Wenhao Zhang

PhD candidate at National University of Singapore *Updated November 13, 2025*

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Research Interests

Machine learning; Human-building interaction; Reinforcement learning; Energy efficient control; Indoor thermal comfort

Education

National University of Singapore Singapore
PhD in Built Environment *Jan 2024 – Present*
Supervisors: Prof Clayton Miller, Prof Adrian Chong, Prof Stefano Schiavon.

University College London London, UK
MSc Smart Buildings and Digital Engineering *Sep 2022 – Sep 2023*
Supervisor: Dr Rui Tang. *Degree: Distinction (Rank: 1/44).*

University of Nottingham China & UK
BEng Hons Architectural Environment Engineering *Sep 2017 – Jul 2021*
Supervisor: Dr Zhiang Zhang. *Degree: First-Class Honours (Rank: 3/67).*

Honors and Scholarships

Gold Medal (Global AI Challenge for Building E&M Facilities) 2025
Most Efficient AI Algorithm Award (Global AI Challenge for Building E&M Facilities) 2025
NUS Research Scholarship (National University of Singapore) 2024
UCL Best Overall Degree Mark Award (University College London) 2023
DesignBuilder Award (DesignBuilder Software Ltd.) 2023
Dean's Scholarship (University of Nottingham) 2021
Head's Scholarship (University of Nottingham) 2020

Journal Publications

Recommender Systems and Reinforcement Learning for Building Control and Occupant Interaction: A Text-Mining Driven Review of Scientific Literature
Wenhao Zhang, Matias Quintana, and Clayton Miller.
Energy and Buildings, 2024. (Link)

Reinforcement Learning in Building Controls: a Comparative Study of Algorithms Considering Model Availability and Policy Representation
Ziyan Wu, **Wenhao Zhang**, Rui Tang, Huilong Wang, and Ivan Korolija.
Journal of Building Engineering, 2024. (Link)

Conference Publications

Poster Abstract: Field evaluation of body thermoregulation-based dynamic bedroom air temperature control to improve sleep
Wenhao Zhang, Stefano Schiavon, and Clayton Miller.
BUILDSYS '25, 2025. (Link)

Wrist to Rest: A pilot study to characterize sleep habits and bedroom environments using scalable watch-based microsurveys
Clayton Miller, Yun Xuan Chua, Mario Frei, **Wenhao Zhang**, May Moe Kyaw, Jia Xu Seah, Xiaojun Fan, Tom Parkinson, Hui Zhang, June Lo, Jason Lee, and Stefano Schiavon.
CISBAT 2025, 2025. (Link)

Bedroom ventilation and air quality during sleep: Insights from a pilot field study in Singapore
Xiaojun Fan, **Wenhao Zhang**, Raagavi Mani, Clayton Miller, Tom Parkinson, June Lo, Jason Lee, Hui Zhang, and Stefano Schiavon.
Healthy Building Conference 2025, 2025. (Link)

Energy Efficient Operation Optimization of Building Air-conditioners via Simulator-assisted Asynchronous Reinforcement Learning
Wenhao Zhang, and Zhiang Zhang.
IOP Conference Series Earth and Environmental Science, 2022. (Link)

Research Projects

HEATS: Heat Exposure, AcTivity, and Sleep Field Study
PIs: Prof Stefano Schiavon (UC Berkeley) Jan 2024 – Present
Prof Jason Lee (National University of Singapore)
Prof Clayton Miller (Singapore Management University)
Dr Thomas Parkinson (The University of Sydney)
Prof June Lo (National University of Singapore)
Prof Hui Zhang (UC Berkeley)
This field study investigates how cumulative heat exposure affects sleep and physical activity among working-age Singaporeans. In this research, a body thermoregulation-based bedroom air temperature control framework and a Just-in-Time Adaptive Intervention (JITAI) model will be developed and evaluated to enhance occupants' sleep in typical Singapore residential buildings.

Comparative Study of Model-Based and Model-Free Reinforcement Learning Control Performance in HVAC Systems
PI: Dr Rui Tang (University College London) May 2023 – Jan 2024
This research conducts the comparison of model-based and model-free reinforcement learning control strategies in HVAC systems. It focuses on analyzing their performance in terms of energy efficiency and indoor comfort. Results indicate both strategies significantly outperform traditional controls, with model-free showing greater resilience to disturbances.

Deep Reinforcement Learning for Energy-Efficient Control of Variable Refrigerant Flow HVAC Systems
PI: Dr Zhiang Zhang (University of Nottingham) Sep 2019 – Jun 2020
Developed an energy efficient operation strategy for VRF system during the cooling season for a case office and achieved energy savings of up to 16.1% as well as improved thermal comfort compared to a rule-based control strategy.

Employment

DesignBuilder Software Ltd. London, UK
Technical Writer (Contrator) Aug 2023 – Jan 2024
Develop DesignBuilder Scripting Basics training content covering EMS and Python Scripting for runtime, pre and postprocessing of simulations along with DesignBuilder API.

China Academy of Building Research Shanghai, China
Energy Consultant (Full-time) Oct 2021 – Aug 2022
Participated in developing building energy simulation software (PKPM), and the design of ultra-low energy buildings with information technology.

Services

Web Chair
13th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys 2026)

Skills

Programming
Proficient in: Python (scikit-learn, Gym, TensorFlow, Word2Vec, NLTK).
Familiar with: AWS Lambda, InfluxDB, C#, MATLAB, Modelica.

Languages
Chinese (Native), English (Proficient).