Rui Bo

rui.bo@ed.ac.uk

[Google Scholar] | [GitHub]

Introduction

I am Rui Bo, a second-year PhD student at the University of Edinburgh, supervised by Dr Daniel Fosas, Prof Daniel Friedrich and Dr Athanasios Angeloudis.

My PhD project aims to explore the role of building energy modelling for improved building operation, ultimately creating a digital twin-based framework for real-world applications. Throughout the process, uncertainty quantification and statistical analysis are employed to investigate trade-offs between data requirements and model complexity for improved operational applications.

Education

University of Edinburgh — United Kingdom
PhD Student, Institute for Infrastructure and Environment — *Sep. 2023 – Present*

Harbin Institute of Technology — China
Master of Engineering, GPA: 87.14/100, Rank: 1/102 — *Sep. 2021 – Jun. 2023*

Seoul National University — South Korea
Exchange Program, GPA: 90.60/100 — *Aug. 2019 – Feb. 2020*

Harbin Institute of Technology — China
Bachelor of Architecture, GPA: 88.65/100, Rank: 9/69 — *Sep. 2016 – Jun. 2021*

Awards

UKRI EPSRC Doctoral Training Partnerships
Awarded by School of Engineering, University of XXX — *Sep. 2023*

Excellent Representative of 3rd Solar Decathlon China
Awarded by Solar Decathlon China Committee — *Aug. 2023*

Outstanding Graduate of Harbin Institute of Technology
Awarded by HIT — *Jun. 2023*

National Scholarship of China
Awarded by Ministry of Education, PRC — *Nov. 2022*

Research Experience

Estates Seed Funding Project, Edinburgh University — 2024
Project Executive

- Funded by Estates Department, £5,000
- Proposed the project with the support of the PhD supervisor
- Developed a data collection framework for building energy auditing for university buildings
- Developed a uncertainty quantification tool to assess the value of information

National Key R&D Program of China — 2021 – 2022
Project Assistant

- Funded by National Natural Science Foundation of China (grant no. 52078153, £69,200)
- Investigated indoor overheating impacts from climate change
- Proposed mitigation strategies for the target region

Solar Decathlon China — 2021 – 2022
Main Participant

- Recognized as excellent representative and received Best Sustainability Award
- Conducted in-situ measurements on thermal properties of straw bale envelope

Teaching/Tutoring Experience

Tutor, University of Edinburgh Jan. 2024 – Apr. 2024

Courses: Engineering Design Tools 2

- Advised students on the design and development of their projects
- Evaluated Python assignments and provided feedback

Teaching Assistant, Shenzhen International School of Design Oct. 2022 – Jan. 2023

Courses: Data Literacy, Creative Methods

- Advised on machine learning methods (e.g., t-SNE) for data analysis
- Facilitated in-class discussions on creative methodologies

Publications

2024 —— Energy

Liu, X., Yang, H., Wang, C., Shen, C., **Bo, R.**, Hinkle, L., Wang, J., 2023. Semi-experimental investigation on the energy performance of photovoltaic double skin façade with different façade materials. *Energy* 295, 131049. https://doi.org/10.1016/j.energy.2024.131049

2023 —— Energy and Buildings

Bo, R., Zhang, H., Ma, Z., Yin, R., Li, A. and Yin, X., 2023. Straw bale construction towards nearly-zero energy building design with low carbon emission in northern China. *Energy and Buildings* 298, 113555. https://doi.org/10.1016/j.enbuild.2023.113555

2023 —— Energy

Liu, X., Shen, C., **Bo, R.**, Wang, J. and Ardabili, N.G., 2023. Experimental investigation on the operation performance of photovoltaic double skin façade in winter. *Energy* 283, 129040. https://doi.org/10.1016/j.energy.2023.129040

2022 —— Building and Environment

Bo, R., Chang, W.-S., Yu, Y., Xu, Y. and Guo, H., 2022. Overheating of residential buildings in the severe cold and cold regions of China: The gap between building policy and performance. *Building and Environment* 225, 109601. https://doi.org/10.1016/j.buildenv.2022.109601

2022 —— Buildings

Bo, R., Shao, Y., Xu, Y., Yu, Y., Guo, H. and Chang, W.-S., 2022. Research on the Relationship between Thermal Insulation Thickness and Summer Overheating Risk: A Case Study in Severe Cold and Cold Regions of China. *Buildings* 12(7), 1032. https://www.mdpi.com/2075-5309/12/7/1032

2022 —— Buildings

Xu, Y., **Bo, R.**, Chang, W.-S., Guo, H. and Shao, Y., 2022. The Use of Horizontal Shading Devices to Alleviate Overheating in Residential Buildings in the Severe Cold Region and Cold Region of China. *Buildings* 12(4), 408. https://www.mdpi.com/2075-5309/12/4/408

2020 —— Sustainability

Dong, Y., Qin, T., Zhou, S., Huang, L., **Bo, R.**, Guo, H. and Yin, X., 2020. Comparative Whole Building Life Cycle Assessment of Energy Saving and Carbon Reduction Performance of Reinforced Concrete and Timber Stadiums—A Case Study in China. *Sustainability* 12(4), 1566. https://www.mdpi.com/2071-1050/12/4/1566

Technical Skills

Simulation Tools: EnergyPlus, IESVE
Programming language: Python (Preferred), Julia, R
Design Software: Rhino/Grasshopper, SketchUp, BIM/Revit, AutoCAD