

Wearable Light Logger to Facilitate Full Spectrum Light Dosing for Mood Disorders

Date: October 4th to October 10th, 2024

Client: Dr. Jean Riquelme

Advisor: Dr. Brandon Coventry

Team:

Molly Wilhelmson mwilhelmson@wisc.edu (Team Leader, BSAC)

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Problem Statement

Currently, there are no affordable wearable light-logging devices on the market. Full-spectrum light therapy has been proven to be successful in treating mood disorders, especially seasonal affective disorder, but patient response studies are lacking. A wearable allows for accurate representation of light intensities that reach the retina, the presumed site of action. A wearable light logger would provide convenient research into what correct dosages for optimal patient response look like for patients suffering from mood disorders.

Brief Status Update

Last week, we presented our preliminary presentation to our peers and advisors. Because of this, we weren't able to meet one-on-one with either our advisor or client. We are making progress on the preliminary report, but have gotten an extension on this assignment until Sunday night.

Summary of Weekly Team Member Design Accomplishments

- Team:
 - Presented our preliminary designs to our classmates and advisor
 - Made progress on our preliminary report

- Molly Wilhelmson:
 - Presented our preliminary designs to our peers and advisor
 - Obtained a comparator to use in our circuit design

- Ella Eklund:
 - Presented section of the preliminary presentation to advisor and classmates
 - Made progress on sections of the preliminary report
 - Received headlamp

- Neel Srinivasan:
 - Presented preliminary presentation with team
 - Soldered pin headers to raspberry pi pico
 - Started coding & researching code requirements for project

- Kate Briesemeister:
 - Presented the preliminary presentation to our advisor and other students
 - Ordered and received necessary circuit parts from Digikey
 - Made progress on the preliminary report

Weekly/Ongoing Difficulties

This was a busy week for our team. We made progress on our report, but need to meet to finalize our design and finalize the preliminary deliverables.

Upcoming Team and Individual Goals

- Team:
 - Decide on a final design, and begin fabrication
- Molly Wilhelmson:
 - Design the light sensing circuit with the components our team ordered
 - Experiment with resistor values and offsets to help our circuit output useful data
- Ella Eklund:
 - Finish the preliminary report
 - Assemble circuit board with assembled parts
 - Alter the design of the ordered headlamp for the project
- Neel Srinivasan:
 - Finish preliminary report
 - Continue coding & hopefully complete bulk of code
- Kate Briesemeister:
 - Finish the preliminary report

- Make a CAD model of the box the circuit components will sit in and then 3D print it
- Observe/assist as group members assemble circuit in order to become more familiar with the electric components of the project

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Meet with client	09/13	All	100%	Yes
→ Product Design Specification	09/20	All	100%	Yes
Preliminary Presentations	10/4	All	100%	Yes
Preliminary Deliverables	10/9	All	60%	No
Show and Tell	11/01	All		
Poster Presentations	12/06	All		
Final Deliverables	12/11	All		

Expenses

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
Component 1								
Happy Light	Light for testing sensor	Verilux	N/A	9/13/24	2	\$49.99	\$99.98	Link

Component 2								
Battery	Battery for chip	PGSONIC	CR2045	9/19/24	1	\$1.15	\$1.15	Link
Component 3								
Head Lamp	Light that attaches to head	Fire Supply Depot	FL8210-6SM D	9/26/24	1	\$11.92	\$11.92	Link
Component 4								
Raspberry Pi	Chip for coding	Raspberry Pi	Raspberry Pi Pico W	10/4/24	1	\$7.20	\$7.20	Link
Component 5								
Comparator	Building circuit	Texas Instruments	LM393PE4	10/4/24	2	\$0.25	\$0.50	Link
Component 6								
Battery Holder	Holder for coin battery	Digikey	BS-2450	10/4/24	1	\$3.84	\$3.84	Link
Component 7								
OPAMP	Building circuit	Digikey	AD8276ARZ	10/4/24	1	\$7.37	\$7.37	Link
Component 8								
IC DAC 12BIT V-Out	Building circuit	Digikey	MCP4726A0T -E/CH	10/4/24	3	\$6.48	\$6.48	Link

TOTAL:		\$138.44
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