

# 13 Portable Optogenetics Device for High School Neuroscience Outreach

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## Need

### User and Problem

High School students have minimal exposure to neuroscience due to curriculum constraints and cost barriers

### Limitations in Existing

Previous optogenetics setups are bulky, expensive, and difficult for classroom settings



## Objective

Develop an **accessible, portable, and cost-effective** optogenetics device to introduce neuroscience to high school students

## Design Inputs

### Constraints

**Durability** – Maintain rigid properties  
**Function** – Maintain previous design's function

### Requirements

- WEIGHT  $\leq$  **5.1 lbs**
- **360-degree** tether rotation
- Phone-to-fly focal distance **8-12cm**
- Assembly time  $<$  **8.3 minutes**
- Stability and durability for **repeated use**

## Component Details

### 1. Magnetic Tether System

Allows for full 360° rotational freedom of fly when tethered and mounted to device

### 2. Double Locking Lever System

Stabilizes phone to device when in use to avoid sway or movement during video capture

### 3. Background

Eliminates unwanted objects in the background that distort visualization of fly by sitting behind fly & rod

## Conclusion

The redesigned optogenetics is **portable, stable, and classroom-ready** which addresses prior issues of bulk, instability, and complexity. Key features like the magnetic tether, background, and double locking phone stand improve usability, visualization, and stability.

### Impact

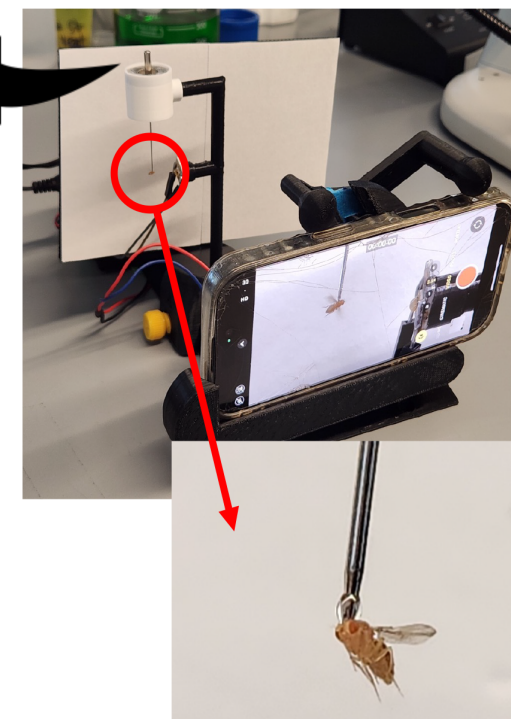
Enhances accessibility, reduces setup difficulty, and increases exposure to STEM careers.

### Revisions

Rework magnetic tether system  
Cleaner containment of wires

## Verification

Test	Description	Results
Weight	Device remains under 5.1 lbs	<b>PASS</b>
Tether Rotation	Rotation of fly reaches full 360° range	<b>FAIL</b>
Focal Distance	Distance within 8-12 cm for clear video image	<b>PASS</b>
Multiuse of Tether	Mount withstands 240 repeated mountings	<b>PASS</b>
Set-up Time	Set-up fully completed in $<$ 8.3 minutes	<b>PASS</b>
Maintain Old Functions	Maintain all previous team's requirements	<b>PASS</b>
Phone Stand Mobility	No angular deviation after 3.59 N	<b>PASS</b>
Phone Stand Stability	No sway of phone nor loss of focus during use	<b>PASS</b>



## Solution/Assembly

