XIANGYU LI

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EDUCATION

University of California, Berkeley Berkeley, CA, USA

Master of Transportation Engineering Aug. 2022 – Jul. 2023 (expected)

- Core Courses: Operation of Transportation Facilities (midterm: 45/50, rank 1/50)
  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), University Physics (91/100), Urban Public Transportation (95/100), Traffic Management and Control (92/100), Traffic Engineering Theory (92/100), Road and Highway Engineering (90/100), Engineering Mechanics (90/100)

PUBLICATIONS & MANUSCRIPTS

[1] **Li, X.Y.**, Yin, Z.W., Wu, H., & 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]

[2] **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*. [PPT][code]

[3] **Li, X.Y.**, Gomes, G., & Wu, Y.Z. Collaborative Traffic Signal Control and Path Recommendations Under PM2.5 Exposure Based on Reinforcement Learning. To be submitted to *Transportation Research Part C: Emerging Technologies*. [code]

[4] 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]

[5] **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]

[6] **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

University of California, Berkeley, Dept. of Mechanical Engineering Berkeley, CA, USA

Research Assistant to **Professor Gabriel Gomes** Aug. 2022 – Present

Ongoing 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 – Present

Ongoing 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** Dec. 2020 – Nov. 2022

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

Second Prize, 16th National Competition of Transport Science and Technology

Project: Ventilation Metamaterial Barrier for Traffic Noise Reduction

- Developed a metamaterial to achieve adequate control of low-frequency mechanical waves and solved the problem of noise pollution on traffic roads
- Designed a new split tube resonator of double-sided noise reduction, ventilation, and no reflector
- Applied local resonance mechanism to the noise reduction combining theories in acoustics, structural mechanics, and road traffic

AWARDS

Departmental Scholarship (15000 dollars)	University of California, Berkeley	2022
Excellent Scholarship for Undergraduate Discipline Competition	Beijing Jiaotong University	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, Vissim, ArcGIS, Synchro, AutoCAD

Familiar C/C++, TransCAD