

Integration and Optimization of Building Loads for Grid-Interactive Efficient Buildings



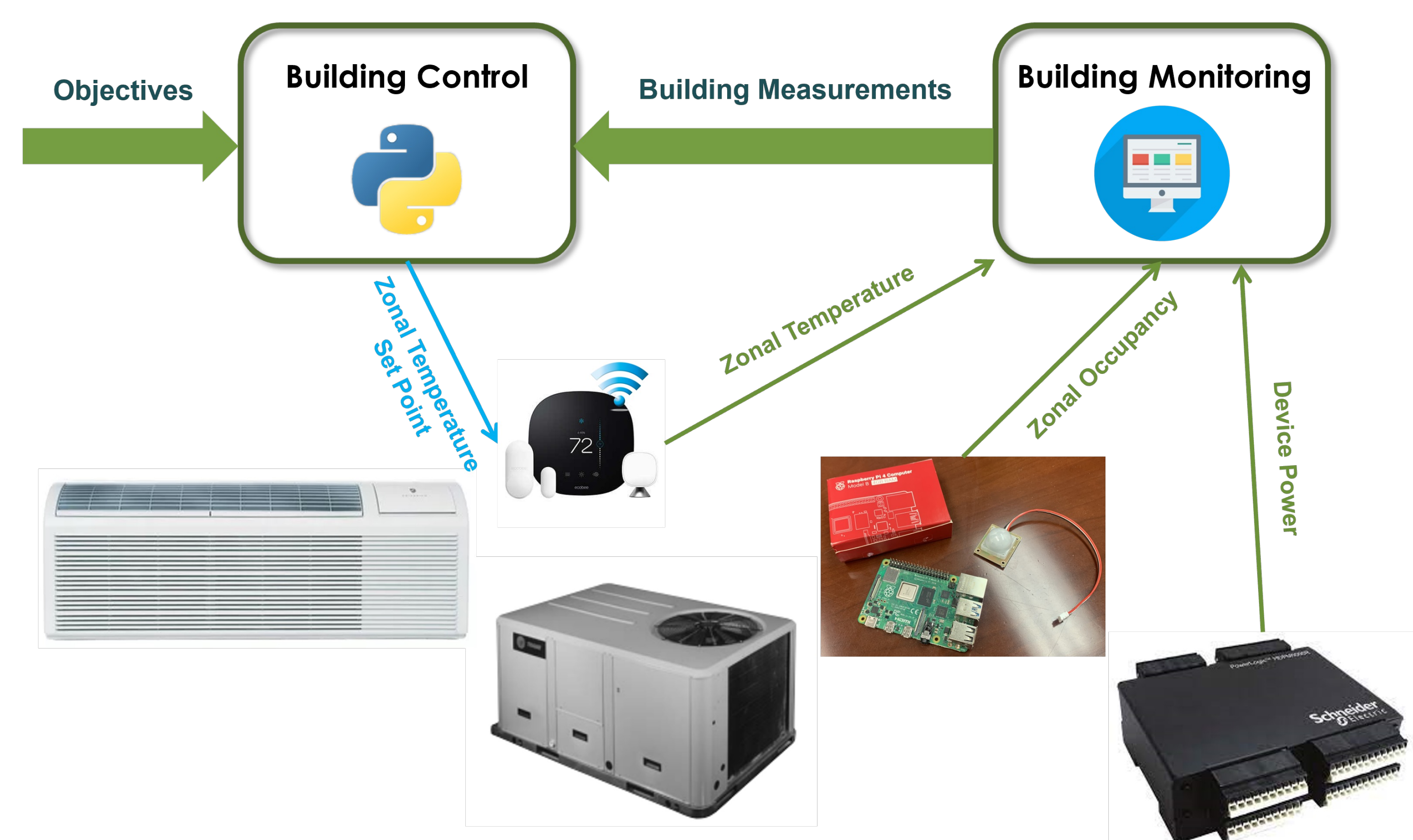
Jamie Lian, Distinguished R&D Staff and Group Leader

Project Objective

- Implement and validate an advanced, grid-interactive monitoring and control system that integrates and optimizes Internet-connected building loads
- Deliver a low-cost, scalable building energy management solution that overcomes barriers to demand response from small and medium-sized commercial buildings

Technical Approach

- Identified Building 3147 at ORNL as test site for advanced controls, with permission from ORNL's Facilities and Operations Directorate and Institutional Review Board
- Retrofitted existing HVAC control system with new Ecobee thermostats and power submetering
- Designed advanced model predictive control based on control-oriented building energy models
- Built a cloud-based control platform with web portal for building visualization and control customization with user preferences and grid signals
- Conducting field measurement/verification to test/validate performance



Major Impact

- Create new capabilities for utility-led energy efficiency and demand response flexibility, tailored especially for new and retrofit small- and medium-sized commercial buildings that achieve at least 750 TBtu/year in national energy savings by 2030

