

## Rocky Mountain INFORMS: March 6, 2024

The Rocky Mountain INFORMS Chapter is pleased to host Professor Bianca Howard, an Assistant Professor in the Department of Mechanical Engineering at Columbia University where she directs the Building Energy Research Laboratory. Her research uses building physics, optimization, and machine learning to develop tools to enable building decarbonization. Dr. Howard received her BS in Mechanical Engineering from the University of Nebraska and her MS and PhD in Mechanical Engineering from Columbia University. She held positions as a postdoctoral researcher at Imperial College London and lecturer (assistant professor) at Loughborough University in the UK. Dr. Howard has been awarded fellowships throughout her career (NSF IGERT fellowship for her PhD and UK ESRC Innovation Fellowship during her time at Loughborough), contributed expertise to city councils and working groups, facilitated academic exchange by chairing the IBPSA England Chapters Biannual Conference “Building Simulation and Optimization,” and teaches building science and energy modeling to the next generation of engineers and architects.



### **Income-aware Residential Building Stock Retrofit Strategies through Constrained Multi-Objective Optimization**

**Abstract:** Policy makers are looking to determine how best to retrofit homes to maximize greenhouse gas emission reductions to understand and generate policies and regulatory design. Often underpinning this analysis, for example, New York City’s Building Decarbonization Plan, is a physics-based building stock model used to evaluate the effects of retrofit measures for cost and carbon as decided by engineering judgement. Subsequently, measures of other social interest, such as affordability, are considered. Our work seeks to develop a methodology to pair extensive building stock models with evolutionary algorithms to (1) generate optimal solutions instead of relying on engineering judgement; and, (2) incorporate additional measures of social interest directly into the optimization to enable a holistic evaluation. In this talk, I will present work to develop an EnergyPlus-based building stock model for the English housing stock, the use of sequential Pareto optimization to generate decarbonization pathways, and solution contrasts when considering fuel poverty constraints.

**Zoom Option on Next Page**

anewman@mines.edu is inviting you to a scheduled Zoom meeting.

Topic: RMIC-Howard

Time: Mar 6, 2024 06:00 PM Mountain Time (US and Canada)

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