

# Towards Efficient Operations of Building Systems Aligned with Human Preference

Buildings consume 30% of global energy while hosting occupants for 90% of their time, highlighting the critical need for creating comfortable and energy-efficient built environments. Traditional building control systems rely on static comfort models that often fail to capture real-time occupant preferences, while manual tuning of control parameters such as heating power limits results in suboptimal energy usage. To address these challenges, this talk introduces a novel framework integrating online preference learning with closed-loop performance optimization, enabling adaptive and cost-effective building operations. A case study in a residential setting demonstrates electricity bill savings of up to 27% compared to default controllers. Additionally, our methods won the 2024 BOPTEST Challenge for Smart Building HVAC Control, setting a new benchmark for intelligent building energy management.



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3.00PM – 4:00PM



**Seminar Link:** <https://cityu.zoom.us/j/86009118024>

Speaker

**Mr Wenjie XU**

Wenjie Xu is a final-year PhD student at EPFL, supervised by Prof. Colin N. Jones and Dr. Bratislav Svetozarevic. His research lies at the intersection of optimization, machine learning, and control, with a focus on efficient design and operations of cyber-physical-human systems, particularly in building systems. He is a recipient of the Chinese Government Award for Outstanding Self-financed Students Abroad for his research contributions.



*Enquiry: 3442 8422 | All are welcome*