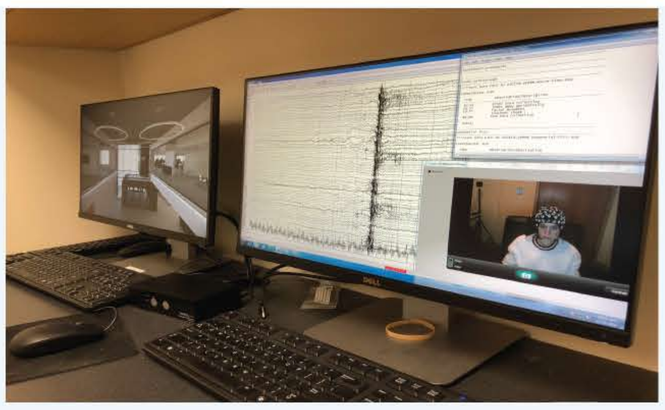
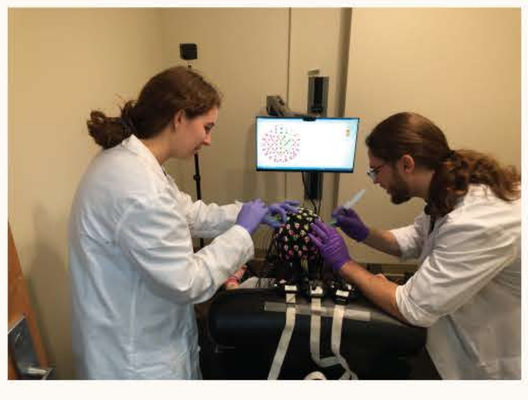
Nexus Between Sustainable Buildings and Human Health: a Neuroscience Approach



Stress
Engagement
Interest
Focus
Relaxation

Perception about a Built enviroment



Visual Connections
Daylight
Spatial Quality
Social Interaction

Virtual Reality

EEG Scan

Algorithm integration via API tool design and testing

Correlation between attributes (Pearson's value)

No correlation R Square value

Evaluation Framework and algorithm

VR Models

Entrance Lobby

Conventional Building

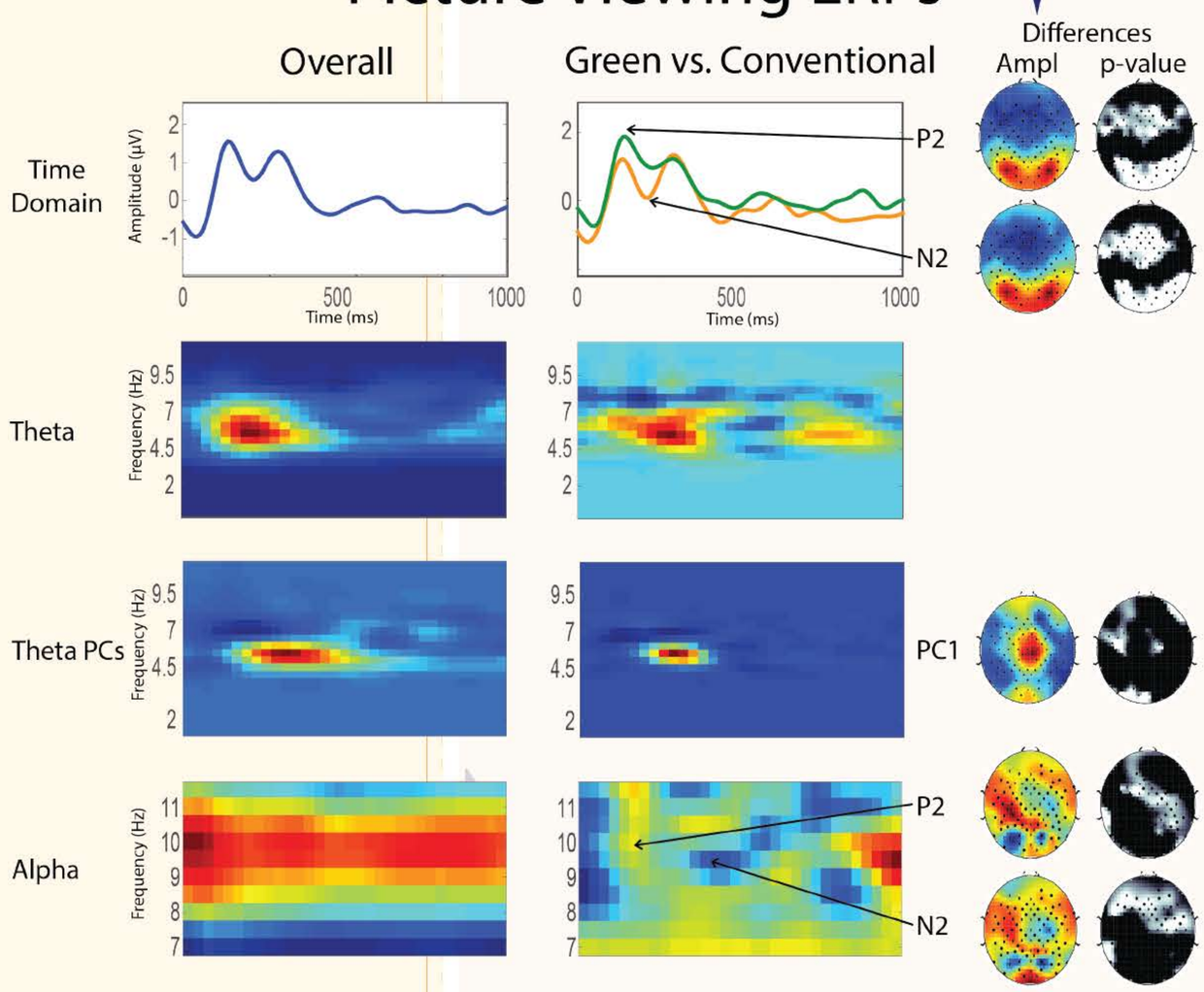
Green Building

Second Floor Office Space

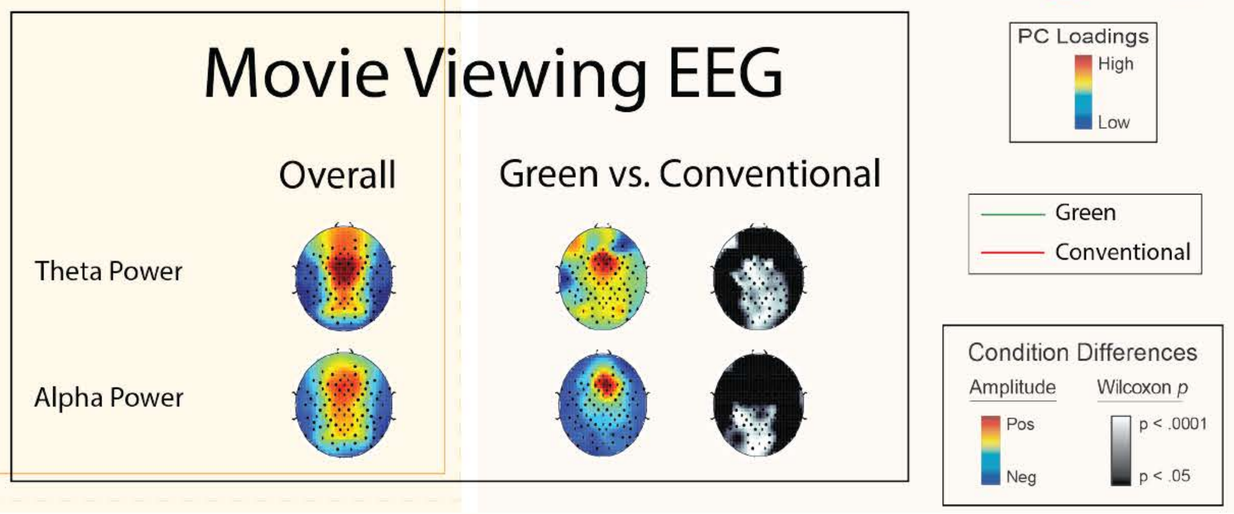
Conventional Building

Green Building

Picture Viewing ERPs



Movie Viewing EEG



Introduction: The goal of this research project is to develop, test, and validate a data-driven approach using virtual reality (VR) and electroencephalogram (EEG) technology for assessing the effect of architectural building design features on occupants' emotional and cognitive functions - proxies for mental health and wellbeing. The project will provide technology-enabled, repeatable measures for quantifying the "soft" benefits of building design features thus providing an economically viable and repeatable assessment model, pre-build.

Hypothesis: SBs, relative to CBs, produce positive mental health outcomes as measured by:

a. Increased engagement, involving orienting, attention, and arousal.
b. Increased focus, involving increased executive function.
c. Increases in interest, involving increased positive approach engagement.

Prelimary Conclusion:

- TD:
  - P2: for green buildings -- greater occipital, less medial-frontal
  - N2: for green buldings -- less occipital, and more medial frontal

TF-alpha

- Reduced P2 alpha for green buildings medial frontal
- Increased N2 alpha for green buildings, broadly frontal

In general, people are more engaged in the green building.

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