



Development of Devices to Aid in the Study of Starvation-Sensitive Neurons

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The goal of my PURM project was to build and implement a Miniscope. A Miniscope is a miniature fluorescence microscope that can be mounted on a mouse's head to monitor neuron activity in real time, while the mouse is awake and moving around. The Miniscope is an open source project, with instructions, software, design files, and other resources provided online by a lab at UCLA.

While this was the main goal of my project, I also implemented another open source project, the Feeding Experimentation Device (FED). The FED is an Arduino-based mouse feeder that can be programmed to dispense certain amounts of food at certain times. The FED dispenses one pellet of food at a time and uses a sensor to determine when the mouse has taken the food. The FED also provides data about how much food was dispensed and at what time. This device can be used in many experiments related to feeding behaviors of mice.

Finally, I designed and built a device to head-fix mice, which will facilitate using and setting up the Miniscope.

Through my research experience, I learned some concrete skills, such as soldering, using Arduinos, and 3D modeling, but I also learned some softer skills too. Through building three different devices, each with a different level of complexity and a different level of instruction

and documentation, I learned to debug issues with both software and hardware. I also learned about the development process, and how to create new designs and improve on existing designs.

As a Bioengineering student, this research project helped me see the process of how a device is actually implemented, and helped me learn how to troubleshoot many different issues that can arise. It also gave me a hands-on way to implement some of the things I had learned in my classes.