

# ZHOUPENG WANG

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## EDUCATION

### Tianjin University

M.Eng. - Smart Building

• Overall GPA: 88.25/100 Rank: **1st/30**

• Course: Engineering Mathematics, Data Mining, Thermodynamics, Electricity/Electronics, Architecture Design, Building Information Modeling in Architecture, Building Thermal Environment and Intelligentization

Tianjin, China

Sep. 2021 - Jun. 2024

### Hefei University of Technology

B.Eng. - Civil Engineering

• Overall GPA: 85.77/100 Rank: **26st/257**

• Courses: Advanced Mathematics, Linear Algebra, Probability Theory and Mathematical Statistics, C Programming, MATLAB Programming, Structural Mechanics, University Physics, Material Mechanics, Theoretical Mechanics, Elasticity and Finite Element Method, Fluid Mechanics, Principle of Concrete Structure, Principles of Steel Structures

Hefei, Anhui, China

Sep. 2017 - Jun. 2021

## HONORS

• Academic Scholarship, First-Class	2023, 2022, 2021
• Merit Student	2023, 2022, 2021
• Third Prize in 2022 International Solar Building Design Competition	2023
• Second Prize in The 19th China Post-graduate Mathematical Contest in Modeling	2022
• Outstanding Graduate	2021

## RESEARCH INTERESTS

AI Applications in Built Environment; High-performance Building Envelopes; Building Performance Simulation; Finite Element Simulation; Machine Learning; Deep Learning; Reinforcement Learning

## PUBLICATIONS

### [1] Predicting and extracting thermal behavior rules of hydronic thermal barrier with interpretable ensemble learning in the heating season

Guo, J., Wang, Z., Jin, Y., Li, M., and Chen, Q.

**Energy and Buildings**, 2023 (Co-first Author)

### [1] Uncertainty quantification and sensitivity analysis of energy consumption in substation buildings at the planning stage

Guo, J., Wang, Z., Li, M., and Jin, Y

**Journal of Building Performance Simulation**, 2022 (First Author in Students)

### [2] Optimized Design of Floor Plan and Components of Prefabricated Building with Energy-Cost Effect

Guo, J., Li, M., Jiang, Z., Wang, Z., and Zhou, Y

**Applied Sciences**, 2022

### [3] Energy Prediction and Optimization Based on Sequential Global Sensitivity Analysis: The Case Study of Courtyard-Style Dwellings in Cold Regions of China

Guo, J., Li, M., Jin, Y., Shi, C., and Wang, Z.

**Buildings**, 2022

### [5] Machine learning-assisted assessment and quantitative prediction of the effect of joint tolerances on thermal bridges in precast elements

Guo, J., Wang, Z., Jin, Y., Zhao, W., Li, M., Feng, H., and Chen, Q.

**Journal of Building Engineering**, 2023 (Under Review) (First Author in Students)

## PATENTS

### [1] A hydronic Thermo-active building system thermal performance prediction and mechanism extraction method and device

Guo, J., Wang, Z., Jin, Y. and Wang, J.

**China National Intellectual Property Administration**, Chinese Patent Application Number: 202310813950.5.

## RESEARCH EXPERIENCE

### Key technologies of village prefabricated house envelope system and passive house

Sep. 2021 - Mar. 2023

Funding agency: National Key R & D Program of China Sub-project

Advisors: **Prof. Juanli Guo** (School of Architecture, Tianjin University)

- Design the overall route to energy efficiency in buildings.
- Participate in the design of demonstration projects (Application of building technology).
- Conduct building performance simulations based on Grasshopper (Ladybug & Honeybee).

### **Digital design of prefabricated houses based on energy consumption and cost**

Sep. 2021 - Mar. 2022

Funding agency: Tianjin Natural Science Foundation

Advisors: **Prof. Juanli Guo** (School of Architecture, Tianjin University)

- Field research.
- Conduct building performance simulations based on Grasshopper (Ladybug & Honeybee).
- Implement multi-objective optimization based on Grasshopper (Octopus).
- Analyze the impact of thermal bridges generated by joint tolerances in prefabricated buildings on the indoor environment based on COMSOL.
- Implement linear thermal transmittance sensitivity analysis and develop linear thermal transmittance prediction models based on machine learning (Python).

### **Study on Evaluable Indicators of Green Technology for Substation Buildings**

Dec. 2021 - Dec. 2023

Funding agency: National Grid Corporation Science and Technology Project

Advisors: **Prof. Juanli Guo, Gang Liu** (School of Architecture, Tianjin University)

- Field research.
- Conduct building performance simulations based on Grasshopper (Ladybug & Honeybee).
- Implement sensitivity analysis of critical design parameters for substation buildings based on R.
- Implement thermal performance simulation of hydronic thermal activated envelopes based on COMSOL.
- Implement thermal performance prediction and rule extraction for hydronic thermal activated envelopes based on machine learning and eXplainable AI (Python).
- Develop thermal performance prediction software for hydronic thermal activated envelopes based on Python.
- Develop green design evaluation system for substation based on AHP and FCE (MATLAB).

### **Shenzhen Gangxia North Comprehensive Transportation Hub Physical Environment Study**

Dec. 2021 - Dec. 2022

Funding agency: China Railway Design Corporation

Advisors: **Prof. Juanli Guo, Zhen Xu** (School of Architecture, Tianjin University)

- Field research. Test Physical Environment.
- Analyze the impact of the atrium on the indoor physical environment (Temperature, Humidity, Illumination).
- Conduct building performance simulations based on Grasshopper (Ladybug & Honeybee) to compare with measured results.
- Propose design improvements based on measurements and simulation analysis results.

### **Shun'an Yuanda Ultra-low Energy Building Demonstration**

Sep. 2021 - Dec. 2023

Funding agency: Hebei Shun'an Yuanda Environmental Protection Technology Co., Ltd.

Advisors: **Prof. Juanli Guo, Ting Zhou** (School of Architecture, Tianjin University)

- Field research.
- Participate in the design of demonstration project.
- Conduct building performance simulations based on Grasshopper (Ladybug & Honeybee) and calculate project costs.

### **EXTRACURRICULAR ACTIVITIES**

• Member of the Student Union	Sep. 2021 - Sep.2022
• State Grid Shandong Electric Power Company, Intern	Dec. 2022 - Jun.2023
• Engaged in substation field studies.	
• China Railway Design Corporation, Intern	Jul. 2022 - Sep.2022
• Engaged in physical environment testing.	
• Longfor Group Holdings Limited	Jun. 2021 - Sep.2021
• Engaged in land site surveys.	
• Produce preliminary land judgment reports and conduct preliminary investment calculations.	

### **SKILLS & INTERESTS**

**Tools:** Energy Plus, Rhino & Grasshopper (Ladybug & Honeybee), Python, MATLAB, R, COMSOL Multiphysics, SketchUp, LATEX, CAD

**Languages:** Mandarin (Native), English (IELTS: 6.5)

**Interests:** Programming, Mathematical Modeling, Calligraphy, Photography, NBA