Wei Liang, P.E., Ph.D.

+65 87434325/+1 2017441353 — weiliang_ucmu@outlook.com — linkedin.com/in/wadeliang/ — https://github.com/LW-G38

Passionate and highly skilled research and industrial professional with extensive interdisciplinary experience in building energy modeling, machine learning, and building systems and controls. Proven track record in managing research projects, designing building systems, developing and deploying tangible models and optimal controls to enhance building decarbonization and occupancy comfort. Looking for challenging roles that collaborate with cross-functional teams to translate research findings into practical solutions for industry applications.

Skills

Coding Python, MATLAB, Julia, R, Pytorch
BAS AutomatedLogic, Honeywell, Siemens, Niagara
Tools Git, ROS, Docker, BIM 360, Trane Trace 700
BEM IES VE, E+, DesignBuilder, Modelica, eQuest
Drawing Autodesk Revit, AutoCAD, BlueBeam
Typesetting LaTeX, Microsoft Office, Pages, Sublime Text
OS MacOS, Windows, Ubuntu, Raspbian
Database InfluxDB, HeidiSQL

Experience

National University of Singapore, Singapore **Jul 2024 – Now**
Research Fellow

- Developed an inverse reinforcement-learning framework for mixed-mode ventilation (MMV) systems to handle controls over complex objectives (energy saving, thermal comfort, and weather resiliency)
- Deployed a rule-based control algorithm for MMV systems using the NETx automation API and implemented it in an actual building with a Honeywell Thermal IQ system, achieving a 48% energy reduction
- Led interdisciplinary research projects, including collaborating with overseas institutions, coordinating with industrial partners and research collaborators, and supervising Ph.D. students
- Authored major portions of successful proposals for funding from institutional, national, and international foundations

Carnegie Mellon University, Pittsburgh, PA, USA **Aug 2019 – May 2024**
Research Assistant/Sole Instructor

- Developed a mobile sensing platform for indoor environmental quality (IEQ) assessment using Raspberry Pi and TurtleBot3 and leveraging MQTT and InfluxDB for robust data handling
- Implemented a visual SLAM-based framework using RGB-D and thermal cameras for spatial thermal comfort mapping, which is difficult to achieve using traditional measuring methods.
- Designed an integrated Iterative Learning Control (ILC) and Model Predictive Control (MPC) approach for thermal control in VAV reheat systems, achieving fast convergence in less than three days considering model discrepancies
- Built data-driven models for IEQ assessments using Gaussian Process (GP), achieving high accuracy in spatiotemporal temperature predictions with less than 0.2°C error
- Sole instructor for three years of the graduate core course *Building Performance Modeling*

Lawrence Berkeley National Laboratory, Berkeley, CA, USA **May 2023 — Aug 2023**
Ph.D. Researcher

- Developed a novel physics-consistent neural network-based MPC to optimize energy flexibility in tropical office buildings
- Designed an optimal control framework with on-site renewable energy and energy storage, demonstrating 20% self-sufficiency improvement

Pacific Northwest National Laboratory, Richland, WA, USA **Oct 2022 — May 2023**
Ph.D. Researcher

- Created a gradient-boosting-based machine learning framework for accurate (less than 10% prediction error) energy consumption predictions over weeks for packaged air conditioning units with limited information

Gayner Engineers, San Francisco, CA, USA **Jul 2015 – Jul 2019**
Mechanical Engineer

- HVAC System and Building Automation System (BAS) design for critical commercial buildings of healthcare, life science laboratory, library, and higher education
- Building energy simulations and sustainability coordination for green building rating systems (LEED, EnergyStar, California Title 24, and ASHRAE 90.1)
- Commissioned and Energy Audited MEP and medical equipment for healthcare and laboratory buildings
- Drawing production, team coordination, and project management
- Developed Python-based API and scripts for BAS data collection, CAD, and energy simulation software to improve working efficiency (First in the company to do so)

Education

Ph.D. in Building Performance and Diagnostics *Carnegie Mellon University, Pittsburgh, PA, USA*
Master of Science in Mechanical Engineering *University of California, Merced, CA, USA*
Bachelor of Science in Acoustics *Nanjing University, Jiangsu, China*

Certifications

Professional Mechanical Engineer, M 38549 *Board for Professional Engineers, Land Surveyors, and Geologists - California*
LEED AP BD+C, 109966178-AP-BD+C *Green Business Certification Inc.*
Deep Learning Specialization, 4LJHJDPJMNVS *Coursera*

Organization

Full Member, American Society of Heating, Refrigeration, and Air-conditioning Engineers **Feb 2016 – Now**
Individual Member, International Building Performance Simulation Association **Dec 2024 – Now**

Selected Publications

1. **Wei Liang**, Yiting Zhang, Adrian Chong, Erica Cochran Hameen, and Vivian Loftness. Exploring gaussian process regression for indoor environmental quality: Spatiotemporal thermal and air quality modeling with mobile sensing. *Building and Environment*, In Press:113143, 2025

2. **Wei Liang** and Adrian Chong. Learning adaptive mixed-mode ventilation policies via adversarial inverse reinforcement learning. In *ICML 2025 CO-BUILD Workshop on Computational Optimization of Buildings*, 2025

3. **Wei Liang**, Han Li, Sicheng Zhan, Adrian Chong, and Tianzhen Hong. Energy flexibility quantification of a tropical net-zero office building using physically consistent neural network-based model predictive control. *Advances in Applied Energy*, 14:100167, 2024

4. Irfan Qaisar, **Wei Liang**, Kailai Sun, Tian Xing, and Qianchuan Zhao. An experimental comparative study of energy saving based on occupancy-centric control in smart buildings. *Building and Environment*, 268:112322, 2024

5. **Wei Liang**, Yiting Zhang, Ji Zhang, and Erica Cochran Hameen. An expeditious spatial mean radiant temperature mapping framework using visual slam and semantic segmentation, 2024. Accepted by 2024 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop

6. **Wei Liang** and Michael R Brambley. Event-based energy impact tracking and forecasting with limited measurements for rooftop units. *ASHRAE Transactions*, pages 239–248, 2024

7. Ruoxin Xiong, Ying Shi, Haoming Jing, **Wei Liang**, Yorie Nakahira, and Pingbo Tang. Calibrating subjective data biases and model predictive uncertainties in machine learning-based thermal perception predictions. *Building and Environment*, 247:111053, 2024

8. **Wei Liang**, Sizhe Ma, Erica Cochran, and Katherine A Flanigan. Distributed mpc-ilc thermal control design for large-scale multi-zone building hvac system. *ACM SIGENERGY Energy Informatics Review*, 3(2):34–46, 2023

9. **Wei Liang**, Sizhe Ma, Erica Cochran Hameen, and Katherine Flanigan. Integrated mpc-ilc control design for thermal control of a large-scale variable air volume reheat systems in buildings. In *Proceedings of the 9th ACM international conference on systems for energy-efficient buildings, cities, and transportation*, 2022

10. **Wei Liang**, Ruoxin Xiong, Pengkun Liu, Pingbo Tang, and Erica Cochran Hameen. Improving post-occupancy evaluation engagement using social robots. In *Proceedings of the 9th ACM international conference on systems for energy-efficient buildings, cities, and transportation*, 2022

11. Eric Kumar, Erica Cochran Hameen, and **Wei Liang**. Global marginal carbon footprint evaluation of internet services with building energy models. In *BuildSIM-Nordic 2020*. IBPSA-Nordic, SINTEF Academic Press, 2020

12. **Wei Liang**, Rebecca Quinte, Xiaobao Jia, and Jian-Qiao Sun. MPC control for improving energy efficiency of a building air handler for multi-zone VAVs. *Building and Environment*, 92:256–268, 2015