# Wentao Zhao

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Website: https://loganzhao1997.github.io/website/

#### TECHNICAL SKILLS

- AI Specializations: reinforcement learning, graph neural network, deep learning
- **Optimization Specializations:** stochastic optimization, integer programming
- Machine learning tools: Pytorch (expert), Numpy, Pandas
- Optimization tools: Gurobi (expert), MATLAB
- **Programming:** Python (expert), SQL, C++

#### **EDUCATION**

University of Southern California	Los Angeles, US
Doctoral Candidate in Operations Research	Sep 2022 - 2026(Expected)
- Advisor: Dr. Maged Dessouky	
- Research field: sequential decision making in supply chain managemen	t
Master of Science in Computer Science	Sep 2023 – 2025(Expected)
Columbia University	New York, US
Master of Science in Operations Research	Sep 2020 – Dec 2021
Zhejiang University	Hangzhou, China
Bachelor of Engineering in Mechanical Engineering	Sep 2016 - May 2020

### **RESEARCH EXPERIENCES**

University of Southern California, School of Industrial & System EngineeringLos Angeles, USResearch Assistant, advised by Prof. Maged DessoukyDec. 2023 – Now

- Developed a backward approximate dynamic programming framework for supply chain infrastructure planning, leveraging neural networks for efficient value function approximation.
- Designed and implemented a reinforcement learning framework with a partial forward training strategy, allowing the neural network to efficiently prioritize and learn estimates for the most critical states.
- Conducted numerical experiments showing that the proposed method improved total profit by 30% over the rolling-horizon algorithm and scaled to over 60 vertices, tripling the capacity of other approaches.
- Wrote a funding proposal and received \$143,490 funding from U.S. Department of Transportation.

University of Southern California, School of Industrial & System Engineering	Los Angeles, US
Research Assistant, advised by Prof. Maged Dessouky	Dec. 2022 – Dec. 2023

- Proposed a multi-agent reinforcement learning framework to address the relocation problem in an electric vehicle sharing system, where each charging station is treated as an agent.
- Developed a centralized-training-decentralized-execution strategy to enhance the learning process with centralized information while enabling large-scale deployment through decentralized execution.
- Designed a special reward function that mitigated the delayed reward problem during learning and allowed the algorithm to be tailored toward specific goals, such as maximizing customer satisfaction.
- Conducted numerical experiments, demonstrating that the proposed method increased the total profit by 10% over traditional relocation strategies while maintaining a similar level of customer satisfaction.

#### Columbia University, School of Civil Engineering Research Assistant, advised by Prof. Sharon Di

**New York, US** Jun. 2021 – Dec. 2021

• Proposed a deep learning augmented heuristic algorithm that integrated a graph neural network model into a local search algorithm to optimize the matching policy for an online ride-hailing system.

- Designed a training method combining imitation learning and evolutionary strategy, where the model was trained to imitate traditional algorithms and then evolve through interactions with the environment.
- Developed a ride-hailing simulation environment using historical data; Demonstrated that the proposed algorithm outperformed the traditional algorithm regarding total profit and customer waiting time.

#### University of Wisconsin-Madison, School of Industrial & System Engineering Research Assistant, advised by Prof. Xin Wang Madison, US May 2019 – Jan. 2020

- Developed a stochastic programming model for an electric vehicle sharing system to optimize its strategies in energy bidding, serving customers, charging, and relocation.
- Designed a two-stage stochastic robust optimization approach that incorporate the spatial-temporal uncertainty of customer demand and consider the worst-case scenarios.
- Implemented and solved the model via Python and Gurobi; Conducted a case study in Austin to demonstrate managerial insights.

### **PUBLICATIONS**

#### **Papers Under Review:**

• Wentao Zhao, Yikang Hua, Xin Wang, "Energy-Sponge Electric Vehicle Sharing System Design," under 3<sup>rd</sup> round review at *Transportation Research Part C: Emerging Technology*.

#### **Working Paper:**

- Wentao Zhao, Maged Dessouky, "Closed-Loop Supply Chain Network Design and Operations for Electric Vehicle Battery."
- Wentao Zhao, Maged Dessouky, "Multi-Agent Reinforcement Learning for Dynamic Electric Vehicle Sharing Relocation."

### Paper before PhD program

• Weifei Hu, W. Zhao, et al., Design Optimization of Composite Wind Turbine Blades Considering Tortuous Lightning Strike and Non-Proportional Multi-Axial Fatigue Damage. *Engineering Optimization* (2019): 1-19 (doi).

#### CONFERENCE PRESENTATIONS

- Wentao Zhao, Maged Dessouky, "Dynamic Closed-Loop Supply Chain Network Design and Operations for Electric Vehicle Battery," *INFORMS Annual Meeting*, Seattle, WA, October 2024.
- Wentao Zhao, Maged Dessouky, "A Two-Stage Distributed Learning-Based Framework for Dynamic Electric Vehicle Sharing," *INFORMS Annual Meeting*, Phoenix, AZ, October 2023.
- Wentao Zhao, Yikang Hua, Xin Wang, "Energy-sponge Service in Electric Vehicle Sharing System", *Transportation Research Board Annual Meeting*, Virtual, 2021 (poster).

## HONORS AND AWARDS

USC CURVE Fellowship: fellowship for selected research mentors	2023-2024
• USC Graduate School Fellowship: merit-based fellowship for selected PhD students	2022-2023
• Advanced Honor Class of Engineering Education: honor Program of Engineering Colleg	ge 2020
Research Special Scholarship: selected excellent research student	2019
TEACHING / MENTORING	
ISE 530 Optimization Method for Analytics (Master Core at USC), Teaching Assistant	Fall 2024
• Independent hold office hours, grade assignment, and provide homework solutions.	
USC Curve Program, Research Mentor Sep. 2	2023 – Sep 2024

• Advise two undergraduate students conduct their own research projects.