OUTLINE

- Who am I?
- My interests
- My research topic
- Current approaches
- Hypothesis
- Output
- Q&A
HISTORY

- Manchester
- Nottingham
- Computer Science and Management Studies
- Graduate Software developer at RomaxTechnology
- Horizon DTC
MY RESEARCH INTERESTS

• Energy Savings
• Simulation
• Built Environment
• Cloud
• Built Environment

• Darren Robinson, Peer-Olaf Siebers

• Multi-Agent Stochastic Simulation of Occupants Comfort and Behaviour
BUILDING SIMULATION

- Building performance simulation
- Model heating, cooling, lighting, ventilating, and water usage, as well as carbon emissions
- Effects of different materials on performance
- Yearly simulations
- Thermal Comfort
CURRENT LIMITATIONS

• Occupants are deterministic profiles

Schedule: Compact,

  OCCUPY-1, !- Name

  Fraction, !- Schedule Type Limits Name

  Through: 12/31, !- Field 1

  For: WeekDays SummerDesignDay CustomDay1 CustomDay2, !- Field 2

  Until: 8:00, 0.0, !- Field 3

  Until: 11:00, 1.00, !- Field 5

  Until: 12:00, 0.80, !- Field 7

  Until: 13:00, 0.40, !- Field 9

  Until: 14:00, 0.80, !- Field 11

  Until: 18:00, 1.00, !- Field 13

  Until: 19:00, 0.50, !- Field 15

  Until: 24:00, 0.0, !- Field 17

  For: Weekends WinterDesignDay Holiday, !- Field 19

  Until: 24:00, 0.0; !- Field 20

• Diversity?
• Stochastic?
CURRENT LIMITATIONS

• Thermal sensation

• Fanger predicted mean vote (PMV)

Thermal comfort (Fanger, P. O. 1970)

• Adaptive model

Acceptable operative temperature ranges for naturally conditioned spaces (ASHRAE Standard 55-2010)
HYPOTHESIS

- A coherent basis for rigorous prediction of a building's performance is the multi-agent stochastic simulation of peoples' presence, comfort and behaviour within a building simulation environment.
WHY AGENTS?

• Archetypes used to build occupant diversity into model

• Agents to encapsulate the stochastic nature of individuals e.g. when do they perform certain actions/ react to certain stimuli

• Sense the environment
OBJECTIVES

• To develop archetypes and a template for use in agent based simulation of occupants comfort and behaviour

• Integration of stochastic models into agent templates for use in building simulation software

• Develop a building simulation solution that encapsulates the stochastic models within agents and produces a richer set of results than previous methods
THANK YOU

- Questions