Hobos in the Catbird Heat

A measurement of comfort parameters in two loft spaces at the Atlantic Center for the Arts, August 5, 2005.

David Driskill

Jack Elliott

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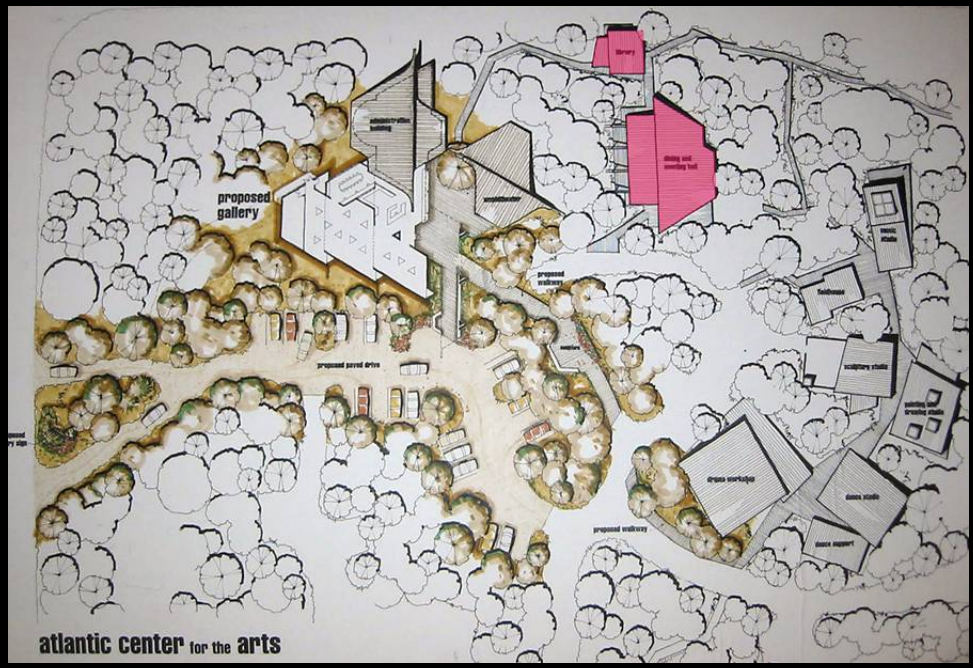
GTF Trainer: Emily Wright

Faculty Advisor: Bob Koester



Atlantic Center for the Arts: Test sites in red.

Atlantic Center for the Arts: Palmetto forest in front of dining hall.

Main space in the dining hall: view looking east.

Loft space in the dining hall: view looking west.

Main space in the library: view looking west.

Loft space in the library: view looking northwest.

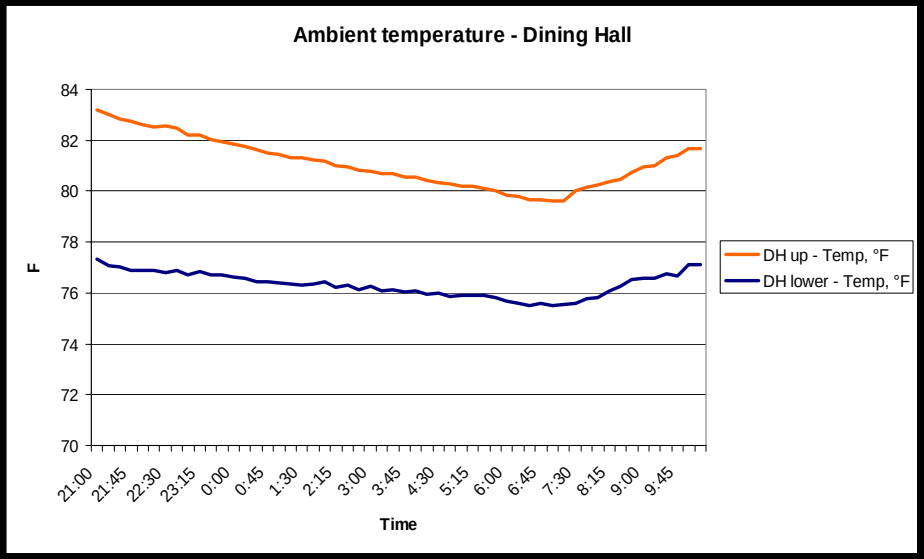
Project Hypothesis

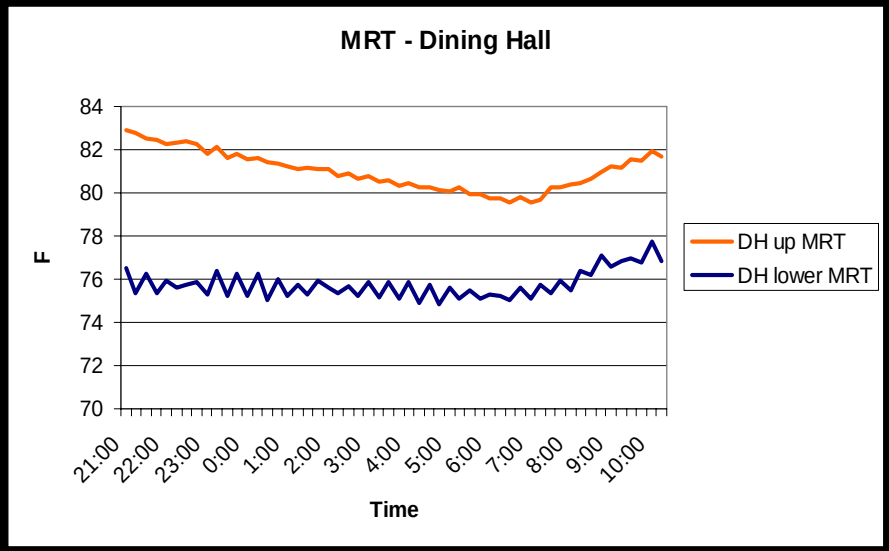
The loft (catbird) spaces in both the library and the dining hall will have higher ambient and mean radiant temperatures with lower relative humidities than the main levels of the buildings.

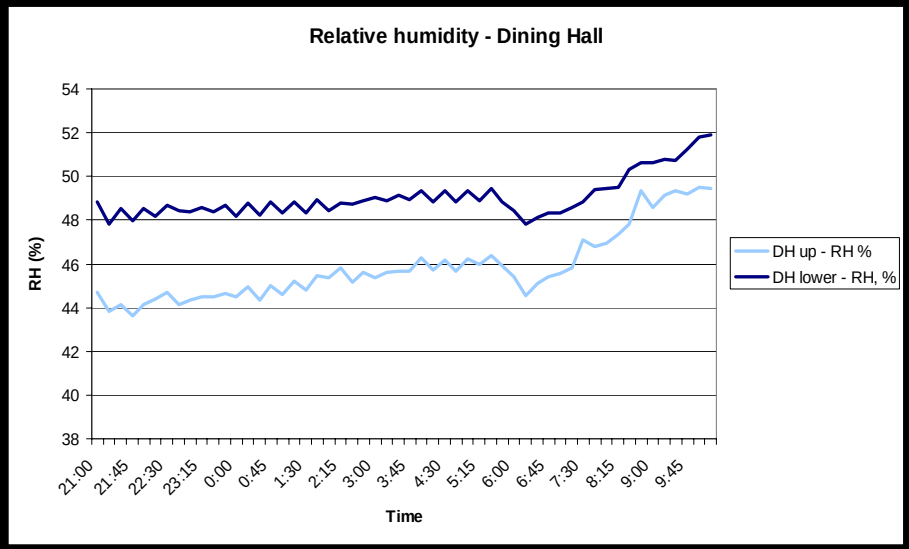
Project Methodologies

1. The Mean Radiant Temperature (MRT) at the center of the main levels and upper levels were measured every 15 minutes by a HOBO U12 installed 57.5" above the floor level.
2. The ambient air temperature and relative humidity at the center of both the main levels and upper levels were measured by a HOBO U12 installed 36" above the floor level.

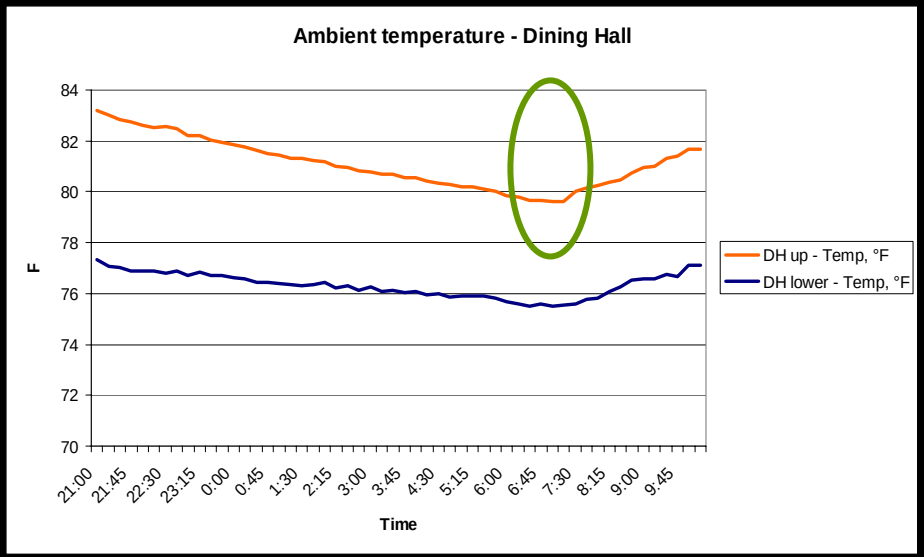
Data Analysis—Dining Hall

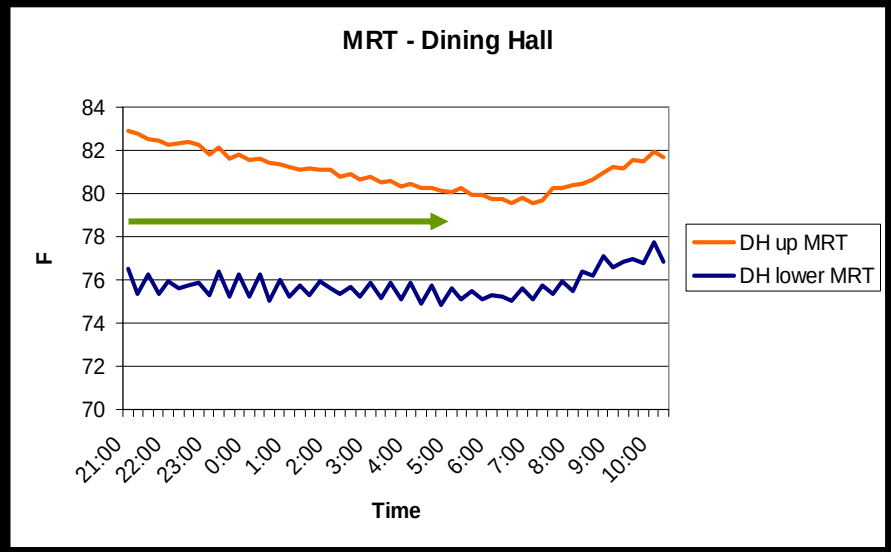


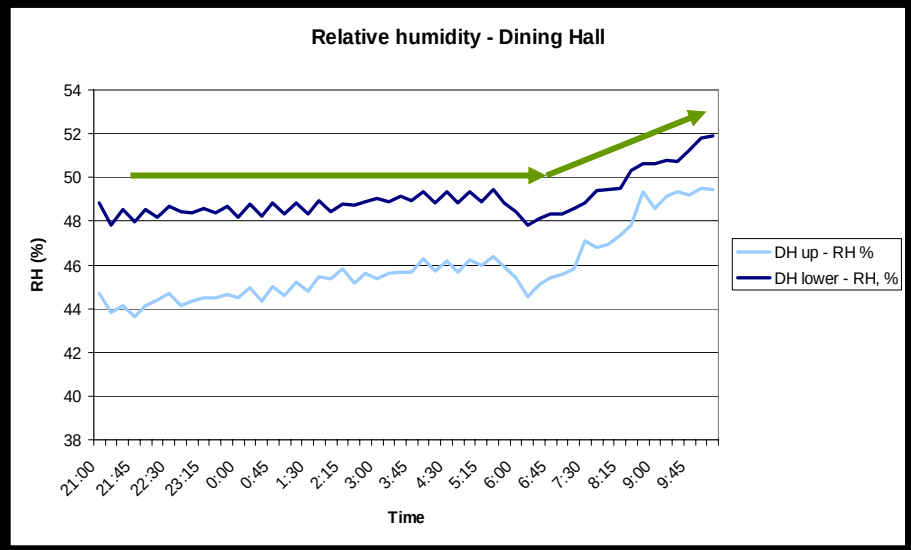




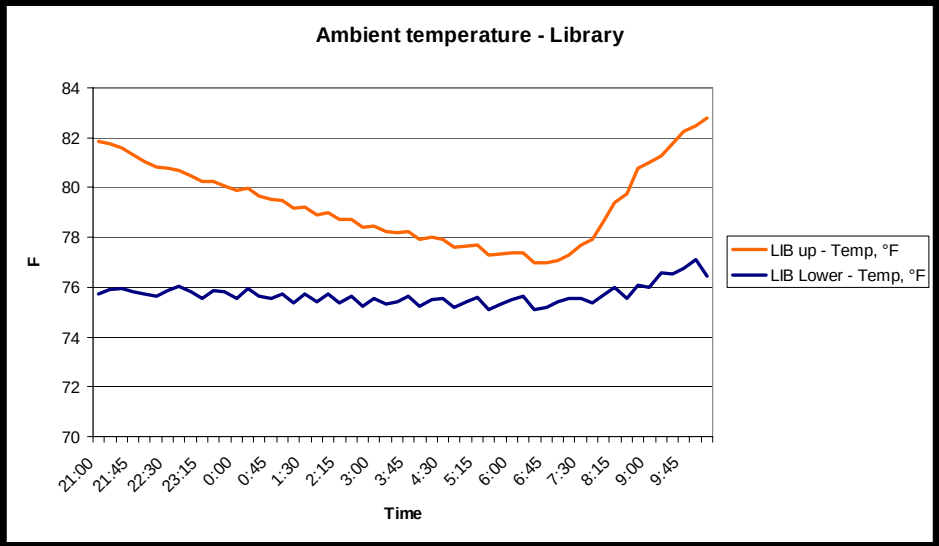
Data Analysis—Dining Hall

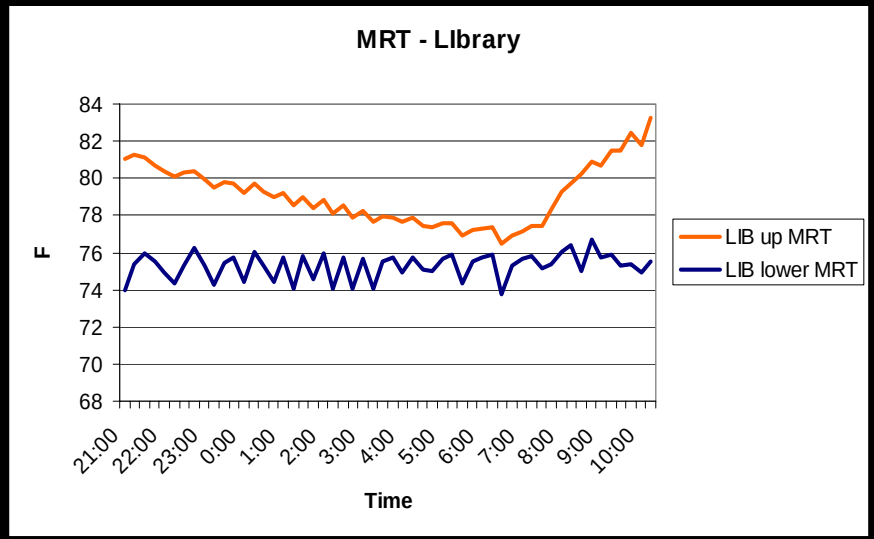


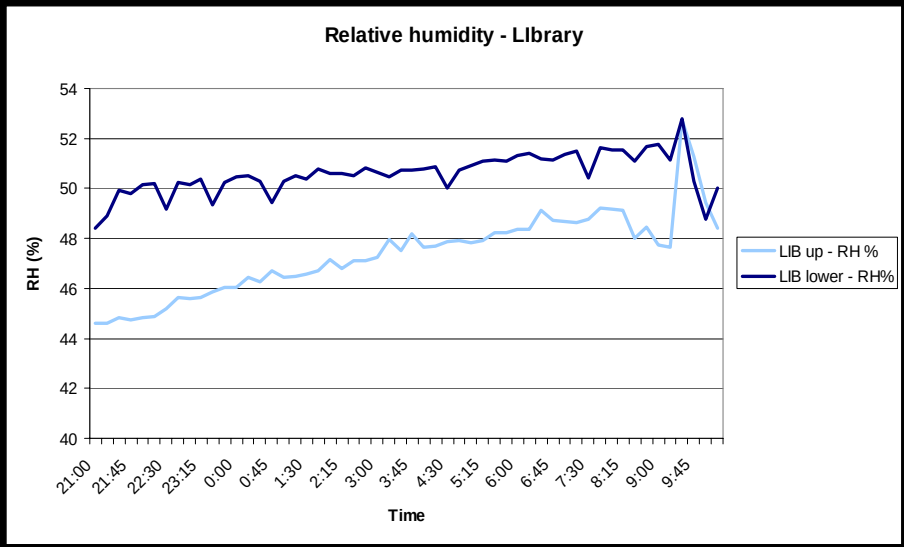




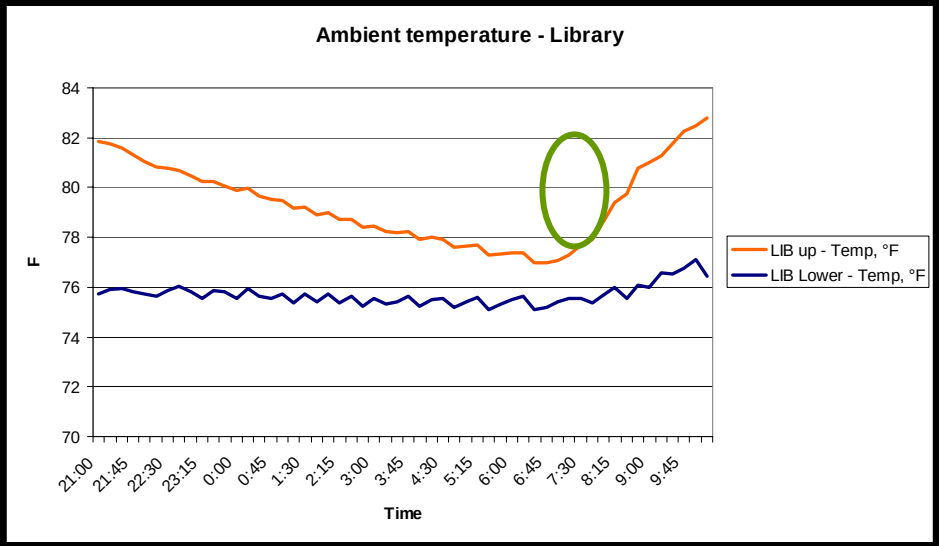
Data Analysis—Library

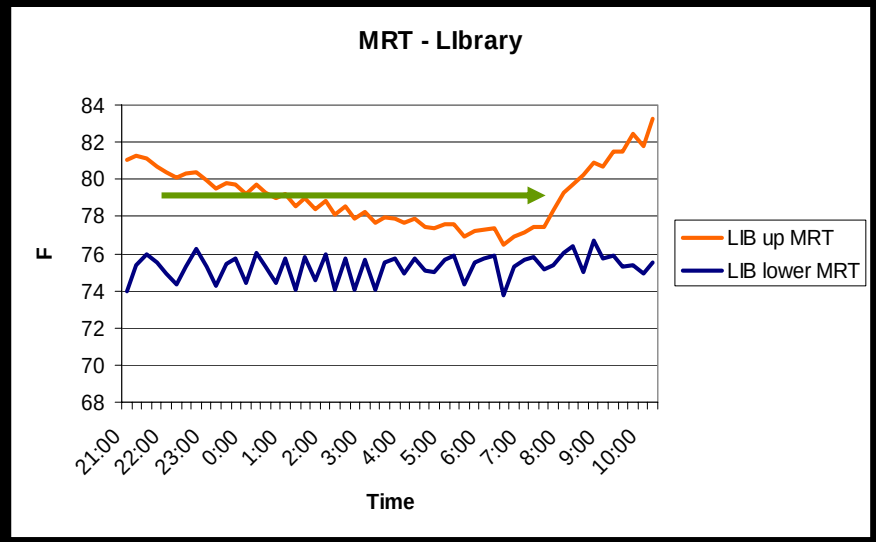


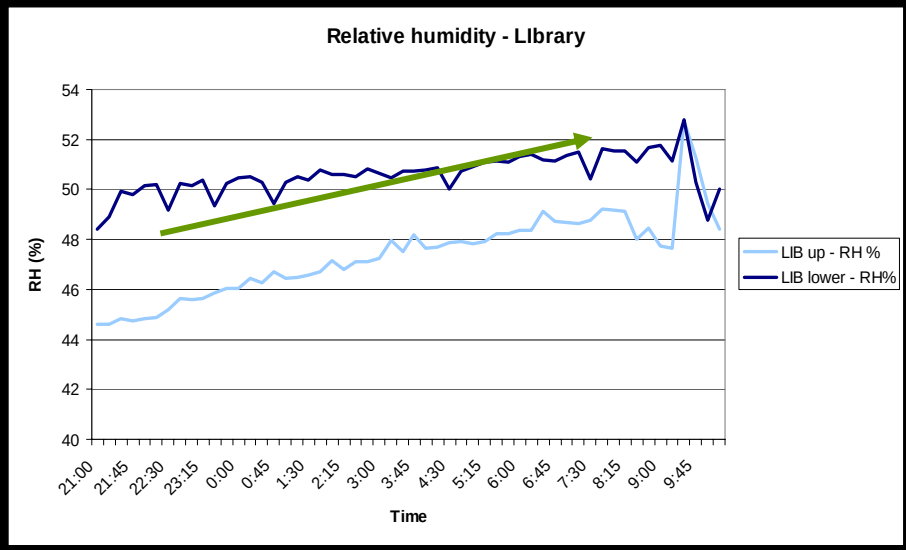




Data Analysis—Library







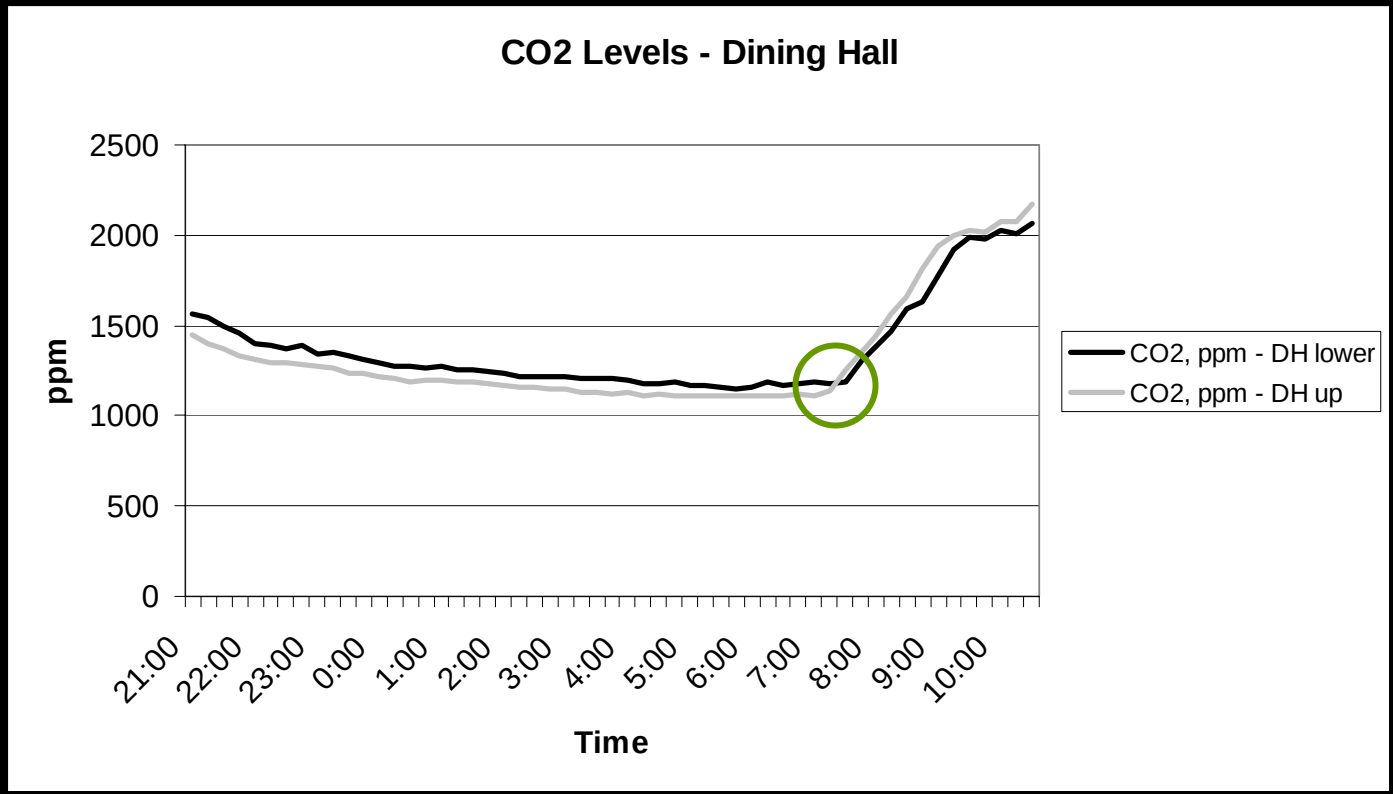
Conclusions

The loft (catbird) spaces in both the library and the dining hall had higher ambient (√) and mean radiant temperatures (√) with lower relative humidities (√) than the main levels of these buildings for the test period.

Factors

1. Air supply
2. Air movement
3. Building envelope
    - Insulation
    - Fenestration
    - Surface/volume ratios
4. Seasonal variation

Addendum


CO2 Levels - Dining Hall
2500
2000
1500
1000
500
0
ppm
21:00
22:00
23:00
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
Time
CO2, ppm - DH lower
CO2, ppm - DH up

Intrinsic motivation: Thermal discomfort.

Extrinsic motivation: Coal-fired thermo-electric power generation.

Tan Team: Catbird chill.

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Loft in the Library Hall: Blowing bubbles.

Loft in the Library Hall: Bubbles on the floor.