**Course**  
COA 8685 Building Simulation Seminar (PhD level)

**Time**  
FRI 12-2:45; Hinman 228 (Time can be changed in consultation with students)

**Instructor**  
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**Synopsis**  
Knowledge of physical transport phenomena in buildings.  
Basic knowledge of the functional role and technical aspects of building systems with emphasis on heat and mass transport inside and around buildings.  
Intermediate level in calculus and physics

The course will closely follow selected chapters from the two textbooks.  
The course explores the following topics each supported by a selected chapter:  
- introduction and trends in building simulation  
- handling of uncertainty  
- performance based design and operation  
- the role of weather data  
- integrated airflow simulation and (hybrid) ventilation aspects  
- HVAC systems performance  
- integration of simulation in design  
- urban energy simulation  
- lighting simulation  
- acoustics  
- thermal comfort  
The course will focus on research methods and state of the art in each of these areas and concentrate on: (1) next generation simulation platforms, (2) uncertainty analysis of building energy models, (3) frontiers in interoperability of simulation in building design (4) the simulation of air flows in and around buildings

**Learning Objectives**  
Students get familiar with state of the art theories and methods in building simulation research, with emphasis on the current state and future directions in simulation methods, tools and computational methods.  
An advanced understanding of the frontiers in building simulation research is acquired.

**Reading**  
Other material.

**Course Assignments and grading**  
Each topic will be introduced in class based on assigned reading followed by discussion of ongoing research efforts and PhD theses from around the globe.  
At mid and end-term we will have students present in a topic that is not well covered in the textbooks. A particular book or article or hypothesis will be presented by a student, followed by discussion. The final assignment will require students to write a research proposal which pushes the envelope of current building simulation research in an assigned area.