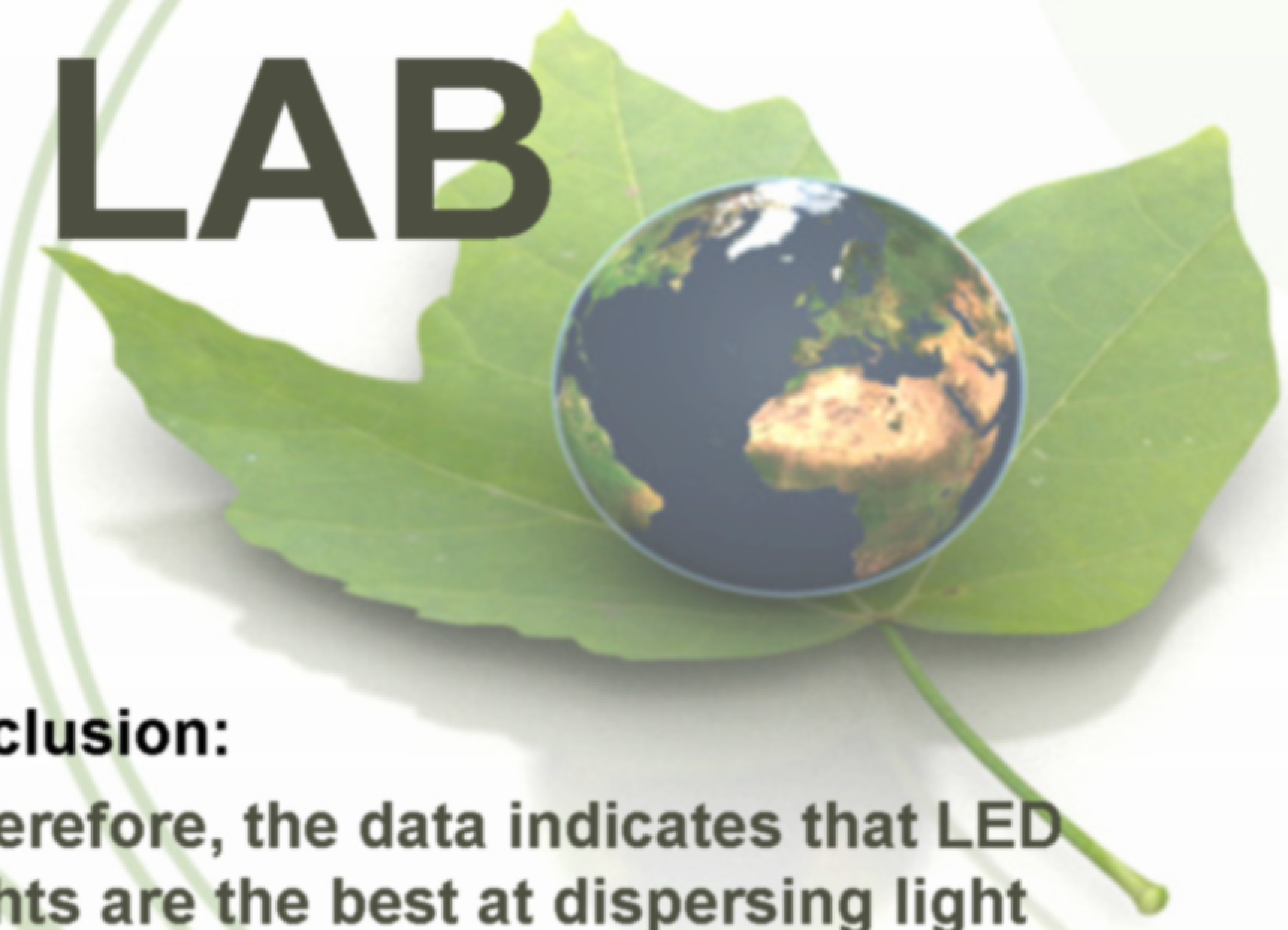


IPRO 337- ZERO ENERGY LAB



Lighting Sub-Team

Problem:

Lack of a proper lighting system to illuminate the space during non-daylight hours

Objective:

- Apply different materials to a small section of the lab in order to determine which scatters light most efficiently
- Compare different types of lights and determine which kind produces the highest light intensity and the lowest amount of wattage used in the small section
- Determine which light fixture worked with the angle of the ceiling and the applied material, to create the most amount of light intensity
- Use results from this small section in order to design a lighting system that will make the Zero Energy Lab usable at all hours of the day

Methodology :

- A model was created to simulate a nighttime setting of the Zero Energy Lab, which allowed for measurements of light intensity*
- Materials tested to disperse light: Photoluminescent Paint, Projection Screen, White Sheet, White Paint, White Paint and Glass Beads
- LED Light vs Fluorescent Light Fixtures
- Measured the light intensity created by each lighting unit with similar wattage
- Painted a section of the ceiling white and applied glass beads on another section
- Measured the light intensity of each section during a night time with different LED light fixtures

Obstacles:

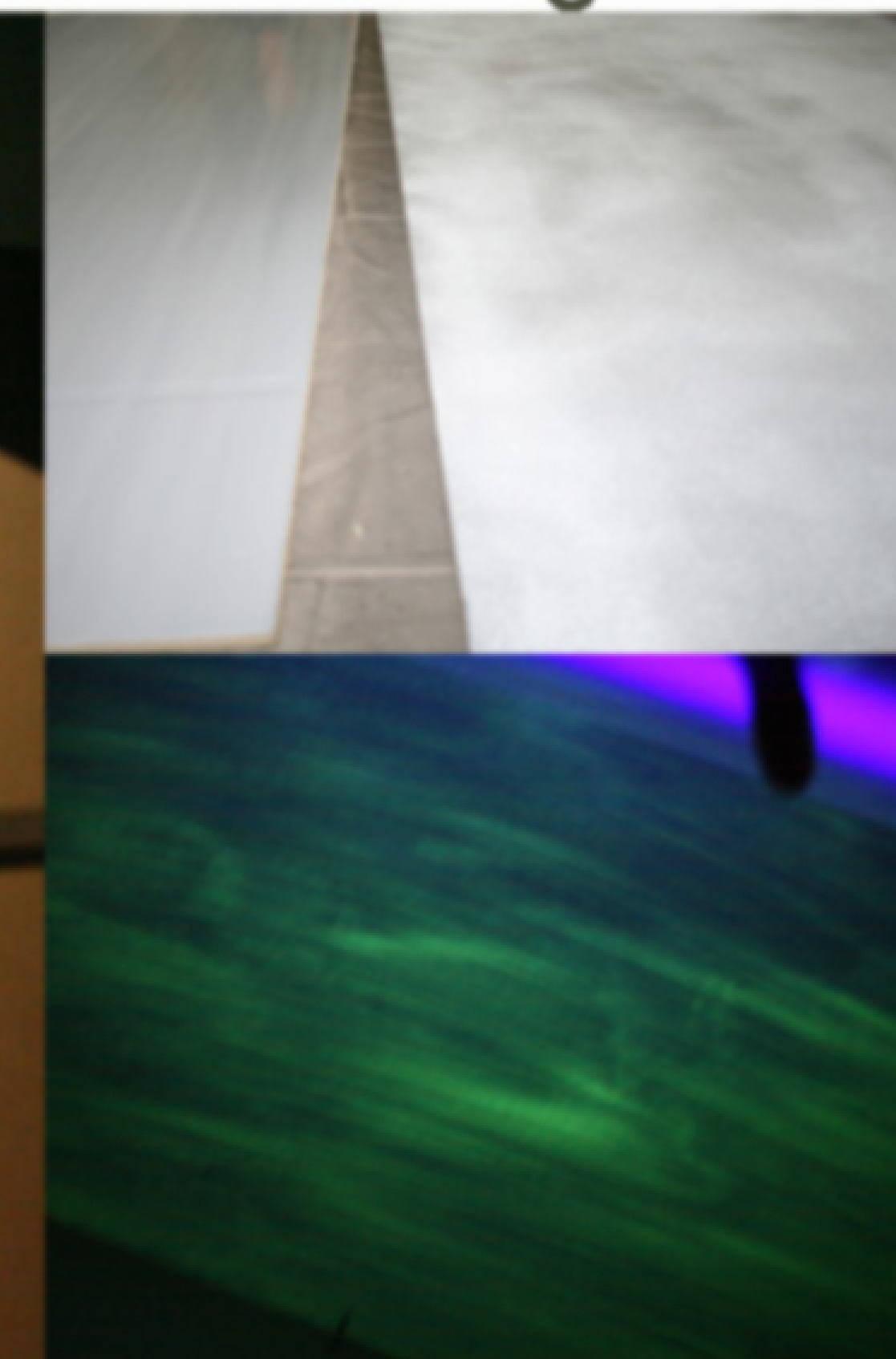
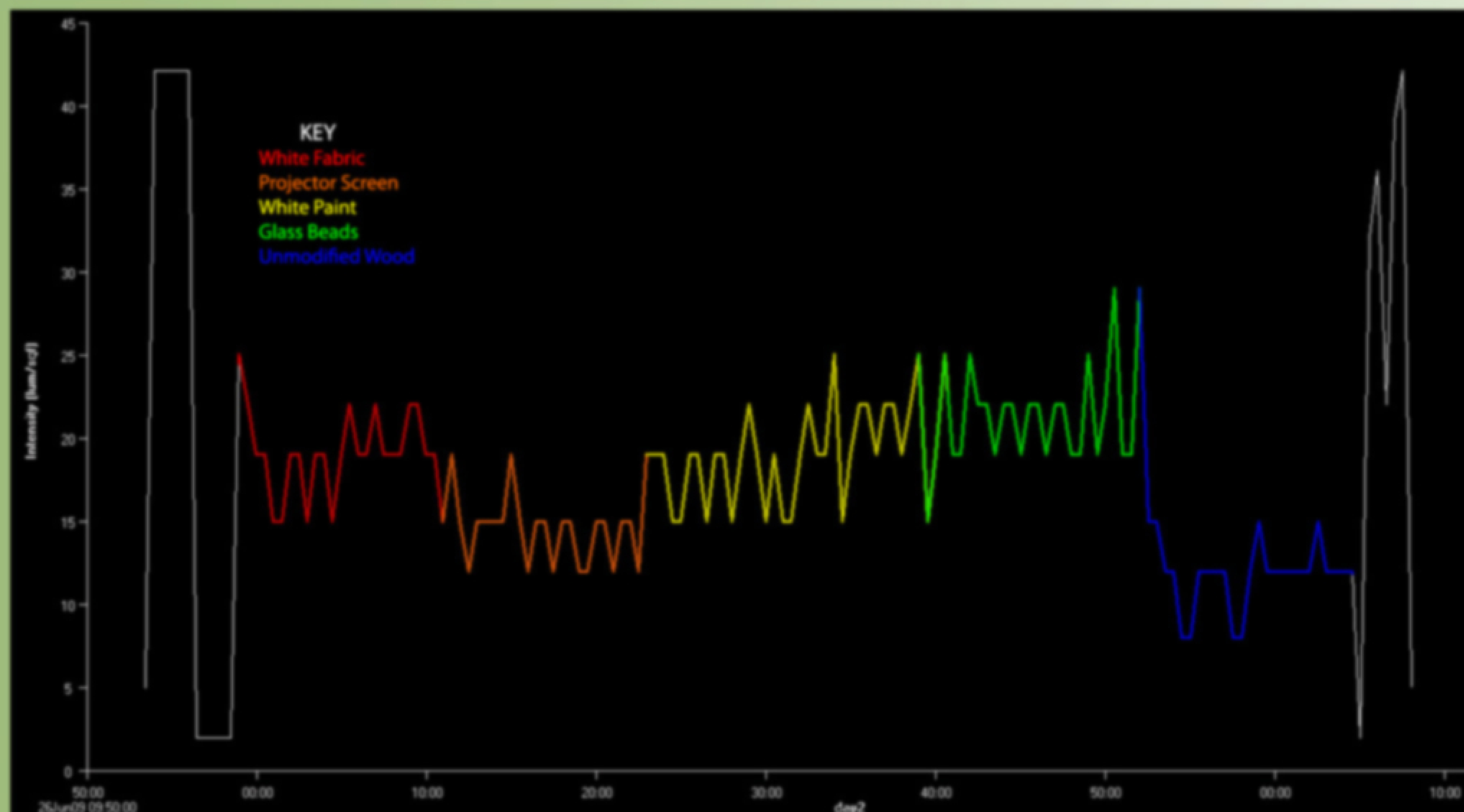
- Creating and transporting a model of the Zero Energy Lab ceiling
- Painting the ceiling due to the height
- Attaching the beaded board to the ceiling

Conclusion:

- Therefore, the data indicates that LED lights are the best at dispersing light when combined with the white paint and glass beads, providing maximum light intensity.

Future Goals:

- Determine which LED light fixture is the most energy efficient
- Modify the existing floor plan of the Zero Energy Lab to include a workable LED lighting system
- Include a light sensor and dimmer system
- Electrical wiring of the LED light fixtures
- Use DC energy from the battery bank
- Apply the materials determined from the test to the entire ceiling of the Zero Energy Lab



*Light intensity was measured in lumens per square foot using a HOBO device