

XIANGYU LI

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EDUCATION

Northwestern University

Evanston, IL, USA

Doctor of Philosophy in Transportation Systems Analysis & Planning

Sep. 2023 – Present

- GPA: **3.8/4.0**
- Core Courses: Deep Reinforcement Learning (4.0/4.0), Deep Learning: FAA (4.0/4.0), Transportation Systems Analysis (4.0/4.0, rank 1/20), Transportation Systems Operations (4.0/4.0), Transportation Systems Planning and Management (4.0/4.0), Travel Demand Analysis and Forecasting (4.0/4.0), Infrastructure System Analysis (4.0/4.0), Infrastructure System Analysis (4.0/4.0), Introduction to Applied Econometrics (4.0/4.0)

University of California, Berkeley

Berkeley, CA, USA

Master of Transportation Engineering

Aug. 2022 – Jul. 2023

- GPA: **3.87/4.0**
- Core Courses: Operation of Transportation Facilities (4.0/4.0, rank 1/50), Behavioral Modeling for Planning and Policy (4.0/4.0), Analysis System Analysis in Transportation (midterm: 96/100)

Beijing Jiaotong University

Beijing, China

Bachelor of Transportation Engineering

Aug. 2018 – Jul. 2022

- GPA: **3.86/4.0**, Rank **7/383** (Top **2%**)
- Core Courses: Operational Research in Management (95/100), Traffic Safety Engineering (97/100), Urban Public Transportation (95/100), Traffic Management and Control (92/100)

PUBLICATIONS & MANUSCRIPTS

- [1] **Li, X.Y.**, Liu, P.Y., Mahmassani, H.S., & Chen, Y. An Adaptive Longitudinal Driving Assistance System (ALDAS) based on Reinforcement Learning. *104th Transportation Research Board Annual Meeting* (Under review). [[PDF](#)]
- [2] **Li, X.Y.**, Yin, Z.W., Luo, S.D., & Hansen, M. Impact of Intracity Traffic Congestion on People's Choices of Housing, Workplace and Commute: Social Optimal Parsimonious Continuum Approach. *Transportation Research Part E: Logistics and Transportation Review* (Under review). [[PDF](#)]
- [3] **Li, X.Y.**, Cao, D., & Ho, I. Deep Imitation Learning for Autonomous Driving based on Cyber-Physical System. To be submitted to *Transportation Research Part C: Emerging Technologies*. [[Report](#)] [[Code](#)]
- [4] **Li, X.Y.**, Gomes, G., & Wu, Y.Z. Collaborative Traffic Signal Control and Path Recommendations Considering PM2.5 Exposure Using Reinforcement Learning. *Working Paper*. [[Report](#)] [[Code](#)]
- [5] **Li, X.Y.**, Wang, Y.X., & Wu, Y.Z. Commuter Exposure to Particulate Matter in Four Transportation Modes in Beijing, China. To be submitted to *Transportation Research Part D: Transport and Environment*. [[Report](#)][[Code](#)]
- [6] Luo, S.D., **Li, X.Y.**, Wu, X.Y., Yin, Z.W., Xu S., & Kang, L.J. (2022). Modeling Resident Choices of Residence, Work Locations and Commutes in a Two-city System for Optimal Urban Design. *Journal of Tsinghua University (Science and Technology)*, 62(7), 1186-1194. [[PDF](#)]
- [7] **Li, X.Y.** Finite Element Optimization Analysis of CFRP Reinforced Box Girder Bridge Under Traffic Load. In *2021 4th International Symposium on Traffic Transportation and Civil Architecture (ISTTCA)* (pp. 89-94). IEEE. [[PDF](#)]
- [8] **Li, X.Y.**, & Xie, M. Short-term passenger volume forecast and model analysis of Beijing public transport. In *Fifth International Conference on Traffic Engineering and Transportation System (ICTETS 2021)* (Vol. 12058, pp. 1423-1429). SPIE. [[PDF](#)]

RESEARCH EXPERIENCE

Northwestern University, Transportation Center

Evanston, IL, USA

Research Assistant to **Professor Hani S Mahmassani**

Dec. 2023 – Present

Project: An Adaptive Longitudinal Driving Assistance System based on Reinforcement Learning

- Built a cyber-physical system to train an autonomous driving system that better aligns with human preferences

- Incorporated the Deep Deterministic Policy Gradient (DDPG) algorithm to optimize car-following behavior
- Collected the desired car-following patterns of 13 drivers to update the reward function of the DDPG algorithm
- The updated DDPG model outperformed LSTM, RNN and CACC in efficiency, comfort, fuel consumption, etc.
- The decreasing human takeover rate over time suggests that the system effectively captures human behavior

University of California, Berkeley, Dept. of Mechanical Engineering

Berkeley, CA, USA

Research Assistant to **Professor Gabriel Gomes**

Aug. 2022 – May. 2023

Project: Collaborative Traffic Lights Control and Path Recommendations Using Reinforcement Learning

- Built a city-scale simulation platform based on simulation of urban mobility (SUMO)
- Proposed a traffic light control algorithm using deep Q-learning network (DQN) and Actor-to-critic (A2C)
- Proposed a real-time path recommendation algorithm for commuters using A2C
- Collaboratively trained two agents to minimize generalized system cost incorporating PM2.5 exposure

Hong Kong Polytechnic University, Dept. of Electronic and Information Engineering

Hong Kong

Research Assistant in Intelligent Transport Systems lab

May. 2022 – Jun. 2023

Project: Cyber-Physical System and Reinforcement Learning-Enabled Autonomous Driving Behavior

- Built a digital twins-based driving simulation platform that connects a physical driving device (i.e., hardware) with a virtual driving environment (i.e., software).
- Collected human driver behavior data on emergency broadcast message scenarios using the platform
- Used proximal policy optimization (PPO) to train self-driving vehicles for emergency scenario responses

University of California, Berkeley, Dept. of Transportation Engineering

Berkeley, CA, USA

Beijing Jiaotong University, Dept. of Transportation Engineering

Beijing, China

Research Assistant to **Professor Mark Hansen & Professor Sida Luo**

Jan. 2021 – Feb. 2023

Project: Game Theoretical Analysis for a Two-city Economic System

- Designed a system composed of two ring-radial cities connected by a high-speed rail with changing congestion
- Derived the Nash Equilibrium (NE) state of people's work and commute pattern distributions
- Proved that no big city residents will choose to work in the small city under the NE
- Derived optimal government interventions on population size control to maximize social welfare
- Two first-authored papers with one submitted to Transportation Research Part E and another published in Journal of Tsinghua University.

Beijing Jiaotong University, Dept. of Transportation Engineering

Beijing, China

Research Assistant to **Professor Yizheng Wu**

Dec. 2021 – May. 2022

Project: Individual Particulate Matter Exposure for Urban Commuters

- Collected inhaled PM2.5 per second with a portable monitor under different travel modes (over 100 hours)
- Quantified the relationship between inhaled PM2.5 and external factors (e.g., gender, age, respiration rate)
- Quantified impacts of PM2.5 on population mortality rate and disability adjusted life year for different regions
- Built an inhaled PM2.5 prediction model based on travel characteristics and simulated the PM2.5 exposure
- Wrote a thesis and obtained Outstanding Undergraduate Graduation Thesis Award (top 5%)

Massachusetts Institute of Technology, Dept. of Civil Engineering

Cambridge, MA, USA

Research Assistant to **Professor Oral Buyukozturk**

Jul. 2021 – Aug. 2021

Project: Impact of Traffic Load on CFRP-Reinforced Bridges Using Finite Element Optimization Analysis

- Constructed a finite element model of a real box girder bridge using ABAQUS software
- Analyzed the impact different composition methods of carbon fiber reinforced polymer (CFRP) and concrete on the bridge's mechanical properties under various traffic loads
- First-authored paper published in ISTTCA 2021

Beijing Jiaotong University, Dept. of Transportation Engineering

Beijing, China

Research Assistant to **Professor Wei Guan**

Mar. 2021 – Jun. 2021

Project: Forecast of Beijing Public Transport Demand under the COVID-19

- Collected and imputed public transit (PT) demand and external factor data in Beijing for the past 40 years
- Used linear regression to analyze the impact of COVID-19 on PT demand

- Proposed a deep neural network architecture to predict future PT demand under COVID-19
- First-authored paper published in ICTETS 2021

AWARDS

Fellowships (a full-tuition scholarship and stipend)	Northwestern University	2023
Departmental Scholarship (15000 dollars)	University of California, Berkeley	2022
Excellent Scholarship for Undergraduate Discipline Competition	Beijing Jiaotong University	2021
Second Prize, 16th National Competition of Transport Science and Technology		2021
University-Level Merit Scholarship	Beijing Jiaotong University	2021
University-Level Merit Scholarship	Beijing Jiaotong University	2020
University-Level Merit Scholarship	Beijing Jiaotong University	2019

COMPUTER SKILLS

Proficient	Python, MATLAB, SUMO, Carla, Vissim, ArcGIS, Synchro
Familiar	C/C++, TransCAD