetts Institute of Technology**, Cambridge, MA, USA

*Graduate Student*

**September, 2015 - June, 2017**

Includes master-level coursework and research projects, with a focus on discrete-choice-based estimation and optimization.

- Dynamic pricing in shared mobility-on-demand services: applied a single-period optimal pricing algorithm and evolution strategy (ES) methods to solve for near-optimal pricing strategies in a multi-period utility-maximization problem, under the assumption that the traveler choice behavior follows the multinomial logit choice model
- Assortment optimization under logit mixture models: developed heuristics to find the operator's profit-maximizing route choice set under the assumption that the traveler choice behavior follows the logit mixture model

*Research Assistant*

Intelligent transportation systems (ITS) Lab

**September, 2015 - June, 2016**

Participated in the development of simulation systems for the Flexible Mobility on Demand (FMOD) and the SimMobility projects.

*Teaching Assistant*

15.093 Optimization Methods

**September, 2016 - January, 2017**

Graded assignments and exams, and answered students' questions during office hours.

**Tsinghua University**, Beijing, China

*Research Assistant*

**January, 2014 - July, 2015**

Includes several research projects in the fields of transportation and operation research.

- Assortment problem under  $d$ -level nested logit models: designed both a fully polynomial-time approximation scheme (FPTAS) and an efficient heuristic to solve the assortment problem under certain regularity conditions on dissimilarity parameters and preference weights
- Traffic flow forecasting under rainy conditions: applied linear regressions to correct the effects of precipitations and improved the forecasting accuracy under rainy scenarios

PROFESSIONAL  
EXPERIENCE

**Reviewer**, Transportation Research Board Annual Meetings.

## EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA, USA

M.S., Transportation, June, 2017

**Tsinghua University**, Beijing, China

B.E., Civil Engineering, June, 2015

B.S., Pure and Applied Mathematics, June, 2015

## COMPUTER SKILLS

- Machine Learning & Deep Learning Package/Framework: TensorFlow, XGBoost.
- Optimization Software: Gurobi, CLP/CBC, CSDP.
- Programming Languages: Python, C++, julia.
- General Purpose Applications:  $\text{\LaTeX}$ , Git.