Faculty Name:

Bianca Howard

Faculty Email:

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Lab:

Building Energy Research Laboratory

Project Title:

Evaluating Illumination Algorithms for Building Retrofit Analysis

Description:

This research project will explore the application of illumination algorithms, such as MAP-Elites, to building energy retrofit analysis. Illumination algorithms provide the opportunity to search for the best solutions with different behavior. In building energy retrofit analysis, often multi-objective optimization is used to find the pareto optimal solutions. However, ultimately decision makers must decide which sets of measures to actually implement. Within their decision, there are typically evaluation criteria not directly incorporated into the optimization. Illumination algorithms will enable these behavioral criteria to be directly incorporated in to the analysis. The research project will compare the results in determining the optimal retrofit options of three different building types using traditional optimization methods and illumination algorithms. Retrofit measures will include incorporating additional insulation, high performance windows, different HVAC system configurations and distributed generation. The aim is to view the diversity of “good” options for retrofitting a building to meet decarbonization goals.

Location of Research:

Hybrid (both remote and on-site)

# of hrs/week:

40

Department/Program:

Mechanical Engineering

Eligibility:

BS, Third Year, BS, Fourth Year

To apply, please contact:

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