Mr. Zichen Liang

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EDUCATION

2020/09 - 2024/01 **Beijing Jiaotong University** **M.Arch.,** Architecture **Built Environment**

- **Thesis Focus :** CFD Analysis of Urban Wind Environment and Microclimate
- This study demonstrates the capabilities of RANS and LES in simulating complex urban environments and buildings and validates these models, contributing to the further development of LES models such as DALES.

2016/09 - 2020/06 **Beijing University of Civil Engineering and Architecture** **B.Eng.,** Electricity Engineering **Building Electricity and Intelligence**

- Relevant courses include Building Electrical CAD(85); Intelligent Building Application Software Development(79); with other courses showing solid academic performance.
- Oct. 2019: Second Prize Scholarship for Autumn Semester 2019-2020

PROFESSIONAL EXPERIENCE

2020/08 - 2024/04, Beijing, China
China Architecture Design & Research Group
Electrical Engineer(Full-time)

- Designed comprehensive building electrical and control systems for large-scale office, public, and underground spaces (over 100,000 m² combined).
- Obtained BIM certification, emphasizing interdisciplinary coordination and digital design practices.
- Applied BIM and spatial analysis and numerical environmental modeling to optimize building electrical distribution systems and energy efficiency.

2023/01 - Present, Beijing, China
Essence Studio, Beijing Jiaotong University
Building Physics Simulation Engineer (Part-time)

- Performed CFD-based modeling for urban design, focusing on pedestrian wind comfort. This work contributed to winning a competition bid.
- Simulated ventilation for a U.S. modular housing project to support LEED environmental assessment.
- Analyzed of wind environment and proposed architectural retrofitting strategies for a hospital building.
- Developed AI algorithms for predictive modeling of building energy performance, AI-driven forecasting in urban atmospheric models.

RESEARCH EXPERIENCE

2021/09 - 2023/12 **Associate Professor Zhongzhong Zeng's Research Group**

PART ONE: Research Training and Critical Thinking

- Attended four academic seminars with Associate Professor Bo Zhang, building research thinking and analytical skills.
- Reviewed two journal papers and three master's thesis, sharpening critical evaluation and academic writing abilities.

PART TWO: Spatial Analysis and Numerical Modeling

- Performed spatial and CFD-based simulations on indoor ventilation or urban wind environments across 3 projects.
- Compiled a literature review combining traditional architecture research with CFD modeling methodologies.
- Utilized AI-driven approaches with large datasets for predictive analysis of occupant comfort and optimization of urban microclimatic design parameters.

PART THREE: Technical Application and Research Team Leadership

- Explored control-oriented simulation frameworks to support the development of occupant-centric, energy-responsive design strategies.
- Conducted Fluent software workshops for a team of eight, fostering technical proficiency and interdisciplinary research collaboration.

2022/06 - 2023/12 **Beijing Courtyards Natural Ventilation Research Project**

PART ONE: Field Investigation and Data Collection

- Led a four-member research team in two rounds of on-site investigations in traditional Beijing courtyard residences.
- Collected meteorological data and surveyed residents' comfort levels related to indoor thermal and airflow conditions.

PART TWO: Data Processing and Computational Analysis

- Performed statistical analysis on environmental parameters with Excel, SPSS to identifying key variables influencing natural ventilation.
- Conducted CFD simulations to evaluate indoor airflow patterns and pedestrian-level wind environments in courtyards.

PART THREE: Research Outcomes

- Designed occupant-centric natural ventilation strategies grounded in spatial airflow modeling, tailoring interventions to the climatic and morphological characteristics of traditional Beijing courtyard houses.
- Developed simulation-based design recommendations for enhancing microclimatic conditions, demonstrating an approach aligned with developing decision-support tools for urban planning.

PUBLICATIONS

UIA 2023 CPH World Congress	Zhongzhong Zeng and **Zichen Liang**, The Effect of the Front Porch and Loft on Natural Ventilation of the Main House in Beijing Courtyard. 2023. **Published.** doi.org/10.1007/978-3-031-36316-0_10
EDRA54 Mexico City	Zhongzhong Zeng, **Zichen Liang** and Zhang bo, Natural Ventilation in Beijing Courtyard Primary Room: A Comparison of Isolated and Non-Isolated Buildings. 2023. **Published.** doi.org/10.52202/074123-0022

SKILL SETS

Language	Fluency in both **Mandarin** and **English**, strong verbal, and written communication skills.
Programming Language	Data Analysis: Python for scientific computing, data analysis (e.g., Pandas, NumPy), machine learning (e.g., XGBoost applications), and automation of simulation workflows. Fluent Scripting: Automation using **Journal files and TUI commands** for CFD simulations
Research Skills	Data Analysis Software: SPSS, Excel, Python **CFD Simulation:** Proficient with Ansys Fluent and associated meshing tools for **RANS** simulations of urban airflow, pedestrian wind comfort and building ventilation. Foundational understanding of **LES** principles and their application in high-resolution atmospheric and urban flow modeling. Environmental Simulation: **OpenStudio,** Air Quality Modeling, Atmospheric Flow Simulation Spatial Analysis: Rhino, Grasshopper Field Research: On-site environmental data collection, occupant comfort surveys
Interpersonal	Team Leadership: Led research and technical training teams Cross-disciplinary Collaboration: Architects, engineers, sustainability consultants Academic Communication: Seminar presentations, interdisciplinary coordination Teaching and Mentoring: Fluent software training, research guidance

REFERENCES

- Zhongzhong Zeng
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