Zichen Liang

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EDUCATION

- **Beijing Jiaotong University, China** Sep. 2020 – Jan. 2024

M.Arch., Architecture in Built Environment

Thesis Topic: *A Study on Wind Environment of Effect Factors and Renewal Optimization of Traditional Residential Buildings in Dongsi Area of Beijing*

GPA: 3.7/5.0

- **Beijing University of Civil Engineering and Architecture, China** Sep. 2016 – Jul. 2020

B.Eng., Electricity Engineering in Building Electricity and Intelligence

Relevant courses include Building Electrical CAD(85); Intelligent Building Application Software Development(79);

Course Design for Building Automation System(75); with other courses showing solid academic performance.

Awards: Second Prize Scholarship for Autumn Semester 2019-2020

RESEARCH EXPERIENCE

i. Research Assistant at Prof. Zhongzhong Zeng's Group Sep. 2021 – Dec. 2023

Foundational Research Engagement:

- Attended four research seminars led by Prof. Bo Zhang, strengthening fundamentals in computational modeling, critical analysis, and academic communication.
- Reviewed literature on CFD in vernacular design, linking environmental simulation with passive climate strategies.

CFD-AI Integration and Scientific Writing:

- Applied CFD and AI models in urban climate and ventilation studies, contributing to analysis in multiple projects.
- Revised two journal papers on CFD-AI integration in building performance analysis, contributing to result interpretation, structural editing, and visual data presentation.

Leadership:

- Led **ANSYS Fluent** workshops for eight junior researchers.
- Applied CFD-based analysis to provide the research team with strategies for adapting to climate change.

ii. Project Manager at Beijing Courtyards Natural Ventilation Research Project Jun. 2022 – Dec. 2023

Step One:

• Data Collection and Cleaning

- Collected seasonal wind data, architectural parameters, and occupant feedback from traditional Beijing courtyards to support CFD model input.
- Leveraged **AI-assisted preprocessing in Python** to clean and standardize meteorological and architectural datasets for quantitative comparison against CFD simulation outputs.

Step Two:

• Numerical Modeling and Simulation

- Adjusted boundary conditions with corrected meteorological inputs to stabilize CFD outputs under complex wind scenarios.
- Extended the applicability of the **RNG k-ε model** by resolving airflow dynamics in courtyard units and interior wind fields.

• **Conclusions**

- Performed cross-validation of simulated and measured airflow, with a variance explanation rate of 70.1%.
- Strengthened the analytical pipeline by aligning simulation feedback with climate-responsive design principles.

PROFESSIONAL EXPERIENCE

i. Project Manager at China Architecture Design & Research Group, Beijing, China Aug. 2020 – Apr. 2024

- Designed comprehensive building electrical and control systems for large-scale office, public, and underground spaces (over 1 million ft^2 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.

ii. Building Physics Simulation Engineer at Essence Studio of Beijing Jiaotong University, China Jan. 2023 – Present

- Performed CFD-based modeling for 3 urban designs, 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 wind environment and proposed architectural retrofitting strategies for a hospital building.
- Applied **AI algorithms** (e.g., XGBoost) to predict building energy performance and enhance occupant comfort.

PUBLICATIONS[Google Scholar]

Zhongzhong Zeng and **Zichen Liang**, *The Effect of the Front Porch and Loft on Natural Ventilation of the Main House in Beijing Courtyar*d. 2023. Published. doi.org/10.1007/978-3-031-36316-0_10 (**UIA 2023 CPH World Congress**)

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 (**EDRA54 Mexico City**)

LANGUAGES & PROGRAMMING SKILLS

Languages: Mandarin (native), English (C1 Academic Communication Profession)

Data Analysis: Python for basic machine learning applications, big data analysis for comfort prediction

Programming language:

- Fluent Scripting: Automation using Journal files and TUI commands for CFD simulations
- Data Analysis Software: SPSS, Excel, **Python**

Simulation Software: Ansys Fluent, Meshing, **EnergyPlus, OpenStudio**

Spatial Analysis: Rhino, Grasshopper, BIM

Field Research: On-site environmental data collection, occupant comfort surveys

INTERPERSONAL

Team Leadership: Led research and technical training teams

Cross-disciplinary Collaboration: Architects, engineers, consultants, industry partners

Academic Communication: Seminar presentations, interdisciplinary coordination

Teaching and Mentoring: Fluent software training, research guidance

REFERENCES

i. Prof. Zhongzhong Zeng

Associate Professor, Deputy Head of the Architecture Department, Beijing Jiaotong University

Shangyuan Village 3, Haidian District, Beijing

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ii. Yunfei Tao

Senior Engineer, China Architecture Design & Research

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iii. Prof. Bo Zhang

Associate Professor of Landscape Architecture, Oklahoma State University

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