JUNZHE CAO, M.ASCE, ENV SP

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EDUCATION

University of California, Berkeley *Expected Graduation: Spring 2024*
Senior Undergraduate Technical Upper Division GPA: 3.7
Civil Engineering (B.S.), Member of Chi Epsilon (XE)

TECHNICAL STRENGTHS & SKILLS

Computer Languages	Python, Julia, MATLAB, JSON, R
Software & Tools	AutoCAD, LaTeX, Excel, GIS, Mathematica, Tableau
Languages	Chinese (Native), English (Native, C2), German (Elementary, A2)
Licenses and Certificates	Google Analytics Certification (12/2022)
	Amateur Radio Operation License–Class A (CHN, 07/2017)
	CATTI Int'l Chinese-English Translation Certification (07/2022)

HONOURS AND AWARDS

December 2022 Recipient of Highest Scholarship (only one) awarded by ACEC BBC
December 2021 Honor to Date, College of Engineering

INTERNSHIP EXPERIENCE

WSP USA May 2023 - August 2023
Transportation Engineering Intern *San Francisco, CA*

- Translated English surveys for the Metropolitan Transportation Commission (MTC) ELSTART Program into Traditional Chinese to engage with the community effectively.
- Employed Tableau to visualize data from the pilot program, offering clear insights into performance.
- Managed the Asset Registry for the US-101 express lane in San Mateo County, demonstrating adept oversight of a sizable inventory comprising over 1500 assets.
- Spearheaded operational enhancement efforts by automating formulas and devising engaging interactive dashboards for the I-880 and I-680 Freeway express lanes.
- Utilized Power Query to cross-verify Key Performance Indicator reports for March 2023.
- Ensured compliance with the MUTCD code and Google Earth by evaluating signage up-to-datedness.
- Spearheaded research on Next-Generation Tolling, presenting innovative possibilities, i.e. Road Usage Charge

ACADEMIC RESEARCH

Understanding Flow-density Relations for City-street Traffic August 2023 - Present
Researcher, advised by Prof. Michael Cassidy *UC Berkeley*

- Conducted detailed traffic analysis at a selected intersection using drone data from Athens, Greece, involving trajectory separation of one lane, and measurement of backward wave speed, jam density, and capacity.
- Demonstrated findings, including that major arterial street free-flow speeds average 30 km/h, slightly lower than highway speeds of 60 km/h.

Analyzing the Impact of Ridership on Track Maintenances May 2023 - Present
Researcher, advised by Prof. Haris Koutsopoulos and Ph.D. Candidate John Moody *JTL Lab, MIT*

- Conducted an extensive review of existing literature to gain a comprehensive understanding of the subject.
- Collected and meticulously curated data from WMATA, amassing over 9 million data points at 30-minute intervals.
- Employed statistical techniques, including the Difference of Differences method, to assess the consequences of total system shutdowns on ridership. Notably, identified reductions of up to 60 percent in ridership during such disruptions.
- Utilized heat mapping technology to provide in-depth geographical and demographic insights into the impact of ridership fluctuations, enhancing our understanding of the nuances within the data, using Python and Julia.

Airline Itinerary Choice Factors Involving Connector Buses May 2023 - Present
Researcher

- Surveyed passenger preferences, highlighting willingness to adopt connector buses for at an average cost of $223.38.
- Identified a positive correlation between ticket prices and passengers' willingness to pay for bypassing security checkpoints, suggesting convenience is a key driver in itinerary choices, addressing the "last hundred-mile problem" in air travel.

Simulation-Based Optimisation of Large-Scale Vertiport Location Selection: Using Machine Learning Models as Surrogates May 2023 - October 2023
Researcher, advised by Prof. Jinhua Zhao, MIT & Prof. Mark Hansen *MIT & UC Berkeley*

- Implemented DBSCAN alg. for UAM pax clustering and LHS for vertiport loc. scheme generation.
- Optimized metropolitan transport network by dividing regions into fully interconnected primary sectors.

Evaluating Simulators for Urban Air Mobility Integration: A Comprehensive Review and Recommendations for Research Approaches December 2022 - October 2023
Researcher, advised by Ph.D. Candidate Xuan Jiang & Prof. Raja Sengupta *AIR Lab, UC Berkeley*

- Evaluated the potential advantages of integrating urban air mobility into existing regional transportation systems, including reducing congestion, emissions, noise, and producing positive economic and environmental outcomes.
- Submitted to *Transportation Science*, under review.

Honor Research on Feasibility of EV Shuttles in Dallas, TX and Evaluation of Transportation System in Commerce, CA September 2022 - June 2023
Researcher, advised by Dr. Elliot Martin & Prof. Susan Shaheen *TSRC, ITS, UC Berkeley*

- Conducted research on the feasibility of implementing electric vehicle charging stations at DART transit stations and analyzed potential cost savings and revenue streams.
- Plotted the stops and bus routes of three bus agencies using GTFS data and QGIS in Commerce.
- Created a method approach to understand the statistics of a transportation system using GTFS data and other datasets.

Optimization Research on Headways Using Continuum Approximation Method September 2021 - December 2021
Researcher, advised by Prof. Michael Cassidy *UC Berkeley*

- Derived the cost formula for metro segment with a few stations in it using Utility Theory.
- Determined and Assessed the optimum headway of Bay Area Rapid Transport and New York Subway using continuous approx. method and calculus, with data sourced from National Transit Database.
- Found out BART was running at optimum headway of around 6 minutes during Peak Hours.

· Found out New York Subway was running less trains (Optimum headway calculated: 1 min.) due to signal capabilities.

PUBLICATIONS AND CONFERENCE PROCEEDINGS

1. **Cao, J.***, Jiang, X., Tang, Y., Mo, Q., Yang, H. (2024). Understanding the Effect of Connector Buses on Flight Itinerary Choice. In *Proceedings of the* 103^{rd} *Transportation Research Board Annual Meeting (No.TRBAM-24-05798).* Accepted for AEP30 Committee Presentation.

2. **Cao, J.***, Jiang, X., Tang, Y., Moody, J.T., Mo, Q., Yang, H. (2023). Understanding the Effect of Connector Buses on Flight Itinerary Choice. In *Proceedings of the 2023 INFORMS Annual Meeting (#23-CCS-AM-7133-INFORMS).* Accepted for Presentation.

3. Jiang X., Tang, Y., **Cao, J.***, Bulusu, V., Yang, H., Tang, Z., Peng, X., Liu, C., Zheng, Y., Poliziani, C., Sengupta, R. (2023) Evaluating Simulators for Urban Air Mobility Integration: A Comprehensive Review and Recommendations for Industrial Research, IEEE Transactions on Industrial Informatics (No.TII-23-4591), under review.

4. Jiang, X.*, Cao, S., Mo, B., **Cao, J.**, Yang, H., Tang, Y., Hansen, M., Sengupta, R., Zhao, J. (2024) Simulation-based Optimization for Vertiport Location Selection: A Surrogate Model with Machine Learning Method, *Transportation Research Record, Journal of Transportation Research Board (23-00952).* Accepted October 2023.

5. Jiang, X.*, Zhuang, D., Cao, S., **Cao, J.**, Tang, Y., Li, J., Bulusu, V., Sengupta, R., Zhao, J. (2023). Performance Benchmarking and Scalability of LPSim: A Multi-GPU Traffic Simulation Approach. *IEEE Transactions on Intelligent Vehicles (Special Issue on Digital Twins and Parallel Intelligence, No. T-IV-23-07-1904*, under review. Presented at *2023 IEEE 3rd Conference on Digital Twins and Parallel Intelligence (DTPI) (#1570950593).*

RELEVANT COURSES

Core Courses
Transportation System Engineering (CIV ENG 155)
Public Transportation Systems (CIV ENG 259, ongoing)
Data Science in Aviation (CIV ENG 160D/260D)
Emergening Technolgies in Civil Engineering (CIV ENG 190S/290)
Airport Design (CIV ENG 153)
Honour Undergraduate Research (CIV ENG H194, ongoing)
Introduction to City and Regional Transportation (CY PLAN 114)

LEADERSHIP EXPERIENCE & EXTRACURRICULAR ACTIVITIES

Institute of Transportation Engineers at UC Berkeley (Cal) August 2021 - Present
President

· Coordinated logistics to ITE Annual Meeting 2023 in Portland, OR, and recruited more than 30 students.
· Helped on Social's and End of Year Banquet's venue reservation and preparation for a group of 50.
· Facilitated on food & beverage for the prof. workshops and weekly meetings to a participant of 50+.

Transportation Team at UC Berkeley (Cal) August 2021 - Present
DeCal (Student-led) Course Facilitator

· Assisted in the planning and design of the next-gen center running bus lanes on Nordhoff St. in Northridge, CA
· Given the 1^{st} lecture on Planning (history, factors and examples) to 40 new and returning members.

· Planned and presented the new bike lanes in the N. Natomas area with consideration of cost and environmental impact in Sacramento Bike Network Improvements project, won Second Place in ASCE Mid-Pacific Competition.

Berkeley Chinese Student and Scholar Association, IT Department August 2021 - Present
Senior Member

· Orchestrated collaboration between BCSSA and Cal Dining to curate a culturally-inspired Lunar New Year menu, showcasing Chinese traditions and flavors.
· Spearheaded the successful execution of the incoming-student welcome program, encompassing airport pick-up logistics, comprehensive campus tours, and coordinating a seamless IKEA shopping trip for students' essentials.
· Assisted the global live video shooting on events by the Assn. like Berkeley Chinese New Year Gala.
· Fostered partnerships and cooperation with various campus departments and new students to elevate the overall student experience, providing valuable insights and support for a more inclusive and engaging campus environment.

PROFESSIONAL AND ACADEMIC ASSOCIATION MEMBERSHIP & SERVICE

Institute of Transportation Engineers September 2021 - Present
Chapter President, University of California at Berkeley

American Society of Civil Engineering September 2021 - Present

· Member, Mobility on Demand as a Service (MoDaaS) Committee, Transportation & Development Institute (T&DI)
· Corresponding Member, Artificial Intelligence (AI) Committee, Transportation & Development Institute (T&DI)

International Chinese Transportation Professional Association June 2023 - Present

· Student Liaison, Northern California Chapter

Chinese Overseas Transportation Association September 2023 - Present
Member

Drone, Automation and Robotics Technology (DART) Initiative October 2023 - Present
Member

Association for Commuter Transportation January 2024 - Present
Member

REFEREE FOR JOURNALS AND CONFERENCES

Transportation Research Board (TRB) Annual Meeting 2023 - Present

· AP020 Standing Committee on Innovative Public Transportation Services and Technologies
· AP065 Standing Committee on Rail Transit Systems
· AV020 Standing Committee on Aviation System Planning
· AV050 Standing Technical Committee on Airport Terminals and Ground Access
· AV090 Standing Committee on Aviation Safety, Security and Emergency Management

ASCE International Conference on Transportation & Development (ICTD) 2023 - Present