

# Case Study of Modeling and Control in Energy-Efficient Buildings



## What

- Develop online resource center to host case studies.
- Create educational material for researchers to learn popular simulation software in the field.

## Why

- This proposal intends to develop an online resource center to host several case studies of modeling and control in energy-efficient buildings. This will create educational material for researchers to learn some popular simulation software in the field, and to test control and optimization methodologies on some real test beds. Such hands-on experience will greatly help the users to enter the field.

## How

- We will create case studies for learning the simulation software, EnergyPlus and TRNSYS. Many efforts have been directed into the field of building design optimization concerning building energy performance. In this field, the whole building energy simulation program EnergyPlus and TRNSYS have been extensively used and validated, facilitating related engineering and researches. In this project we will provide materials helping beginners to gain a primary experience on how to use EnergyPlus and TRNSYS to estimate buildings energy consumptions, to design energy-efficient buildings, and to evaluate the effectiveness of HVAC systems control laws.

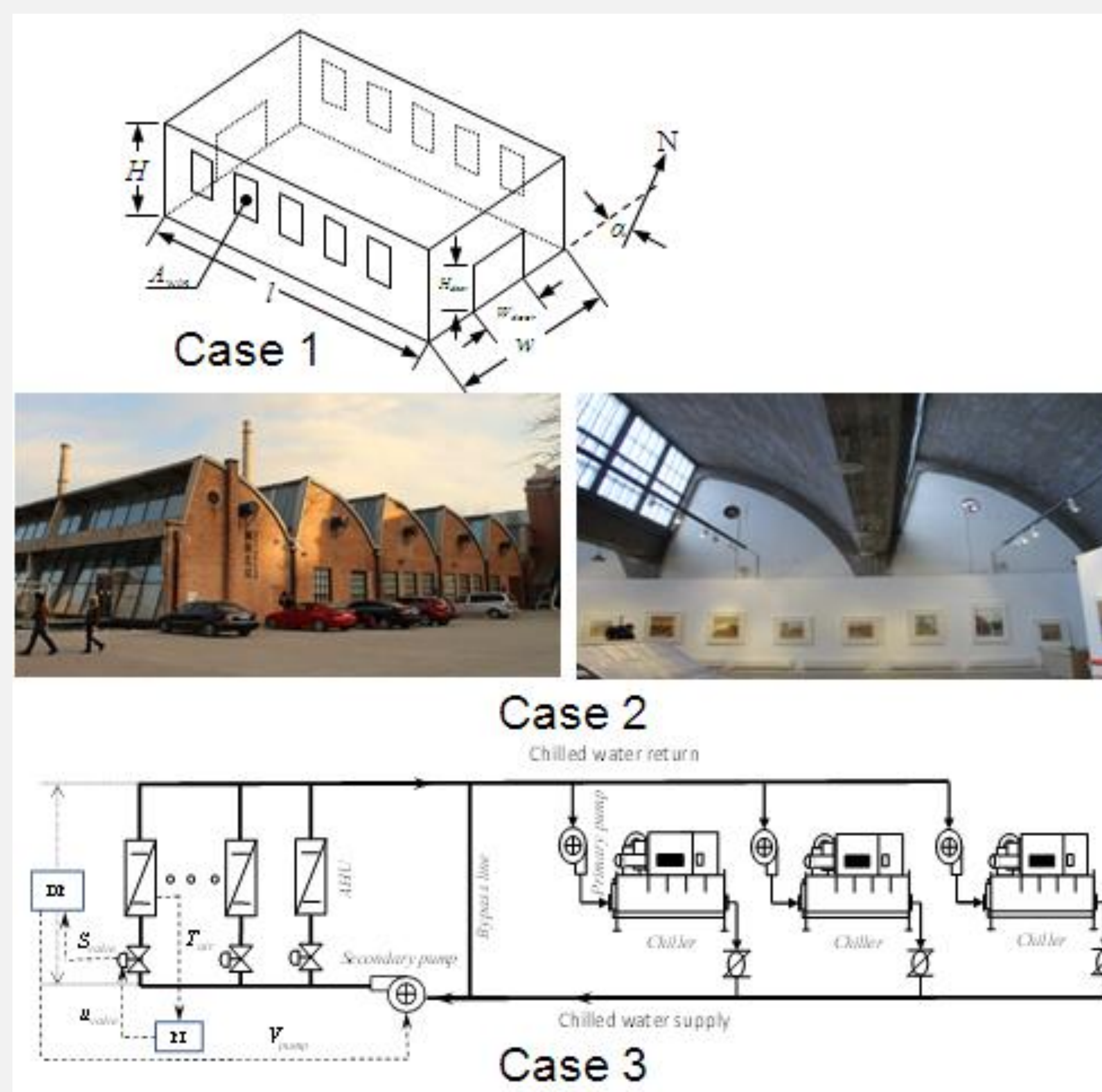
- For testing the control methods in energy-efficient buildings, we will leverage existing platforms. The user will be able to download real data that is collected in real buildings, and to test their control methodologies in these testbeds (after online approval of access request).

- Case 1: Building envelope design for a single-zone welding shop. (EnergyPlus)

- Case 2: Investigate the value of a north-light roof in lowering building energy consumption. (EnergyPlus)

- Case 3: Multiple-chiller plant simulation platform. (TRNSYS)

- Host links to various existing testbeds
- KTH-ACL HVAC Testbed
- USC Human-Building Interaction Apps



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## Who

Qianchuan Zhao  
Karl H. Johansson  
Henrik Sandberg  
(Samuel) Qing-Shan Jia  
Li Xia  
Gongsheng Huang  
Alessandra Parisio  
Marco Molinari  
Damiano Varagnolo  
Hao Liu  
Ying Shen

**Contact:** (Samuel) Qing-Shan Jia