

# Stephen Bourne, Ph.D. Student (Advised by Dr. Atila Novoselac)

**IGERT Affiliate**

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## Ongoing Research Work

### 1) Small-Scale PCM-based Active Thermal Store

- Use to reduce peak energy demand
- Combine with smart-grid enabled controls

#### Goals

- Simplified parametric model for store optimization
  - encapsulation shape/size
  - flow rate vs. energy recovery rate
  - overall capacity vs. cyclic capacity
- Design guidelines for future applications
- Design validation through experimentation
  - Development occurring at the Façade Thermal Lab



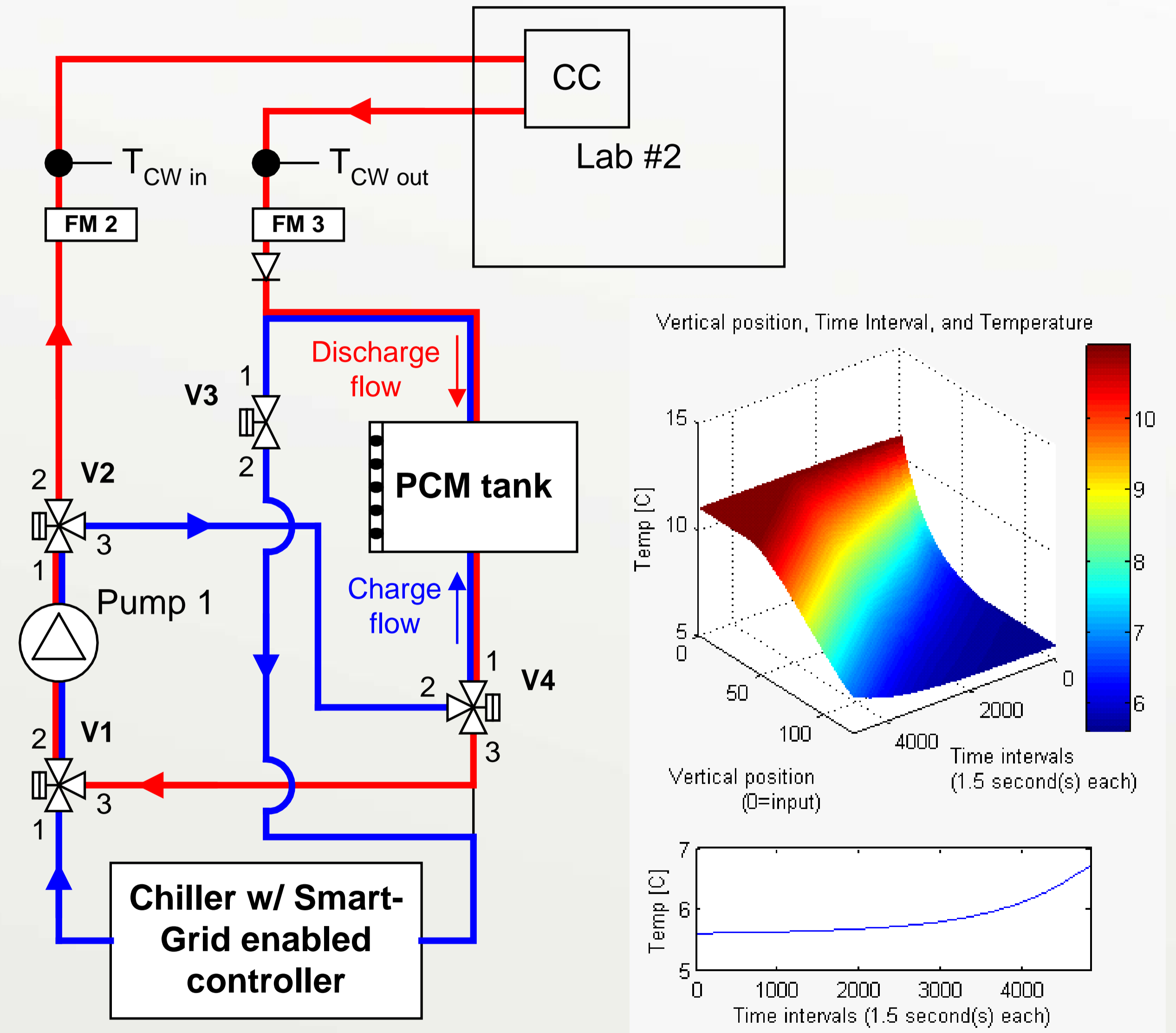
Experiment Site - Façade Thermal Labs



## Building Energy & Environments

THE UNIVERSITY OF TEXAS AT AUSTIN

Department of Civil, Architectural and Environmental Engineering



Active PCM Thermal Store -  
Operating Modes and Basic Thermal Model Results

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## Ongoing Research Work

### 2) PCM Integration Into Building Materials

- Reduce peak energy demand
- Combine passive elements with PCM-aware HVAC system

#### Goals

- Quantification of PCM performance
  - Determine effects of location, material
  - Test impact of semi-active, PCM-aware controls
- Model PCM charge/discharge cycles
- Develop charge & status verification tools
- Integrate controls into Smart-grid enabled controls



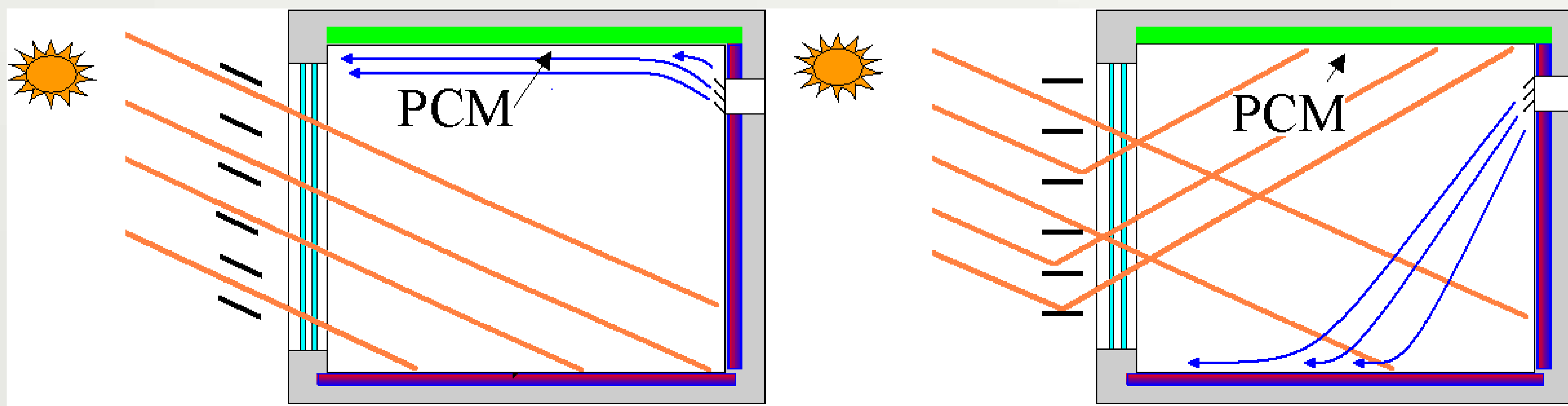
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Application of semi-active controls for passive ceiling tile PCM